

001

WITHDRAWN

003

EVALUATION OF A COMMUNITY-BASED INTERVENTION TO INCREASE BREAST CANCER SCREENING AND EARLY DETECTION AMONG LOW-INCOME, AFRICAN AMERICAN WOMEN. *I J Hall, C Johnson-Turbes, N Kamalu (Centers for Disease Control and Prevention, Atlanta, GA 30341)

Breast cancer is diagnosed at a later stage among African American women, thus timely mammography screening may be important. We evaluated a multimedia, pilot-campaign to increase awareness of breast cancer screening and utilization of no-cost mammography services provided by the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) among African American women in Savannah and Macon, Georgia. Using breast cancer survivor testimonials on radio stations with wide African American listenership (Black radio), the African American Women and Mass Media (AAMM) pilot campaign was launched in July 2008 in Savannah and Macon, Georgia. Savannah fielded a community-based component as well. Columbus, Georgia was used as a control site. Following the year-long campaign, receipt of mammograms among African American women in the three sites was evaluated using routine data collected by Georgia on the number, and outcomes, of screening mammograms delivered to low-income, uninsured or underinsured women through the NBCCEDP. In Savannah, the number of mammograms/month averaged 129 in the first 7 months of the campaign among African American women and increased to an average of 176 in the final months of the study; an increase of 36%. In Macon, monthly increases were not statistically significant. No change was observed in the control site. Our findings reveal the potential value of using Black radio combined with a focused community-based print campaign to reach African American women with public health messages, affect changes in knowledge, awareness, and behavioral intent, and potentially help reduce racial/ethnic health disparities.

002-S

CUTANEOUS MALIGNANT MELANOMA AMONG WHITE HISPANICS AND NON- HISPANICS IN THE UNITED STATES. *J Calvert, R M Merrill, N D Pace, and A N Elison (Brigham Young University, Provo, UT 84602)

Background: To explore whether disparities exist in melanoma incidence and prognosis between white Hispanics and white non-Hispanics. Methods: Analyses are based on 42,770 patients with malignant melanoma in the United States, 2004 through 2006. Results: Hispanics were significantly less likely to be diagnosed with superficial spreading melanoma or Hutchinson's melanotic freckle, but significantly more likely to be diagnosed with nodular melanoma or acral lentiginous melanoma. Hispanics were also significantly less likely to have multiple primary cancers and less likely to receive surgical treatment. Among those diagnosed during the study period, 12.4% (n = 142) of Hispanic patients and 8.5% (n = 3,235) of non-Hispanic patients died sometime during these years. Approximately 7.3% of Hispanic patients and 4.8% of non-Hispanic patients died specifically from melanoma. Later stage at diagnosis was the primary explanation for the difference in death from melanoma between Hispanic and non-Hispanic whites. Conclusions: Hispanic melanoma patients experience significantly poorer prognostic findings at diagnosis. The disparity in melanoma stage, tumor depth, and ulcerated tumors at diagnosis emphasizes the need for greater secondary prevention efforts among this group.

004

MALE BREAST CANCER—GEOGRAPHIC VARIATION IN THE UNITED STATES. Mridhula Kumar, Jessica B King, and Christie R Ehemann (Cancer Surveillance Branch, Division of Cancer Prevention and Control, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, GA)

Incidence of male breast cancer (MBC) continues to increase but due to its rarity, it remains an understudied disease. While there have been previous descriptive analyses on MBC, most of the findings have been based on limited data sets that may not be generalizable to the entire United States population. For our analysis of geographical variation and other risk factors for MBC, we used combined NPCR and SEER incidence data from 2004-2006 representing coverage of 100% of the US population. For our analysis on histologic distribution of MBC, we used combined data from more years, 1999-2006, where data are available for 87.7% of the US population. When compared to whites, incidence and mortality rates of MBC were significantly higher among Blacks and significantly lower among Asian/Pacific Islanders. Whites were more likely to be diagnosed at an early versus late stage; however, there was no significant difference between early and late stage diagnosis for Blacks and Asian/Pacific Islanders. Our study found a difference in incidence rates among the four geographical regions with rates being the highest in the South, in black men and men over the age of 80 years. Our paper presents an in-depth analysis of the demographic and geographic variation of male breast cancer incidence. Additional research should address the etiology of these geographical variations and possible reasons for differences in stage at diagnosis among racial groups. Variations in incidence rates in terms of race and stage of diagnosis support the need for increased study of male breast cancer.

005-S

DICHLORODIPHENYLTRICHLOROETHANE (DDT) AND RISK OF HEPATOCELLULAR CARCINOMA. *E C Persson, A A Evans, W T London, J P Weber, A LeBlanc, G Chen, W Y Lin, K A McGlynn (National Cancer Institute, Bethesda, MD 20852)

Dichlorodiphenyltrichloroethane (DDT) is an organochlorine pesticide known to cause hepatocellular carcinoma (HCC) in rodents. Whether DDT and its most persistent metabolite, dichlorodiphenyldichloroethylene (DDE), increase risk of HCC in humans is uncertain. To examine the hypothesis, we conducted a nested case-control analysis in a population at high-risk of HCC, the 90,836 person Haimen City Cohort. Serum samples and questionnaire data were collected 1992-1993. Hepatitis B viral status was determined at study enrollment by examination of hepatitis B surface antigen (HBsAg). The current study included 488 persons who developed HCC and 492 who did not. Non-cases were frequency matched to cases on gender, residential township and age. DDT/DDE levels were determined in baseline sera by mass spectrometry. Unconditional logistic regression, adjusted for age, gender, residential township and HBsAg, was used to estimate odds ratios (OR) and 95% confidence intervals (CI). The analysis found no significant association between DDT levels and HCC. Persons with DDE levels in the highest quintile, however, were at lower risk of developing HCC than persons with levels in the lowest quintile (OR = 0.66, 95%CI = 0.29-1.49). In men, but not in women, the relationship was statistically significant (OR = 0.44, 95%CI = 0.22-0.88), suggesting that there may be gender-specific differences in response to DDT/DDE exposure. Overall, these results do not support the hypothesis that DDT and DDE increase risk of HCC.

007

SEDENTARY BEHAVIOR AND PHYSICAL FUNCTIONING AMONG CANCER SURVIVORS. *S M George, C M Alfano, C E Matthews (National Cancer Institute, Bethesda, MD 20892)

While exercise has been shown to be beneficial in improving physical functioning among cancer survivors, evidence is limited on the independent role of sedentary behavior. We examined how sedentary behavior and patterns of sedentary behavior, fitness, and moderate-vigorous physical activity are associated with physical functioning. 3.5 years after completion of chemotherapy, 56 cancer survivors were enrolled into an exercise trial designed to improve cognitive function. At baseline, we measured sedentary behavior and moderate-vigorous physical activity with the ActivPal, cardiorespiratory fitness with treadmill testing, and physical functioning with questionnaires. In multivariate models, we regressed physical functioning linearly on sedentary behavior, and joint variables reflecting % time in sedentary behavior (lower: < 70; higher: \geq 70), hours of physical activity (lower: < 0.5; higher: \geq 0.5), and max-METS of fitness (lower: < 6; higher: \geq 6). Sedentary behavior was inversely related to overall physical functioning ($\beta = -0.41$, $p = 0.06$) and abilities to climb several flights of stairs ($\beta = -0.02$, $p = 0.03$) and walk several hundred yards ($\beta = -0.02$, $p = 0.03$). Compared to survivors with higher fitness and lower sedentary behavior, survivors with lower fitness and higher sedentary behavior had poorer physical functioning ($p = 0.02$). Survivors with higher physical activity and higher sedentary behavior had worse physical functioning than survivors with higher physical activity and lower sedentary behavior ($p = 0.009$) and survivors with lower physical activity and lower sedentary behavior ($p = 0.03$). In this cross-sectional study of cancer survivors, certain behavioral patterns characterized by lower sedentary behavior were related to better physical functioning.

006

SOCIAL AND CLINICAL PREDICTORS OF PROSTATE CANCER TREATMENT DECISIONS AMONG MEN IN SOUTH CAROLINA. *S E Wagner, B F Drake, K Elder, and J R Hébert (UGA, Athens, GA 30602)

Insufficient evidence exists to recommend one prostate cancer (PrCA) treatment over another. Therefore, the decision of treatment type is usually influenced by a number of idiosyncratic factors. This cross-sectional study assessed the social and clinical influences of PrCA treatment decisions among White and Black men with PrCA in the Midlands of South Carolina (SC). We identified men diagnosed with PrCA (1996-2002) from the SC Central Cancer Registry (SCCCR), and linked data from the survey with clinical and sociodemographic factors identified in the SCCCR. The relationship between social (physician, family/friend, self) and clinical (cure, impotence, incontinence, pain) influences and treatment decision (surgery versus radiation) was modeled using logistic regression. Interaction by race was considered. A total of 435 men were evaluated. Men of both races who chose surgery were more likely to be influenced by family/friends (overall odds ratio (OR): 2.64; 95% confidence interval (CI): 1.35, 5.14), and Black men who chose surgery were more likely to make independent decisions (OR: 5.35; 95% CI: 1.22, 23.60) compared to Black men who chose radiation. White men who chose surgery were more likely to be influenced by the chance of cure (OR: 2.20; 95% CI: 1.07, 4.55) and less likely to consider the side effects of impotence (OR: 0.40; 95% CI: 0.18, 0.88) and incontinence (OR: 0.27; 95% CI: 0.12, 0.63) as important decision factors; no clinical side effects significantly predicted a treatment choice among Black men. Our results suggest that both clinical and social predictors play an important role for men in choosing a PrCA treatment, but these influences may differ by race.

008-S

ANATOMIC-SITE IMPACTS OF BETEL-QUID, COUPLED WITH ALCOHOL AND CIGARETTE ON DIGESTIVE TRACT CANCERS. *C L Chang, H C Tu, KW Lee, D C Wu, F M Fang, W T Lin, Y C Ko, C H Lee (Kaohsiung Medical University, Kaohsiung 807, Taiwan)

Betel-quin (BQ) is the fourth-most widespread psychoactive substance in the world, and is regularly consumed by about 600 million users worldwide. Unlike in India and certain Southeast Asian countries, the various additives used in the preparation of BQ in Taiwan do not contain tobacco. BQ chewers in Taiwan often also consume cigarettes and/or alcohol. Such particular epidemiological characteristics allow us to study the independent and joint risks of these substance uses on the genesis of diverse sites of digestive tract cancer. We conducted a multicenter case-control study examining 2163 pathology-proven upper aerodigestive tract (UADT) and gastrointestinal tract (GIT) cancer patients, and compared them with 2250 control subjects. Polytomous logistic regression was employed in multivariate analyses, and the generalized additive model was applied to identify possible curvatures in the exposure-risk relationship. The cancer impacts of alcohol, BQ and cigarette use varied according to anatomic digestive tract sites, with the peak risk observed, respectively, in the esophagus (aOR = 9.0), oral cavity (aOR = 16.8) and larynx (aOR = 5.4). Along the UADT down to GIT, a 16.8, 7.8, 2.6 and 1.9-fold significant oral, pharyngeal, esophageal (digestive tracts) and laryngeal (airway) squamous cell carcinoma risk, and a 0.9 and 1.0-fold non-significant gastric and colorectal adenocarcinoma risk were, accordingly, discerned among BQ uses. Alcohol drinking supra-additively modified the risk of chewing and smoking in determining the development of UADT-specific neoplasms. 82-89% of UADT cancers were attributable to combined exposure to the three agents, but only 16-27% for GIT cancers. In conclusions, anatomic-site gradients of digestive tract cancer risks indicate that the degree to which squamous epithelia are in direct physical contact with BQ-derived compounds discernibly affects its impact on these neoplasms.

009-S

COFFEE AND TEA CONSUMPTION AND COLORECTAL CANCER RISK. J Mix, K Kasza, K B Moysich (Department of Social and Preventive Medicine, University at Buffalo, Buffalo, NY 14214)

Coffee and Tea are a major source of antioxidants which may be protective against colorectal cancer. Epidemiologic findings on this topic are inconsistent. We examined the association between consumption of coffee and tea and of colorectal cancer risk in a case control study of patients admitted to Roswell Park Cancer Institute (RPCI) in Buffalo, NY between 1982 and 1998. The study population included 1011 incident, pathologically confirmed colorectal cancer patients and 4038 controls who received medical care at RPCI for non-benign or malignant conditions. Participants completed a questionnaire as part of their admission process that included a section assessing usual intake of regular coffee, decaffeinated coffee, and black tea. Data on demographics, lifestyle factors and other potential confounders were also collected. Odds ratios (OR) and 95% confidence intervals (95%CI) were calculated using unconditional logistic regression adjusted for age, sex, decade of participation, race, body mass index, years of education, family history of colorectal cancer, red meat intake and multivitamin use. No overall associations were observed with colorectal cancer and consuming 4 or more cups of coffee (OR = 0.92; 95%CI = 0.74-1.14) or decaffeinated coffee (OR = 1.02; 95%CI = 0.77-1.36). An increased risk was observed with consuming 4 or more cups of black tea (OR = 1.36; 95%CI = 1.01-1.83). After stratification by sex and tumor site, this association was limited to colon cancer risk among males (adjusted OR = 1.79, 95%CI = 1.12-2.88). Further research is warranted on how the chemical composition of black tea may affect colorectal cancer risk.

011-S

PERFORMANCE OF MOBILE UNITS OF THE QUEBEC BREAST CANCER SCREENING PROGRAM, 2002-2009. A M Fontenoy, *A Langlois, P Ladouceur Kègle, E Pelletier, J Brisson (Institut National de Santé Publique du Québec, Québec, Canada G1V 5B3)

Background: The Quebec Breast Cancer Screening Program includes three Mobile Units (MU) since 2002. They were added to Fixed Centers (FC) to improve breast screening access. The aim of this study was to estimate the contribution of these MU to the participation rate and to assess their performance. Methods: The impact of MU on the participation rate was evaluated for 2002-2009. Performance measures include abnormal call rate, cancer detection rate and positive predictive value. The performance of MU was compared with that of FC by multivariate logistic regression models. Results: Between 2002 and 2009, 1,976,956 mammograms were performed in the program, including 37,079 (1.9%) by MU. The MU contribution to participation rate increased from 0.5% in 2002 to 2.5% in 2009. In 2009, in areas served only by MU, they accounted for 93.4% of the participation rate. In areas served by MU and FC, the abnormal call rate of MU was lower than that of FC (Odds Ratio = 0.73, 95% confidence interval [CI] 0.70-0.76). However, cancer detection rate and positive predictive value of MU were not significantly different from those observed in FC (Odds Ratio = 0.95, 95% CI 0.73-1.22 and 1.18, 95% CI 0.90-1.55 respectively). Conclusion: The contribution of MU to the participation rate in this North American program has increased since 2002 and has been essential in areas only served by MU. MU have an abnormal call rate lower than FC but their cancer detection rate and their predictive positive value were not significantly different from those of FC.

010-S

BODY MASS INDEX AND RISK OF HEAD AND NECK CANCER BY RACE. *J L Jensen, M M Gaudet, and A F Olshan (The University of North Carolina at Chapel Hill, Chapel Hill, NC 27599)

Most previous studies have found the risk of head and neck cancer (HNC) is increased among lean people (body mass index (BMI) < 18.5 kg/m²) and decreased among overweight or obese people (BMI 25.0- < 30.0 and ≥ 30 kg/m², respectively) compared to normal weight people (BMI 18.5- < 25.0 kg/m²). However, many recent studies of HNC were conducted in populations of European ancestry and have not allowed assessment of the BMI-HNC relationship by race. The Carolina Head and Neck Cancer Study (CHANCE) is a racially-diverse (23% African American) case-control study of 1,340 incident HNC cases and 1,378 population-based, frequency-matched controls, conducted throughout North Carolina (2002-2006). BMI was based on self-reported adult height and weight one year prior to interview. Odds ratios (ORs) and 95% confidence intervals (CIs) were estimated for associations between BMI and HNC risk stratified by race and adjusted for matching factors (age and sex), pack-years of smoking, lifetime alcohol consumption, and education. Multiplicative interaction between BMI and race was evident (p = 0.001). Compared to normal weight, ORs (95% CIs) for leanness were increased for African Americans (3.48, 0.66-18.28) and Caucasians (1.68, 0.66-4.28). The increased risk associated with leanness was greater for smokers than non-smokers and greater for men than women. For overweight and obesity, the ORs were lower, compared to normal weight, in African Americans (0.49, 0.30-0.79 and 0.42, 0.25-0.70, respectively) but not Caucasians (0.98, 0.77-1.26 and 1.22, 0.93-1.60, respectively). These data provide support that leanness increases the risk of HNC in African-Americans and Caucasians and overweight and obesity decreases the risk of HNC in African Americans.

012

RISK OF RENAL CELL CARCINOMA IN RELATION TO BLOOD LEUKOCYTE TELOMERE LENGTH IN A POPULATION-BASED CASE-CONTROL STUDY. *J N Hofmann, A Baccarelli, K Schwartz, F G Davis, J J Ruterbusch, M Hoxha, B J McCarthy, S A Savage, S Wacholder, N Rothman, B I Graubard, J S Colt, W H Chow, M P Purdue (National Cancer Institute, Bethesda, MD 20892)

Introduction: There are few known risk factors for renal cell carcinoma (RCC). Two small hospital-based case-control studies suggested an association between short leukocyte telomere length and increased risk of RCC. Methods: We conducted a large population-based case-control study in two metropolitan regions of the United States. Relative telomere length was measured by quantitative PCR in DNA derived from peripheral blood leukocytes from 891 RCC cases and 894 controls. Odds ratios and 95% confidence intervals were estimated using unconditional logistic regression. Results: Median telomere length was 0.85 for both cases and controls (p = 0.4), and no consistent differences in risk of RCC by quartiles of telomere length were observed. Among controls, telomere length was inversely associated with age (p < 0.001) and was significantly longer among African Americans (p < 0.001) after covariate adjustment. A borderline significant association between history of hypertension and shorter telomere length was also observed (p = 0.07). Conclusions: These data do not support the hypothesis that leukocyte telomere length is associated with RCC risk. Findings of shorter telomere with increasing age and history of hypertension are consistent with previous reports, which supports the validity of these data. Reported differences in telomere length by race have been inconsistent in previous studies and additional research is needed to confirm these findings. Prospective studies are needed to further evaluate the relationship between telomere length and RCC risk.

013-S

REGIONAL VARIATION IN HISTOPATHOLOGY-SPECIFIC INCIDENCE OF INVASIVE CERVICAL CANCER AMONG PERUVIAN WOMEN. *C Pierce Campbell, M P Curado, S Harlow, and A Soliman (University of Michigan, Ann Arbor, MI 48109)

This study aimed to evaluate cervical cancer patterns in Peru by examining the variation in two common histopathologic types, squamous cell carcinoma (SCC) and adenocarcinoma (ADC), and analyzing differences over time. Data on invasive cervical cancer incidence was obtained from three population-based cancer registries in Peru: Lima, Arequipa, and Trujillo. A cervical cancer-specific quality assessment was performed on each registry. Crude and age-specific incidence rates per 100,000 were calculated for overall, SCC- and ADC-specific cervical cancers, and time trends analyzed. Lima and Trujillo demonstrated acceptable data quality; however, Arequipa was questionable. Incidence rates for overall cervical cancer were significantly different across registries: Arequipa (47.2), Trujillo (36.1), and Lima (18.9). Rates for SCC were significantly lower in Lima (14.0) as compared to Arequipa (29.7) and Trujillo (30.0). Rates for ADC did not differ significantly across registries. Time trend analyses showed significant declines in overall and SCC-specific rates in Trujillo. No other time trends were found. Age-specific analyses showed that young women (15-29 years) in Trujillo and Arequipa experienced significant increases in ADC-specific rates over time. Cancer registry data showed that overall and histopathology-specific cervical cancer incidence rates varied across regions of Peru, and over time. The use of cancer registry data proved to be an efficient method for evaluating cervical cancer incidence patterns in Peru. We suggest supplementing current screening methods with newer preventive methods to combat the rising incidence of ADC among young women in Peru.

015-S

TP53 GENE POLYMORPHISMS, GENE-GENE AND GENE-ENVIRONMENT INTERACTIONS AND COLORECTAL CANCER RISK IN A CHINESE POPULATION. *Yin-yin Wu, Ming-juan Jin, Shan-chun Zhang, Kun Chen (Department of Epidemiology & Health Statistics, School of Public Health, Zhejiang University, Hangzhou, Zhejiang 310058, China)

The tumor protein 53 gene (TP53) encodes a transcription factor which exerts multiple anti-proliferative functions. Genetic variations in TP53 gene are common in many cancers and may be associated to the etiology and molecular pathogenesis of some human cancer. We examined whether the single nucleotide polymorphisms (SNPs) within TP53 gene affect the risk of colorectal cancer (CRC) and whether there are gene-gene or gene-environment interactions. Eight SNPs of the TP53 gene (rs12951053, rs9895829, rs1042522, rs2078486, rs8064946, rs17884306, rs12947788 and rs1642785) were assessed in a population-based case-control study which enrolled 504 cases and 845 controls from China. Gene-gene and gene-environment interactions were further investigated by classification and regression tree (CART) and logistic regression (LR) models. None of the investigated polymorphisms were significantly associated with CRC risk. However, the haplotype analyses showed that the haplotype ATCTCCCC was associated with a significantly decreased risk of CRC when compared with the most common haplotype ATCTGCCC (OR = 0.7; 95% CI = 0.5-0.9). Additionally, both CART and LR analyses indicated a gene-gene interaction between rs1042522 and rs1642785 polymorphism and the ORinteraction was 3.1 (95% CI = 1.6-5.8) obtained from the LR model. Besides, both CART and LR analyses indicated gene-environment interactions between reference age and rs1642785 as well as rs12951053 polymorphism, and the ORsinteraction were 1.9 (95% CI = 1.2-3.2) and 2.3 (95% CI = 1.0-5.2), respectively. Our findings indicated that the polymorphisms in the TP53 gene might have a joint effect to the susceptibility of CRC, and the gene-age interactions also play important roles in the susceptibility to CRC. Keywords: TP53; Single nucleotide polymorphism; Colorectal cancer; Molecular epidemiology

014-S

ASSOCIATION BETWEEN DIABETES AND COLORECTAL CANCER RISK IN A HOMOGENEOUS CANADIAN POPULATION. *Lin Liu, Jinhui Zhao, Yun Zhu, Barbara Roebothan and Peizhong Wang (Memorial University of Newfoundland, St. John's, Newfoundland, Canada A1B 3V6)

The great similarity in lifestyle and environmental risk factors for the development of CRC and diabetes mellitus HAS led to the hypothesis that diabetes may increase the risk of colorectal cancer. While most epidemiological studies have shown a positive association between diabetes and CRC, findings around the strength of the association and possible sex-diabetes interaction on CRC –have been inconclusive. This study used the data collected from a population based case-control study conducted in NL based on 673 cases diagnosed between 1999 and 2003 and 718 controls. CRC patients were identified through the Newfoundland Cancer Registry. Controls were recruited through random-digit dialing. Cases and controls were frequency-matched by age and sex. Diabetes was based self-reporting. ORs and the corresponding 95% CIs were derived from multivariate logistic regression analyses, including age, sex, and so on. Results show a statistically significant association between diabetes and CRC with an adjusted OR of 1.67 (95% CI: 1.23 - 2.26). Other significant predictors include: education attainment, income level and marital status. Sex-stratified logistic regression analyses suggest the association between diabetes and CRC seems to be greater in men than in women. However, the SEX difference was not significant. The preliminary results show a significant increased risk of colorectal cancer among those who had diabetes compared with those who did not after controlling for other potential risk factors. The findings do not support results from previous studies that females with diabetes have a greater risk of CRC than their male counterparts.

016-S

JOINT EFFECTS OF ALCOHOL INTAKE AND OBESITY ON COLORECTAL CANCER – RESULTS FROM A POPULATION BASED CASE-CONTROL STUDY IN NEWFOUNDLAND AND LABRADOR. *Y Zhu, J Zhao, L Liu, P Campbell, and P Wang (Memorial University of Newfoundland, St John's, Newfoundland, Canada A1B 3V6)

Background: While the effects of alcohol intake and obesity on colorectal cancer have been extensively examined, no studies have investigated the joint effects of the two factors. The objective of this study is to assess the relationship between alcohol intake and CRC, and the joint effects of alcohol intake with obesity. Methods: Newly diagnosed CRC cases identified between 1999 and 2003 were frequency-matched by age and sex with controls selected from the residents of Newfoundland and Labrador through random digit dialing (RDD). A total of 702 cases and 717 controls consented to participate in the study and completed a set of self-administered questionnaires. Measures of alcohol intake include types of beverage, years of drinking, and drinks daily. Odds ratios for drinking were estimated by obesity in order to investigate the modifying effects of obesity on the association between alcohol intake and CRC. The joint effects of drinking years and drinks daily, and drinking and smoking on CRC were analyzed by obesity. Results: There was a 1.89 times increased risk of CRC for alcoholic drinkers compared to non-drinkers among the obese (BMI ≥ 30). Drinkers who drank two or more types of beverage had 2.24 times increased risk of CRC compared to non-drinkers among the obese. The risk of CRC increased with drinking years and drinks daily among the obese. Conclusion: A synergistic interaction effect on CRC was found between alcohol drinking and obesity. The risk of alcohol drinking on CRC was significantly higher among obese people than that in non-obese people.

017

TOP 10 CANCERS IN I.R.IRAN 2005-2009. *Modirian M (MD, DrPH), Partovipour E (MS), Ramezani R (Internist MD), Etemad K (MD) (Non Communicable Diseases Center, Tehran, I.R.IRAN)

In Iran cancer is the third cause of mortality after injuries and cardiovascular diseases. National cancer registry system in Iran is established from 2002. Every year there is about 80000 cases. Every cancerous tissue separated by surgical or non surgical procedure based on International Classification of Diseases for Oncology (ICDO third edition) collect from pathologic laboratories in all provinces and some population cancer registry data, after checking data transfer via soft ware to Communicable Diseases Centers for final correction, data analysis and annual national cancer report establish and disseminate. Reports includes age specific incidence rates of primary tumor sites according to sex, age groups, provinces and topographic sites of tumor based on ICDO3. Assessment of Iran annual national cancer reports determines that the 10 top cancers are: skin, stomach, breast, colorectal, bladder, esophagus, hematopoietic system, prostate, lymph nodes and lungs with differences in ranking based on incidence in males and females during 2005 until 2009. The first cancer is breast cancer in females but skin in males and colorectal cancer in males is the fifth but in females the third one during the years above and lung cancer isn't in top 5 cancers. references: 1. National cancer report of I.R.IRAN/2011

018

RACIAL/ETHNIC DIFFERENCES IN UPPER-TRACT UROTHELIAL CANCER. M Hosain, M Khan, G Amiel, S Lerner, D Latini, J Chen (Baylor College of Medicine, Houston, TX)

Introduction and Objective: Racial/ethnic differences in demographics, cancer stage, treatment and outcome have been observed for bladder and many other cancer sites. However, data on upper-tract urothelial carcinomas (UTUCs) involving the renal pelvis and ureter are scarce. Methods: We used a population-based Surveillance, Epidemiology, and End Results (SEER) database from 1988-2007 in the analysis. Race/ethnicity was classified as white, African American (AA) Hispanics. The study subjects diagnosed with UTUCs were ascertained by ICD-9 codes. We compared racial/ethnic differences in UTUC by gender, age at diagnosis, tumor size, disease stage, lymph node-related data and survival. Kaplan-Meier model and Cox proportional-hazards model was used for disease-specific survival and hazard ratio respectively. Results: We identified 17,074 UTUC cases in the SEER database from 1988-2007. AA patients were diagnosed at a younger age than whites and Hispanics ($p = .004$). Whites were less likely to be diagnosed with distant-stage disease ($p < .001$), whereas Hispanics were more likely to be diagnosed with larger tumor size ($< .0001$). No racial/ethnic differences were observed either in lymph-node removal or in finding a positive node. A higher mean number of lymph nodes were removed from Hispanics (6.0) compared to whites (4.8) and AAs (5.3), and it was marginally significant ($p = 0.07$). Cox proportional-hazard model revealed that Hispanics and AAs had a higher risk of dying ($HR = 1.26$, 95% CI = 1.12-1.43, $p = .0002$ and $HR = 1.10$, 95% CI = 0.93-1.27, $p = .27$, respectively) from UTUC than whites. Conclusions: We observed racial/ethnic differences in UTUC cancer-stage distribution and survival. While no differences were observed for lymph node dissection/examination, we observed that only a small proportion of patients received lymph node dissection across all racial/ethnic groups.

019-S

BREAST CANCER DETECTION AND SURVIVAL AMONG WOMEN WITH COSMETIC BREAST IMPLANTS: A SYSTEMATIC REVIEW AND META-ANALYSIS. *E Lavigne, J Brisson, S Y Pan, E Holowaty, K C Johnson and H Morrison (URESP, Laval University, Quebec, QC, Canada)

Cosmetic breast implants impair visualization of breast tissue at mammography and, consequently, may delay detection of breast cancer. The aims of our two meta-analyses were to assess the relation of breast implants to delayed detection of breast cancer, and the relation of implants to survival after diagnosis. Studies were identified through a systematic search of the literature. Delayed detection of breast cancer was defined as breast tumors with positive lymph nodes. Survival was evaluated in terms of breast cancer-specific mortality. Summary odds ratio (OR) for delayed detection of breast cancer, and summary hazard ratio (HR) for survival following diagnosis, along with 95% confidence intervals (CI) were computed via random effects models. Our first meta-analysis using a pooled effect of 11 studies showed that cosmetic breast implants are associated with a delayed detection of breast cancer (Overall OR: 1.38, 95% CI: 1.15, 1.66). Our second meta-analysis of 4 studies suggests that breast implants may be associated with a slight increase in breast cancer-specific mortality after diagnosis but the observed effect is not statistically significant (Overall HR: 1.26, 95% confidence interval (CI): 0.87, 1.82). Accumulating evidence indicates that cosmetic breast implants are associated with a delayed detection of breast cancer. Further studies are warranted regarding survival following breast cancer diagnosis among augmented women.

020

RACIAL VARIATION IN BREAST CANCER TREATMENT AMONG DEPARTMENT OF DEFENSE BENEFICIARIES. *L Enewold, J Zhou, K A McGlynn, W Anderson, C D Shriver, J F Potter, S H Zahm, K Zhu (United States Military Cancer Institute, WRAMC, Washington, DC 20307)

Although the overall age-adjusted incidence rates for female breast cancer are higher among whites than blacks, mortality rates are higher among blacks. Many attribute this discrepancy to disparities in healthcare access and to blacks presenting with later stage disease. The aim of this study was to determine if female breast cancer treatment varied by race in the Defense (DoD) Military Health System, which is an equal access system. The study data were drawn from the DoD cancer registry and medical claims databases. Study subjects included 2,308 white and 391 black female beneficiaries diagnosed with breast cancer between 1998 and 2000. Multivariate logistic regression analyses that controlled for demographic factors, tumor characteristics, and comorbidities were used to assess racial differences in the receipt of surgery, chemotherapy and hormonal therapy. There was no significant difference in surgery type, particularly when mastectomy was compared to breast conserving surgery plus radiation [blacks vs. whites: odds ratio (OR) = 1.1; 95% confidence interval (CI) = 0.8-1.5]. Among those with local stage tumors, blacks were as likely as whites to receive chemotherapy (OR = 1.2; 95% CI = 0.9-1.8) and hormonal therapy (OR = 1.0; 95% CI = 0.7-1.4). Among those with regional stage tumors, blacks were significantly less likely than whites to receive chemotherapy (OR = 0.4; 95% CI = 0.2-0.7) and hormonal therapy (OR = 0.5; 95% CI = 0.3-0.8). Even within an equal access healthcare system, stage-related racial variations in breast cancer treatment are evident. Studies that identify driving factors behind these within-stage racial disparities are warranted.

021

PRE-DIAGNOSTIC PLASMA VITAMIN C AND RISK OF ESOPHAGEAL AND GASTRIC CANCERS IN THE GENERAL POPULATION NUTRITION INTERVENTION TRIAL COHORT. *T K Lam, N D Freedman, J-H Fan, Y-L Qiao, S M Dawsey, P R Taylor, C C Abnet (Division of Cancer Epidemiology and Genetics, National Cancer Institute, Rockville, MD 20852)

Background: Esophageal and gastric cancers represent the 6th and 2nd most common causes of cancer death worldwide. Plasma vitamin C possesses antioxidant, anticarcinogenic, and anti-*H.pylori* properties that may prevent these cancers. These relationships, however, have not been fully evaluated. Methods: We used a case-cohort study nested in a large prospective cohort from Linxian, China to examine the relationship between plasma vitamin C and risk of incident esophageal squamous cell carcinoma (n = 618) and gastric adenocarcinoma (cardia = 350; non-cardia = 139). Cox proportional hazards models were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs) over 15 years of follow-up. All estimates were adjusted for season of blood draw, age, sex, BMI, smoking status, and *H. pylori* seropositivity. Results: Compared to individuals with low plasma vitamin C levels ($\leq 28 \mu\text{mol/L}$), those with normal levels ($> 28 \mu\text{mol/L}$) had a 30% reduced risk for all gastric cancers (HR: 0.70; 95% CI: 0.53-0.94). When separated by anatomic subsite, we observed inverse associations for both cardia (0.72; 0.52-0.99) and non-cardia (0.66; 0.42-1.04) gastric cancers. Similarly reduced risks were apparent using continuous or season-specific quartiles. We found no significant association between vitamin C levels and esophageal cancer. Conclusion: Our results suggest that higher plasma vitamin C is associated with reduced risk of gastric cancer across both anatomic subsites, but we saw no association with esophageal squamous cell carcinoma.

023-S

INCIDENCE AND TRENDS FOR HPV AND NON HPV-ASSOCIATED HEAD AND NECK CANCERS IN THE U S BY RACE/ETHNICITY. *L Cole, E Peters and L Whitaker (Louisiana State University School of Public Health, New Orleans, LA, 70112)

Incidence and survival rates of head and neck cancer (HNC) vary by demographic characteristics, with significant disparities for men and African Americans. Alcohol and tobacco exposure are established etiologic factors for HNC, but recent epidemiological and experimental data have demonstrated that infection with human papillomavirus (HPV) is a risk factor for specific HNC sub-sites. The objectives of this study are to describe the incidence and trends of HNC in the US from 1995 to 2005 and to investigate the variation of rates by HNC sub-site and potential association with HPV. Incident cases of HNC were identified using the North American Association of Central Cancer Registries Cancer in North America Deluxe Analytic Data, which is composed of US cancer registry data meeting high quality data standards. Age-adjusted incidence rates by sex, race/ethnicity, sub-site, stage, and likely HPV association were calculated. Annual percent change (APC) was estimated for HPV and non HPV-associated HNC by age and race. A total of 273,273 HNC cases were diagnosed with incident HNC from 1995 to 2005. Males and Non-Hispanic Blacks (NHB) had higher HNC incidence compared to women and other race/ethnicity groups. Among HPV-associated sites, HNC incidence significantly increased from 1995-2005 (APC = 3.0%), while the reverse was observed for non HPV-associated sites (APC = -2.6%). Interestingly, HNC incidence trends for NHB decreased independent of HPV association. The current study suggests that HPV-associated tumors may have a different disease process than non HPV-associated tumors, and treatment therapies should be tailored based on HPV tumor status.

022

IRON IN RELATION TO GASTRIC CANCER IN THE ATBC CANCER PREVENTION STUDY. *M B Cook, F Kamangar, P R Taylor, J Virtamo, D Albanes, G Petty, R J Wood, A J Cross, S M Dawsey (National Cancer Institute, Bethesda, MD, 20852)

Helicobacter pylori infection is associated with a reduced risk of gastric cardia cancer. A mechanistic hypothesis is that *H. pylori* infection reduces iron levels; this element can induce oxidative DNA damage via free radical generation. We assessed whether iron metrics were associated with gastric cardia and noncardia cancers in the ATBC cancer prevention study, a prospective cohort of over 29,000 men in Finland. We selected 258 incident gastric cancer cases (86 cardia, 172 noncardia), accrued during 22 years of follow-up, and 341 controls from the ATBC study. Using prediagnostic serum, we measured iron, ferritin, unsaturated iron binding capacity (UIBC), and C-reactive protein, a marker of inflammation. Total iron binding capacity (TIBC) and transferrin saturation were estimated from these metrics. Dietary iron was estimated from a food frequency questionnaire. Multivariable logistic regression was used to estimate odds ratios (OR) and 95% confidence intervals (CI) within quartiles. Serologic and dietary iron metrics were not associated with gastric cardia cancer. For gastric noncardia cancer we found suggestive inverse associations with iron (OR_{Q2} = 0.55, CI:0.32-0.95; OR_{Q3} = 0.33, CI:0.18-0.60; OR_{Q4} = 0.59, CI:0.34-1.04), ferritin (OR_{Q2} = 0.78, CI:0.46-1.34; OR_{Q3} = 0.45, CI:0.25-0.82; OR_{Q4} = 0.68, CI:0.39-1.18), and transferrin saturation (OR_{Q2} = 0.69, CI:0.39-1.20; OR_{Q3} = 0.61, CI:0.35-1.06; OR_{Q4} = 0.63, CI:0.36-1.11); dietary iron, UIBC, and TIBC were null. We found no evidence to suggest that iron underlies the inverse association between *H. pylori* and gastric cardia cancer. There were suggestive inverse associations between iron metrics and gastric noncardia cancer, in a profile similar to that of anemia.

024-S

COST-EFFECTIVENESS OF MAMMOGRAPHY SCREENING IN CANADA. *N-T Dinh, K Brand, D Coyle, W Flanagan, H Morrison, C Deri Armstrong, J Onysko (University of Ottawa, Ottawa, Ontario, Canada K1N6N5)

Although there is general agreement that mammography is effective in reducing breast cancer mortality, the cost-effectiveness of mammography screening in Canada is uncertain. Expanding age eligibility and increasing screening frequency could result in an increase in cancers detected and decrease in breast cancer mortality. Costs and harms associated with more aggressive screening may also increase. This study evaluates the tradeoffs between the anticipated benefits and harms of potential screening program designs within the Canadian context. The analysis used the microsimulation Population Health Model (POHEM) and data from the Canadian Breast Cancer Screening Initiative. Ten screening scenarios were tested against a "no screen" option. Scenarios varied in terms of age eligibility and screening frequency. The model was run for each scenario in order to determine life expectancy, number of lifetime screens and false positives, and lifetime treatment costs. Screen costs were calculated by applying cost per screen estimates to the number of lifetime screens generated by POHEM. Results showed that any screening scenario would be considered cost-effective at a threshold of \$50,000 per life-year gained (LYG) compared to no screening. Screening women ages 50-69 biennially was shown to be the most cost-effective or optimal program, costing \$3,916/LYG. Screening women ages 40-79 annually would be considered the least optimal program, costing \$18,996/LYG. A program that screens women ages 40-49 annually and women ages 50-79 biennially would cost \$13,082/LYG. Current results are undiscounted. Further analysis will apply discounting and adjust for quality of life. Subgroup analysis will also be performed for the high-risk population.

025

INTAKE OF LONG-CHAIN N-3 FATTY ACIDS AND MAMMOGRAPHIC BREAST DENSITY. *C Diorio, S Bérubé, and J Brisson (URESP at Centre de recherche FRSQ du CHA universitaire de Québec, Université Laval, Québec, Canada G1S 4L8)

Epidemiological and laboratory studies suggest that long-chain n-3 (omega 3) fatty acids may be associated with a reduction in breast cancer risk. This study reports on the association of long-chain n-3 fatty acids intake with mammographic breast density, one of the strongest breast cancer risk indicators. Among 1560 women aged 31 to 81 years, mammographic breast density from screening mammograms was evaluated using a computer-assisted method and intake of long-chain n-3 fatty acids from food and supplement by a semiquantitative food frequency questionnaire. Mean breast density and p-value for the linear trend across quartiles of long-chain n-3 fatty acids intake were estimated by linear regression adjusting for multiple covariates including age and body mass index. For increasing quartiles of total long-chain n-3 fatty acids intake (< 0.11, 0.11-0.20, 0.21-0.32 and > 0.32 g/day), adjusted-mean breast density was 29, 29, 27 and 25%, respectively (p = 0.005). A similar association was observed between quartiles of dietary long-chain n-3 fatty acids intake (< 0.11, 0.11-0.20, 0.21-0.31 and > 0.31 g/day) and breast density (29, 28, 27 and 26%, respectively; p = 0.01). Our data show that increases in long-chain n-3 fatty acids intake was associated with lower breast density. These results support the notion that intake of long-chain n-3 fatty acids should be evaluated for breast cancer prevention.

027

THE EFFECT OF NEIGHBORHOOD DISADVANTAGE ON STAGE AT DIAGNOSIS OF EPITHELIAL OVARIAN CANCER. *S Kim, C Joslin, I Chukwudozie, F Davis (University of Illinois at Chicago, IL 60612)

Individual and neighborhood level socioeconomic status (SES), such as education, income, race/ethnicity, and access to care are known to affect individual health outcomes. One of the ways in which race and SES affect health is by influencing one's access to resources, which confer ability to avoid or mitigate adverse outcomes. Ovarian cancer incidence rate in the US is higher for white women compared to black women. And, due to the fact that there is no effective screening tool and few early symptoms, ovarian cancer cases are often diagnosed at advanced stages. We explored whether neighborhood characteristics, such as SES, racial composition, and access to care, affect stage at diagnosis of ovarian cancer. Using the multilevel hierarchical model and geographic mapping, we examine differences in diagnosis stage among ovarian cancer cases diagnosed during 1994-1998, in Cook County, Illinois (N = 704). A disadvantage measure was computed using the 2000 census data (% of living below poverty, % of less than high school education, % female headed households with children, and % of whites). 19% were black and 81% were white women. Average age at diagnosis was 53 years old. 52% of the cases were diagnosed at later stages (Stages III and IV). Despite the fact that ovarian cancer cases are often diagnosed at advanced stages due to the lack of effective screening tools, and racial disparities are less prominent compared to other cancer types, the findings suggest that women living in disadvantaged neighborhoods were more likely to be diagnosed at later stages. Marital status, education, race were not associated with stage at diagnosis. Broader neighborhood characteristics should be accounted for in explaining cancer disparities.

026

RACIAL DISPARITIES IN BLADDER CANCER SURVIVAL: RESULTS FROM SEER-MEDICARE. *G D Datta, P Grosclaude, I Kawachi, B Neville, N S Datta, C C Earle (University of Montreal, Montreal, QC Canada H3C 3J7)

Background: Black patients have lower survival rates from bladder cancer than White patients, but previous studies have not been able to explain this difference. Recent work has found that racial disparities in bladder cancer survival persist after adjusting for sex, age, and tumor characteristics. The objective of this study was to assess the association of insurance status, comorbidities, marital status, census tract (CT) SES and the receipt of radical cystectomy with disparities in bladder cancer survival. Methods: We identified 15,666 (592 Black and 15,074 White) bladder cancer cases diagnosed between 1992 and 1999 (follow-up through 2003) from the SEER-Medicare database. We constructed relative survival models to assess racial disparities in 5-year survival. Results: The relative survival ratios (RSR) for Black patients vs White patients were as follows: unadjusted, RSR = 2.22 (95%CI = 1.90-2.59), adjusting for year of diagnosis, registry, age, sex, stage, and grade, RSR = 1.54 (95%CI = 1.32-1.81); additionally adjusting for comorbidity score, marital status, and receipt of radical cystectomy, RSR = 1.45 (95%CI = 1.25-1.70); additionally adjusting for CT SES, RSR = 1.33 (95%CI = 1.12-1.57). Lower comorbidity score, being married, higher CT SES and receipt of radical cystectomy were independently associated with increased bladder cancer survival. Conclusions: Racial disparities persist after adjusting for comorbidity score, marital status, CT SES, and receipt of radical cystectomy in this insured population. As CT SES is an incomplete SES indicator and it is strongly associated with race, further studies investigating the influence of individual-level SES and its correlates may provide further explication of this disparity.

028-S

NON-STEROIDAL ANTI-INFLAMMATORY DRUGS USE AND COLORECTAL CANCER: A POPULATED BASED CASE-CONTROL STUDY. *J Zhao, Y Zhu, L Liu, and P P Wang (Memorial University of Newfoundland, St John's, NL Canada A1B3V6)

Background: Non-steroidal anti-inflammatory drugs (NSAIDs) use has been shown to prevent the occurrence of colorectal cancer (CRC) and reduce polyps and colorectal adenomas recurrence. However, few studies have been carried out in the Canadian population. This study aimed to assess the primary prevention effect of NSAIDs on the incidence of CRC in Canada. Methods: The study analyzed the data of a population based case-control study of 5421 participants (2752 cases and 2669 controls) in Ontario (ON) and Newfoundland and Labrador (NL). Information on dietary intake, family history, and lifestyles was collected using a self-administered family history questionnaire, food frequency questionnaire and personal history questionnaire. Odds ratios (OR) and the 95% confidence interval (95%CI) were estimated by multivariate logistic regression after adjusting for potential confounding factors. Results: Overall, NSAIDs use significantly reduced the risk of CRC in both ON (OR = 0.65, 95%CI 0.52-0.80) and NL (OR = 0.72, 95%CI 0.53-0.98) populations. When province-sex stratified analyses were performed, similar associations were observed across all sub-groups. However, a statistically significant association was only observed in ON men (OR = 0.56, 95%CI 0.41-0.77). Conclusions: Our study adds evidence corroborating the association between NSAIDs and reduced risk of CRC in the Canadian population. It also suggests a possibility that the effect of NSAIDs on CRC may vary between men and women. Funding: Jing Zhao is supported by a trainee award from the Beatrice Hunter Cancer Research Institute with funds provided by The Terry Fox Foundation Strategic Health Research Training Program in Cancer Research at CIHR.

029-S

IRON AND COLORECTAL CANCER: A POPULATED BASED CASE-CONTROL STUDY IN CANADA. *J Zhao, Y Zhu, L Liu, and P P Wang (Memorial University of Newfoundland, St John's, NL Canada A1B3V6)

Background: Iron can cause genomic and chromosomal instability, rearrangement and mutations through reactive action. Excessive iron intake has been considered as a potential risk factor of colorectal cancer (CRC). The objective of this study was to examine the associations between iron intake and the risk of CRC in the Canadian population. Methods: The study analyzed the data collected from the existing population based case-control study of 5421 participants (2752 cases and 2669 controls) in Ontario (ON) and Newfoundland and Labrador (NL). Information on dietary intake, family history and lifestyles was collected using self-administrated questionnaires. Multivariate logistic regression analysis was used to estimate odds ratios (OR) and the 95% confidence intervals (95%CI) after adjusting for potential confounding factors. Tests for trend were used to assess dose-response relationships. Results: The OR increases with each quintile of iron intake. A borderline significant dose-response association between total iron intake and CRC was observed in this study (In ON: men, OR = 1.02, 95%CI 1.01-1.03; women, OR = 1.01, 95%CI 1.00-1.01; both men and women OR = 1.01, 95%CI 1.01-1.02; In NL: women, OR = 1.01, 95%CI 1.00-1.02; both men and women OR = 1.00, 95%CI 1.00-1.01, all $p < 0.05$). Conclusions: Excess iron intake appears to increase the risk of colorectal cancer in the Canadian population. This study also raises a methodological issue around quantifying and grouping iron intake in epidemiological studies. Funding: J. Zhao is supported by a trainee award from the Beatrice Hunter Cancer Research Institute with funds provided by The Terry Fox Foundation Strategic Health Research Training Program in Cancer Research at CIHR.

031

BUCCAL SAMPLES AS A SURROGATE MEASURE OF GLOBAL DNA METHYLATION IN THE COLON. *J Ashbury, W King, Y Tse, S Pang and S Vanner (Queen's University, Kingston, ON, Canada K7L 3N6)

Global DNA hypomethylation, which refers to a genome-wide decrease in the number of cytosine bases that have been methylated to form 5-methylcytosine, is recognized as a key mechanism in the regulation of genes implicated in carcinogenesis. Further, there is substantial evidence to suggest that global DNA hypomethylation in colon tissue represents an intermediate endpoint in the early development of colorectal cancer. However, apart from specific clinical procedures (e.g. colonoscopies), it is prohibitively invasive to obtain colon tissue samples and virtually impossible to obtain samples for a true population-based study. The objective of this cross-sectional study was to determine whether buccal global DNA methylation was an appropriate proxy measure for colon tissue methylation. Ninety-one subjects (59.3% female and 40.7% male), aged 40 – 65 (mean age = 54.3, standard deviation = 5.86) undergoing a screening colonoscopy in Kingston, Ontario have been recruited. Global methylation is being quantified using high-resolution melting (HRM) profile analysis - a validated real-time fluorescence-based polymerase chain reaction (PCR) method. In preliminary data based on 10 subjects, the Pearson correlation coefficient between buccal and colon methylation measures was 0.95 ($p < 0.0001$). Further analysis will be conducted for all 91 subjects and include consideration of blood methylation levels. Aberrant DNA methylation is suspected to be an important early step in colon cancer development. If buccal DNA methylation is shown to be an appropriate proxy measure for colon tissue methylation, this would facilitate the use of easily accessible buccal cells for the investigation of risk factors for aberrant DNA methylation patterns.

030-S

AFRICAN AMERICAN BREAST CANCER PATIENTS EXPERIENCE LONGER DELAYS IN DIAGNOSIS AND TREATMENT. *P George, M Azu, E Bandera, C Ambrosone, G Rhoads, K Demissie (University of Medicine and Dentistry of New Jersey, New Brunswick, NJ, 08901)

Delays in diagnosis and treatment may contribute to excess deaths among African-American breast cancer patients. The authors' objective was to examine racial differences in delays in diagnosis and treatment initiation for early stage breast cancer. Newly diagnosed invasive breast cancer patients during the period 2006-2010 were identified in the seven counties of eastern New Jersey through rapid case ascertainment methodology. For each African-American woman ages 18-85 years, a white woman within 5 years of age who resided in the same county was randomly selected. After obtaining patient consent, medical records were obtained from multiple providers. Delay intervals were defined as the time interval from symptom recognition to diagnosis (diagnosis delay), from symptom recognition to surgical treatment (surgical delay), from the end of the last chemotherapy cycle to initiation of radiation or from 4 weeks after last surgery to initiation of radiation (radiation delay) and from 4 weeks after last surgery to initiation of chemotherapy (chemotherapy delay). African-Americans experienced delays of ≥ 2 months more than Whites in diagnosis [odds ratio (OR) = 2.4; 95% confidence intervals(CI): 1.6-3.6], in surgical treatment initiation (OR = 2.0; 95% CI: 1.4-3.1) and in radiation therapy initiation (OR = 2.4; 95%CI: 1.1-5.3). No racial difference was found in chemotherapy delay. The findings suggest that African-American breast cancer patients experience longer delays in diagnosis and treatment for breast cancer; interventions to reduce delays may help narrow the racial gap in mortality between the races.

032

CORRELATES OF MEETING PHYSICAL ACTIVITY GUIDELINES FOR CANCER PREVENTION. *F E Aparicio-Ting, C M Friedenreich, K A Kopciuk, R C Plotnikoff, H E Bryant (Alberta Health Services, Calgary, AB, Canada T2N 4N2)

Consistent and strong epidemiologic evidence exists that physical activity (PA) reduces the risk of several cancer sites. A cross-sectional study was undertaken in Alberta to investigate potential determinants of leisure PA behaviour at levels sufficient for cancer prevention. In 2008, 1,087 male and 1,684 female Alberta residents participating in The Tomorrow Project (a province wide cohort study) who were 35 to 64 years old completed self-administered questionnaires on PA behaviour and potential PA determinants. Applying a social ecological model, correlates of PA in the intrapersonal and social domains were examined as potential determinants of compliance with American Cancer Society and the U.S. Department of Health and Human Services PA guidelines, which recommended PA at levels thought to be sufficient for cancer risk reduction. A hierarchical backwards elimination modelling strategy with 10-fold cross validation was used to build sex-specific, logistic regression models adjusted for known confounders. Intrapersonal correlates of compliance with these PA guidelines were the following: ability to schedule and plan PA ($p < 0.001$), self-efficacy ($p = 0.037$), single marital status (for women only, $p = 0.004$) and hypertension (for men only, $p = 0.018$). Social factors that were correlates of compliance were: friend social support ($p < 0.001$); and, for women only, familial social support ($p = 0.021$) and companionship for PA ($p = 0.033$). Both intrapersonal and social factors should be incorporated into multidimensional intervention strategies to promote sufficient levels of activity for cancer risk reduction and interventions may need to be tailored by gender to be effective at the population level.

033-S

VALIDITY OF SELF-REPORTED MAMMOGRAPHY USE AMONG WOMEN WITH FAMILIAL HISTORY OF BREAST CANCER. *M J Walker, A M Chiarelli, L Mirea, G Glendon, P Ritvo, I L Andrusis, J A Knight (Cancer Care Ontario & Samuel Lunenfeld Research Institute, Toronto, ON Canada M5G 2L7)

Previous evidence suggests women may underestimate the time since last mammography; however it is unknown whether this holds true for women with familial risk of breast cancer. The purpose of this prospective study is to assess the validity of self-reported mammography use among women with varying levels of familial risk. A cohort of 1514 relatives of invasive breast cancer cases from the Ontario site of the Breast Cancer Familial Registry, were followed for three years by questionnaire. Women were Ontario residents, 18 or older and unaffected by breast cancer. Of the 1114 women responding at baseline, 847 (76%) had a recent mammogram, 578 (59%) had one at year-one follow-up and 546 (62%) had one at year-two follow-up. Ninety-seven percent (788) of requested mammogram reports have been received from imaging departments for baseline, ninety-seven percent (534) of year-one and ninety-seven percent (503) of year-two. Self-reported and abstracted dates were compared for 3- and 6-month concordance, in addition to mammogram reason. Sensitivity, specificity, positive and negative predictive values, overall percent agreement and Cohen's kappa (κ) will be examined, along with further multivariate analyses. At baseline, 63% demonstrated 3-month concordance, 86% 6-month concordance and 87% reason concordance. Preliminary analyses suggest 3-month concordance differs by familial risk ($p = 0.0174$); women with low ($N = 343$), moderate ($N = 198$) and high ($N = 247$) familial risk demonstrated 58%, 65% and 70% concordance, respectively. Understanding the validity of self-reported mammography use in women with familial risk is essential to determining screening adherence.

035

IN UTERO EXPOSURE TO BISPHENOL-A (BPA) AND ITS EFFECT ON BIRTH WEIGHT OF OFFSPRING. *M Miao, W Yuan, D-K Li (Department of Epidemiology and Social Science on Reproductive Health, Shanghai Institute of Planned Parenthood Research, Shanghai China)

Objective: To examine the effect of in utero exposure to BPA, a suspected endocrine disruptor with widespread human exposure, on the birth weight of offspring. Methods: A total of 587 children from families in which parent(s) did or did not have occupational exposure to BPA were examined. Their birth weights were obtained by an in-person interview of the mother. Parental BPA exposure level during the index pregnancy was determined through job-exposure matrix. Maternal exposure was considered a direct in utero exposure to fetuses while paternal exposure was considered an indirect in utero exposure. Results: After controlling for maternal age at birth, education, pre-pregnancy weight, gravidity, calendar year of birth, and family income using a linear regression model, parental exposure to BPA in the workplace during pregnancy was associated with decreased birth weight. The association was stronger for maternal exposure which is statistically significant. There was also a dose-response relationship with increased BPA exposure levels in pregnancy associated with greater magnitude of decrease of birth weight in offspring, with a statistically significant trend for the association. ($p = 0.003$). Conclusions: Our findings provide the first epidemiologic evidence suggesting that in utero exposure to BPA during pregnancy may be associated with decreased birth weight in offspring. This finding, if confirmed by other studies, has important public health implications due to ubiquitous BPA exposure.

034-S

ASSOCIATIONS OF PERIODONTAL DISEASE AND DENTAL CARIES WITH GASTRIC PRECANCEROUS LESIONS. *C Salazar, F Francois, Y Li, R Hays, S Bedi, J Sun, E Queiroz, C Leung, B Wang, H Hao, P Corby, Z Pei, A Dasanayake, Y Chen (Columbia University, New York, NY 10032)

To investigate whether periodontal disease and dental caries experience are associated with an increased risk of gastric precancerous lesions, we conducted a pilot case-control study with subjects who underwent upper gastrointestinal endoscopy at Bellevue Hospital Center in New York City. Cases were diagnosed with either intestinal metaplasia or chronic atrophic gastritis. Comprehensive oral examinations were performed utilizing National Institute of Dental and Craniofacial Research criteria. Bacterial genomic DNA was isolated from saliva and plaque samples and quantitative real-time PCR was performed with species-specific primers to evaluate the colonization of 4 groups of bacteria etiologically linked with periodontal disease (*P. gingivalis*, *T. forsythensis*, *A. actinomycetemcomitans*, and *T. denticola*). Preliminary results with 17 cases and 36 controls showed a significantly higher mean proportion of decayed tooth surfaces (DS) to decayed and filled tooth surfaces (DFS) among cases than controls (%DS/DFS = 43.5% vs. 16.6%, $p = 0.04$) after adjustment for age, sex, number of teeth evaluated, smoking, and BMI. The adjusted mean proportion of sites with bleeding on probing was higher among cases than controls (32.1% vs. 24.1%, $p = 0.15$). The adjusted mean of bacterial load values for *A. actinomycetemcomitans* in plaque samples was higher among cases than controls (1.80 vs. 0.13, $p = 0.28$). Our findings suggest that individuals with gastric precancerous lesions have a higher degree of active periodontal inflammation and a higher level of untreated caries.

036-S

ASSOCIATION BETWEEN SERUM PFOA LEVELS AND HYPERURICEMIA IN CHILDREN. *S Geiger, A Shankar, and A Ducatman (West Virginia University, Morgantown, WV 26506)

Hyperuricemia in children is associated with increased future risk of diabetes, metabolic syndrome and cardiovascular disease. Serum perfluorooctanoic acid (PFOA) has been shown to be associated with hyperuricemia in adults, but the association in children remains unexplored. An advantage of examining environmental exposures in children is that observed associations are less likely to be affected by confounding due to limited cumulative lifetime exposure to chronic disease risk factors such as smoking or heavy alcohol intake. However, population-based data on serum PFOA and uric acid level are rare in children, probably because of challenges associated with parental commitment necessary for drawing blood samples. In this context, we conducted a cross-sectional study using data from the C8 Health Project (2005-2006), a large, population-based study of six Appalachian communities in Ohio and West Virginia who were exposed to high PFOA levels through contaminated drinking water. There were $n = 9,645$ children (age < 18 years) in the sample; 26.4% exhibited hyperuricemia (serum uric acid > 5.5 mg/dL). We detected a significant positive association between serum PFOA and hyperuricemia in multivariable logistic regression analyses after adjusting for age, sex, and body mass index. Compared to children in quartile 1 of serum PFOA (referent category, PFOA level < 12.8 ng/mL), the odds ratio (95% confidence interval) of hyperuricemia was 1.18 (1.02-1.36) in quartile 2 (PFOA level 12.9-28.2 ng/mL), 1.27 (1.10-1.47) in quartile 3 (PFOA level 28.3-65.4 ng/mL), and 1.30 (1.12-1.50) in quartile 4 (PFOA level > 65.4 ng/mL); p -trend = 0.002. Our results suggest that, similar to adults, higher PFOA levels are associated with hyperuricemia in children.

037-S

POLYCHLORINATED BYPHENILS (PCBS) AND ORGANOCHLORINE PESTICIDES (OCPS) AND MENSTRUAL CYCLE LENGTH AMONG WOMEN IN THE NEW YORK STATE ANGLER PROSPECTIVE PREGNANCY STUDY. *L I Iglesias, M A Cooney, A C McLain, K J Lum, R Sundaram, G M Buck Louis (Division of Epidemiology, Statistics, and Prevention Research, Eunice Kennedy Shriver National Institute of Child Health and Human Development, Rockville, MD)

Background: The potential adverse effects of PCBs and OCPs on women's health are a major public health concern because they are known to be endocrine-disrupting chemicals (EDCs). The mechanisms of PCBs and OCPs on menstrual cycle patterns remain uncertain and controversial despite the importance of menses as an integral part of a woman's experience and reproductive life. Objectives: To quantify the effects of PCBs and OCPs in women's serum prior to pregnancy and observe their menstrual cycle length and variability as prospectively recorded on daily menstrual diaries among women enrolled in the New York State Angler State Prospective Pregnancy study (PPS). Methods: During 1991-1992, we collected data for eighty-three women aged 20-34 who were not pregnant, have completed PCB and OCP information as well as daily diaries regarding menstruation and lifestyle behaviors. Toxicological analyses were conducted to process 76 PCB congeners in sera specimen samples by using gas chromatography with electron capture detection. A mixture distribution model was used to identify exposures that significantly affect menstrual cycle length, after adjusting for age and age at menarche. Results: The results from the linear regression models indicated that mean menstrual cycles were four days longer ($\beta = 3.89$, 95% CI 0.04 to 7.74) for women with estrogenic PCB levels in the highest tertile compared to those in the lowest tertile after adjustment for age and age of menarche. Conclusions: Our findings suggest that PCBs may increase or mimic estrogen activity which may produce high levels of luteinizing hormone before the luteinizing hormone peak. This may be associated with both a longer luteal phase and longer menstrual cycles.

039-S

BEDBUG, MICE AND RAT COMPLAINTS AND PESTICIDE USE AMONG WASHINGTON DC RESIDENTS BY NEIGHBORHOOD: GIS ANALYSIS. *K Rury and D F Goldsmith (George Washington University, School of Public Health and Health Services, Washington, DC, 20052)

Background: In 2008, the GWU Environmental and Occupational Health Department surveyed 789 DC residents to elicit attitudes towards residential pests and pesticides in an effort to highlight public health concerns about urban pests. Responses to questions relating to bedbugs, mice, and rats were analyzed by city ward. The DC survey is the largest survey of pests and pesticide use in any urban area. Methods: Ward-specific results were compared to all survey responses, which represent DC as a whole, using the Wilcoxon signed-rank test. Significant differences ($p < 0.05$) were then displayed using Geographic Information Systems (GIS) to highlight findings for selected pest complaints and pesticide uses between individual wards and all of Washington DC. Results: DC Wards 1, 3, and 7 reported significantly more bedbug problems than the city as a whole. Ward 3 also reported significantly more use of bedbug spray and mattress powder/dust than DC; Ward 1 reported significantly higher use of mattress powder/dust than DC. Additionally, Wards 5 and 8 reported significantly more frequent mice problems than DC, and more frequent use of glue, sticky, and snap traps. Ward 1 also reported significantly more frequent rat problems than DC. Findings do not suggest that only lower income Wards 7 and 8 have the most pest problems/complaints. Discussion & Conclusion: Based on our survey, bedbug treatment and residential educational efforts should focus on Wards 1, 3 and 7. Mice and rat intervention and educational efforts should focus on Wards 5 and 8. DC residents should be resurveyed after treatment and educational efforts to test intervention success.

038

PESTICIDE HEALTH PERCEPTIONS AMONG WASHINGTON DC RESIDENTS. *D F Goldsmith, P Davidson, J Paulson, (George Washington University, Washington DC, 20052)

Background: There is a paucity of information about pesticide use and health effects among urban dwellers, especially among low income renters. We conducted a survey in Washington DC to assess health attitudes among a nonrandom sample of Washington DC residents. Methods: We studied 789 Washington DC residents > 18 years in the summer of 2008 using a questionnaire approved by GWU's Institutional Review Board. The survey asked their perceptions of health issues related to using pesticide chemicals in their homes. The questionnaire asked how worried residents were if there were pesticide residues on surfaces, and we asked about threats to health from different groups of pesticides applied to homes. Results: For flea spray, 13% indicated these products were not very harmful, while 29% thought they were a serious threat to health. For cockroach sprays, 12% indicated these insecticides were not very harmful, but 35% thought they were a serious health threat. For room foggers/bug bombs, 7% indicated these were not very harmful, while 50% thought they were a health threat. For chemical lawn products 40% thought they would be a serious threat to health. In our sample, 46% expressed concern that residues on exposed surfaces can make people ill. We asked if skin rashes, headaches, cough/sore throat, asthma and other respiratory problems rose after residential pesticide applications; 8% reported these illnesses were made worse after pesticide products were used. Conclusion: This survey suggested that more community education would benefit residents, especially where children are concerned. Educational efforts should include pesticide safety training as well as direct means of preventing the entry of pests into residences.

040

PLASMA CONCENTRATIONS OF PERFLUORINATED COMPOUNDS AND SUBFECUNDITY IN THE NORWEGIAN MOTHER AND CHILD COHORT STUDY. K W Whitworth*, L S Haug, D D Baird, G Becher, J A Hoppin, R Skjaerven, C Thomsen, M Eggesbo, G Travlos, R Wilson, M P Longnecker (National Institute for Environmental Health Sciences, NIH, DHHS, Durham, NC 27703)

Perfluorinated compounds (PFCs) are ubiquitous pollutants and have been associated with subfecundity. The authors examined subfecundity in relation to two specific PFCs, perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), with the hypothesis that the associations would differ by gravidity. This study is based in the Norwegian Mother and Child Cohort Study (MoBa). The analysis was restricted to women enrolled from 2003-2004, including 430 women with a time-to-pregnancy (TTP) > 12 months and 509 randomly-selected women with a TTP \leq 12 months. At 17 weeks of gestation, mothers reported TTP and provided blood samples. Plasma concentrations of PFCs were analyzed using liquid chromatography-mass spectrometry. Odds ratios and 95% confidence intervals (CI) were estimated for each PFC quartile using logistic regression, adjusted for age and prepregnancy body mass index. An association between subfecundity and PFCs was seen only in gravid women. The relative odds of subfecundity for gravid women in the highest quartile of PFOS was 1.7 (CI = 1.1-2.7) and for PFOA was 2.1 (1.2-3.4). For nulligravid women the respective relative odds were 0.6 (0.3-1.2) and 0.5 (0.2-1.4). Prior studies suggest that PFC levels fall during pregnancy and lactation as the contaminants are transferred to the fetus and breast milk; afterwards they rise to baseline. Among gravid women, a long TTP allows for a longer time during which levels can rise. Results from nulligravid women may be more informative regarding toxic effects of these compounds, and in these data, did not support an adverse relation.

041

CHLORPYRIFOS EXPOSURE AND THE PREVALENCE OF WHEEZE AMONG EGYPTIAN COTTON WORKERS. *M R Bonner, F Farahat, J Olson, D Rohlman, R Fenske, W K Anger (University at Buffalo, Buffalo, NY 14214)

Pesticide exposure, including organophosphate insecticides (OP), has been associated with wheezing in agricultural settings. Chlorpyrifos (CPF), an OP, has been linked with airway hyperreactivity in experiments with guinea pigs, supporting this hypothesis. We conducted a cross-sectional study to investigate CPF exposure and the prevalence of wheeze among 159 CPF-exposed cotton workers and 122 non-agricultural workers. Male cotton workers, aged 18-55 years, were recruited from the Ministry of Agriculture field stations near Shebin El-Kom, Egypt. Male non-agricultural workers, aged 18-55 years, were recruited from Shebin El-Kom. All participants completed a questionnaire that queried demographics, occupational and medical histories, including the number of wheezing episodes in the past year. Unconditional logistic regression was used to estimate prevalence odds ratios (PORs) and 95% confidence intervals (CIs), adjusted for age, pack-years of smoking, asthma, and body mass index. Workers exposed to CPF had a 3-fold higher prevalence of wheezing (POR = 3.2; 95% CI = 1.2-8.4) as compared with the non-exposed. When categorized by job title, the PORs for applicators, technicians, and engineers were 4.7 (95% CI = 1.5-15.4), 2.3 (95% CI = 0.7-7.9), and 2.0 (95% CI = 0.5-7.6), respectively. Applicators have been demonstrated to have higher occupational CPF exposure than either technicians or engineers. In summary, our results are consistent with the hypothesis that CPF exposure is positively associated with wheezing, although interpretation is complicated by the cross-sectional study design, the self-reported assessment of wheezing, and the small sample size. Supported by NIH (ES16308).

043-S

PRENATAL PCB EXPOSURE IS ASSOCIATED WITH DECREASED GESTATIONAL LENGTH. *K Kezios, X Liu, P Cirillio, H Yu, O Kalantzi, Y Wang, M Petreas, J-S Park, B Cohn. P Factor-Litvak (Columbia University, New York, NY 10032)

Polychlorinated biphenyls (PCBs) were used in a variety of industrial applications, but although banned in 1979, persist in the environment. PCBs are considered endocrine disruptors. Previous literature is inconsistent regarding exposure to PCBs and pregnancy outcomes. The present study uses a sample of 600 infants (300 male, 300 female) drawn from the Child Health and Development Studies prospective cohort study to investigate the associations between PCBs and gestational length. We evaluated PCBs in groups according to hypothesized biological action (1b (sum of weak phenobarbital inducers), 2b (sum of limited dioxin activity), and 3 (sum of CYP1A and CYP2b inducers)) or degree of ortho- substitution (mono, di, tri) as certain configurations may interfere with thyroid hormone function. In secondary analyses we examined total exposure and individual congeners. For each log unit increase in total PCB concentration, we found a 0.37 week decrease (95% confidence interval (CI) -0.72, 0.015) in length of gestation. We also found decreases in length of gestation for di-ortho substituted PCBs (0.33 week decrease (95% CI -0.68, 0.0076)) and group 3 PCBs (0.35 week decrease (95% CI -0.69, 0.044)). Decreased gestational length was also found for most congeners. The magnitude of decreased gestation was most pronounced comparing the highest tertile of PCB exposure to the lowest tertile of exposure. No mediation by maternal thyroid function was found. We conclude that there is an approximately 2.3 day decrease in gestational length per log unit increase in PCB exposure. While small for any individual, this may have public health implications for population exposures.

042-S

DDT, DDT METABOLITES AND BIRTH WEIGHT. *K Kezios, X Liu, P Cirillio, H Yu, B Cohn, O Kalantzi, Y Wang, M Petreas, J-S Park, P Factor-Litvak (Columbia University, New York, NY 10032)

Organochlorine (OC) pesticides are persistent endocrine disruptors. In pregnant women, OC pesticides have the capacity to cross the placenta; this prenatal exposure has been associated with adverse pregnancy outcomes, although the findings are inconsistent. We used a sample of 600 infants (300 male, 300 female) drawn from the Child Health and Development Studies prospective cohort study to investigate the relationship between maternal exposure to OC pesticides and birth weight. Linear regression models were used to examine the associations between dichlorodiphenyltrichloroethane (DDT), accounting for the metabolite, dichlorodiphenyldichloroethylene (DDE) and the contaminant, ortho,para'-DDT (o,p'-DDT). We also examined whether the pathway between OC levels in maternal serum and pregnancy outcomes is mediated by maternal thyroid hormone. For each log unit increase in DDT concentration, adjusted birth weight increased by 98.36 grams (95% confidence interval (CI) 13.19, 183.53). When the effects of DDT, DDE and o,p'-DDT were considered jointly, adjusted birth weight increased by 302.48 grams (95% CI 151.41, 453.55), decreased by 191.22 grams (95% CI -332.67, -49.77) and decreased by 73.13 grams (95% CI -153.32, 7.05), respectively. A significant dose-response relationship was observed with increasing tertiles of DDT corresponding to higher adjusted mean birth weights ($p < 0.05$) and this effect was substantially magnified when o,p'-DDT and DDE were considered concurrently in the model ($p < 0.01$). We did not find mediation by thyroid disruption. DDT has been associated with increased risks of breast cancer and diabetes, thus, we suggest that increased birth weight may be one mediator of those associations.

044-S

PRENATAL ORGANOCHLORINE EXPOSURE, MATERNAL THYROID FUNCTION AND NEUROMOTOR DEVELOPMENT. *H Yu, X Liu, K Kezios, O Kalantzi, Y Wang, M Petreas, J-S Park, P Cirillio, B Cohn, P Factor-Litvak (Columbia University, New York, NY 10032)

Organochlorines (OCs) are putative endocrine disruptors and have been associated with developmental deficits in young children. We investigated the associations between prenatal OC exposure, maternal thyroid levels and neurodevelopmental outcomes at age 5 in a sample of 600 mother-child pairs (300 male, 300 female) enrolled at birth into the longitudinal Child Health and Development Studies between 1960-1963. OC levels were measured from post-partum maternal sera. Neurodevelopmental outcomes of the children were assessed at age 5 using the Lincoln-Oseretsky Motor Development Scale (MDS) (mean = 18.33 ± 1.89), the Goodenough-Harris Draw-A-Man Test (DMT) (mean = 9.76 ± 3.99), and by drawing three Gesell Figures (GF) (40% passed all 3, 31% passed 2, 29% passed one or less). Linear regression analyses were used to model MDS and DMT outcomes, and polychotomous logistic regression was used to model GF results. For MDS, we found sex specific associations between dichlorodiphenyldichloroethylene (DDE), a metabolite of dichlorodiphenyltrichloroethane (DDT) such that for each log unit increase there was an adjusted 1.18 (95% CI -1.91, -0.45) point reduction in score for girls. No associations were found between OCs and MDS in boys. We also found a small association between PCB203 and MDS in girls. No associations were found between any OC and DMT or GF, nor was any mediation via an effect of OCs by maternal thyroid function found. We conclude that few associations were found between exposure to OCs and developmental outcomes at age 5. Further, the data suggest that neurodevelopmental toxins may have different effects on the developing male and female brains.

045

ORGANOPHOSPHATE PESTICIDE USE AND SELF-REPORTED INCIDENT UTERINE FIBROIDS IN THE AGRICULTURAL HEALTH STUDY. *S L Myers, J A Hoppin, D P Sandler, D D Baird (NIEHS, Research Triangle Park, NC 27709)

Uterine fibroids, hormonally-mediated benign tumors, are the leading indication for hysterectomy in the US. Results from a cross-sectional analysis of women enrolled in the Agricultural Health Study suggested an association between organophosphate insecticide use and fibroids. To clarify the temporal relationship between pesticide use and fibroid diagnosis, we conducted a prospective analysis of incident fibroid diagnosis among white women who were less than 55 years old, premenopausal, with intact uteri, and without a previous fibroid diagnosis at baseline (778 incident cases and 10,972 non-cases). Logistic regression was used to estimate the association between pesticide use reported at baseline and self-reported fibroids diagnosed between baseline and 5-year follow-up, controlling for age and state (Iowa/North Carolina). While the cross-sectional analysis had shown a significant increase in fibroids among organophosphate users compared to never users (Odds Ratio [OR]: 1.33; 95% Confidence Interval [CI]: 1.19, 1.48), the association was attenuated in the prospective analysis (OR: 1.19; 95% CI: 0.99, 1.42). When examined individually, the OR for diazinon use was elevated (OR: 1.25, 95% CI: 0.98, 1.58), though slightly less than in the cross-sectional analysis (OR: 1.35; 95% CI: 1.17, 1.55). Users of coumaphos and parathion also had increased odds of fibroids, with ORs of about 1.3, but estimates were imprecise due to small numbers. Although the smaller sample size led to a loss of power, the general pattern of results was consistent with the cross-sectional analysis. Toxicological testing would help determine if and how organophosphates may be related to fibroid development.

047

IN UTERO BPA EXPOSURE AND CHILD NEURODEVELOPMENT AND BEHAVIOR AT AGE 5 YEARS. *K Harley, R Aguilar, M Vedar, J Chevrier, A Bradman and B Eskenazi (University of California, Berkeley, CA, 94704)

Background: Bisphenol A (BPA) is an endocrine-disrupting compound used in the manufacture of polycarbonate bottles, food cans and packaging, dental sealants, and cash register receipts. Human exposure to BPA is nearly ubiquitous, with 93% of Americans having detectable levels of BPA in urine. Animal studies have linked BPA to sexually dimorphic alterations in brain structure and behavior but only one other study has examined prenatal BPA exposure and neurobehavior in children. Methods: We measured BPA in urine collected at two time points during pregnancy from 325 women participating in the Center for the Health Assessment of Mothers and Children of Salinas (CHAMACOS) longitudinal cohort study. Children's neurodevelopment was assessed at 5 years of age using the Weschler Intelligence Scales for Children (WISC-IV) and the Peabody Picture Vocabulary Test (PPVT). Attention deficit and hyperactivity scores were assessed using the Connor's Kiddie Continuous Performance Test (K-CPT). Results: Maternal BPA concentrations (median = 1.1 ug/L, IQR = 0.5 - 1.7) were lower than the U.S. national average (median = 2.8 ug/L, IQR = 2.5 - 3.1). In preliminary analyses, higher BPA concentration during pregnancy was associated with poorer verbal ability scores on the PPVT. Statistically significant interaction was seen by child sex, with the association being seen in boys (beta (95% CI) = -9.6 (-17.8, -1.4) for each 10-fold increase in BPA concentrations) but not girls (beta (95% CI) = -0.4 (-6.8, 6.0)). Higher prenatal BPA exposure was also associated with increased odds of attention problems in boys, but not girls.

046

BISPHENOL A EXPOSURE DURING PREGNANCY AND MATERNAL AND NEONATAL THYROID HORMONE. *J Chevrier, K Harley, A Bradman and B Eskenazi. (University of California, Berkeley, CA 94704)

Background: Bisphenol A (BPA) is widely used in the manufacture of polycarbonate bottles, food packaging, can linings, and dental sealants. High detection frequencies in numerous environmental and human specimens indicate that BPA is a widespread contaminant. Animal and in vitro studies suggest that BPA may disrupt thyroid hormone (TH) but little human data are available, particularly in pregnant women and neonates. Normal thyroid function during these critical developmental periods is essential for normal brain development. Methods: We measured BPA in urine samples collected during the first and second half of pregnancy in women participating in the Center for the Health Assessment of Mothers and Children of Salinas (CHAMACOS). Free thyroxine (T4), total T4 and thyroid-stimulating hormone (TSH) was measured in 339 maternal serum samples obtained at ~27 weeks' gestation. Neonatal TSH levels were abstracted from medical records (n = 371). Results: The median BPA urinary concentration was lower in CHAMACOS women (1.1 ug/L) than in the general U.S. population (2.8 ug/L). Preliminary analyses suggest that every 10-fold increase in maternal BPA urinary concentration in the second, but not the first, half of pregnancy was associated with a 0.5 ug/dL decrease in total T4 (95%CI = -1.0, -0.1) after controlling for confounders. Associations were stronger when BPA was measured closer in time to total T4. BPA urinary concentrations were not associated with maternal free T4 or TSH, or with neonatal TSH. Conclusion: Maternal exposure to BPA was inversely associated with total T4 during pregnancy. Findings may have implication for fetal brain development.

048-S

WOMEN'S EXPOSURE TO LOW MOLECULAR WEIGHT PHTHALATES IN RELATION TO USE OF PERSONAL CARE PRODUCTS. *L Parlett and S Swan (University of Rochester, Rochester, NY 14642)

Endocrine disrupters di-ethyl phthalate (DEP) and di-butyl phthalate (DBP), often characterized as low molecular weight (LMW), are used in personal care products (PCPs) to fix fragrance and hold color. Recent studies have found significant correlations between PCP use and urinary phthalate levels in men and minority pregnant women. Increasing concern about phthalate health effects demands better exposure characterization. We investigated how women's reported use of personal care products within the past 24 hours affected urinary levels of phthalate metabolites. Between 2002 and 2005, 337 women from California, Iowa, Minnesota, and Missouri provided single spot urine samples and answered questions regarding PCP use of thirteen hair, makeup, and body products. In multivariable analyses, age, education, and the square root of creatinine were covariates. Monoethyl phthalate (MEP), monobutyl phthalate (MBP), and mono isobutyl phthalate (MiBP) comprised the sum LMW score. In most women (87%) ≥ 8 metabolites were detected. Reported PCP use ranged from 91% using deodorant to 7% using nail polish/nail polish remover. After adjusting for age and education, women reporting use of perfume had 2.57 times higher (95% CI: 2.01-3.29) levels of sum LMW. Other PCPs that were significantly associated with sum LMW were: hair spray, "other" hair products, lipstick, nail polish, bar soap, lotion, and deodorant. Sum LMW increased with the number of reported PCPs used. In conclusion, phthalate exposure and PCP use is widespread in women of reproductive age. Use of fragrance-laden products such as perfume and lotion is predictive of LMW phthalate levels. This information provides additional understanding of phthalate exposure sources.

049

AGE OF ONSET IN GENOME-WIDE ASSOCIATION STUDIES. *A J Agopian, L M Eastcott, L E Mitchell (The University of Texas Health Science Center, Houston, TX)

Genome-wide association studies (GWAS) have identified many susceptibility loci for complex traits. However, GWAS findings have explained the genetic basis of some traits more than others, and overall, have not identified the majority of the genetic contribution to common diseases. We evaluated whether the success of GWAS is related to age of onset, specifically, if the magnitude of the associations detected in GWAS is generally greater for traits with early onset than for traits with onset later in life. Data were obtained from the National Human Genome Research Institute Catalog of Published Genome-Wide Association Studies. Traits in the Catalog were categorized as having an average age of onset in childhood (< 18 years), early adulthood (18-54 years), or late adulthood (\geq 55 years). The relationship between age of onset category and magnitude of association from GWAS (i.e., between traits and single nucleotide polymorphisms (SNPs) with $p < 5 \times 10^{-5}$) was assessed using logistic regression. Associations characterized by an odds ratio (OR) \geq 1.5 were significantly more common in GWAS of traits with onset in childhood compared to traits with onset in early (OR: 4.3, 95% confidence interval (CI): 2.6, 7.3) or late (OR: 3.9, 95% CI: 2.2, 6.9) adulthood. Adjustment for minor allele frequency of the associated SNP, number of cases, number of GWAS publications on each trait, and trait prevalence did not have an appreciable effect on these results. Further, excluding the first GWAS publication for each condition or studies with < 300 or > 2,000 cases in the discovery sample also yielded similar results. Our findings suggest that, on average, genes involved in pediatric conditions have stronger effects than genes for adult-onset conditions; confirmation may guide GWAS design.

051

FACTORS RELATED TO TYMPANOSTOMY TUBE TREATMENT AMONG CHILDREN WITH CHRONIC AND/OR RECURRENT OTITIS MEDIA. K Daly, B Lindgren, M Sale, K Walt, F Rimell, J Sidman, T Lander, and R Tibesar (University of Minnesota, Minneapolis, MN)

Otitis media (OM), a common childhood disease, has been shown to cluster in families. Potential risk factors were studied to better understand their role in the development of OM. Cases (children and young adults treated with tympanostomy tubes for chronic/recurrent OM) and controls (children and young adults without chronic/recurrent OM and tube treatment) were participants in a genetic study of OM from 2004 to 2010 at the University of Minnesota. Data for phenotyping were collected from parent-reported history, ear examination, tympanometry and medical record abstract. Associations between demographic, genetic and environmental risk factors and case status were evaluated with univariate and multivariate (logistic regression) analyses. Sample size for univariate analyses was 735 individuals; 672 were available for multivariate analyses. Factors significantly related to tube treatment for chronic/recurrent OM in univariate analyses ($p < 0.05$) were entered into multivariate models. Female gender, odds ratio (OR) 0.54, 95% confidence interval (CI) 0.39, 0.75, $p < 0.001$; bottle/combination feeding, OR 1.42, 95% CI 1.00, 2.00, $p < 0.047$; daycare, OR 1.64, 95% CI 1.13, 2.37, $p = 0.009$; white race OR 1.64, 95% CI 1.01, 2.64, $p < 0.044$; and female gender 0.54, 95% CI 0.39, 0.75, $p < 0.001$. Of six SNPs with $p < 0.10$ in univariate analyses, only the rs12271647_A allele was significantly related to tube treatment in multivariate analyses: OR 1.43, 95% CI 1.03, 1.98, $p < 0.034$. This study demonstrates a significant relationship between several risk factors, a SNP allele and tympanostomy tube treatment, and provides evidence that genetics plays a role in chronic/recurrent otitis media.

050-S

EFFECTS OF ETHANOL AND RELATED METABOLIZING GENES ON ONSET AGE, RISK AND SURVIVAL OF ORAL CANCER. *H C Tu, W T Lin, C L Chang, L W Lee, D C Wu, H L Huang, C H Lee (Kaohsiung Medical University, Kaohsiung, Taiwan)

The activity of ethanol oxidation is closely linked to the encoded proteins from ADH1B and ALDH2 genes. The process of alcohol catabolism is imperative because the first metabolite of ethanol oxidation (acetaldehyde) is carcinogenic in animals. To investigate the potential genotoxic effect of the two genes with regard to ethanol intake on the age of tumor diagnosis, the risk of contracting carcinoma and survival of cancer patients for oral neoplasm, we carried out a multicenter cancer series and case-control study in Taiwan. We examining 416 oral cancer patients and compared them with 1042 control subjects. Age at first tumor diagnosis and clinical/pathological aspects were reviewed and assessed. Logistic regression and survival related methods were used in multivariate analyses. A 1.3 and 1.5-fold appreciably higher hazard ratio (HR) for earlier oral cancer onset was observed to be related to drinkers who carried ADH1B ARG48HIS *1/*1 and ALDH2 GLU504LYS *2 allele, respectively. Compared with non-drinkers, ADH1B *1/*1 genotype and ALDH2 *2 allele conferred a 2.0 and a 2.3-fold increased risk, and a 7.4-fold gene/gene combined risk of contracting oral cancer among > 35 g/day of drinkers. However, no substantial association between the two genes and survival of oral cancer patients was detected. In conclusion, the genetic vulnerability in regard to ADH1B and ALDH2 genes is involved to carcinoma occurrence of oral cavity, however, for patient's survival the evidence is limited.

052-S

GENETIC VARIATION IN VITAMIN D RESPONSE GENES AND PULMONARY FUNCTION. *J Gilmour, T Harris, D K Houston, S B Kritchevsky, K Lohman, Y Liu, B Reardon, P A Cassano (Cornell University, Ithaca, NY, 14853)

Higher serum vitamin D is associated with better pulmonary function in cross-sectional studies. In vitro studies of epithelial tissue identified over 900 vitamin D-responsive genes, which may suggest a mechanism through which vitamin D affects lung health. We previously identified a subset of vitamin D-responsive genes that were differentially expressed in lung tissue from persons with low vs. high serum vitamin D. Variation in these genes is hypothesized to lead to changes in pulmonary function, and this question was studied in 1,502 men and women of European ancestry in the Health, Aging, and Body Composition study. 2,129 SNPs in 24 autosomal genes were analyzed for associations with lung function (forced expiratory volume in the first second, FEV1). The 16 top hits (nominal $p < 0.02$, range .0186-.0029) were in 3 genes: KCNS3, FGD3, and ARHGAP10. 6 linked SNPs in the 3' region of KCNS3 had the strongest associations with FEV1; KCNS3 encodes a potassium voltage-gated channel protein, and is associated with airway hyperresponsiveness. In KCNS3, rs4832574 was associated with a 50 mL increase in FEV1 per allele copy (C allele, MAF 0.47). FGD3 and ARHGAP10 are GTPase-activating proteins with a role in signaling and cytoskeleton function. Among 7 tightly linked SNPs in FGD3, rs1933670 had the strongest effect (76 mL increase in FEV1 per allele copy [A allele, MAF 0.11]). Genetic variants in vitamin D-responsive genes are associated with pulmonary function, supporting a mechanism for the serum vitamin D - pulmonary function association. This project was supported by NIA contracts N01-AG-6-2101, N01-AG-6-2103, N01-AG-6-2106, R01-AG029364, and R01-AG032098.

053-S

WITHDRAWN

055

PLA2G4A MUTANTS MODIFIED PROTECTIVE EFFECT OF TEA CONSUMPTION AGAINST COLORECTAL CANCER. *Y-X Yu, M-W Zhang, Y-F Pan, M-J Jin, X Jiang, S-C Zhang, Y-Y Wu, Q Ni, K Chen (Department of Epidemiology & Health Statistics, School of Public Health, Zhejiang University, Hangzhou, Zhejiang 310058, China)

The main aim was to evaluate PLA2G4A mutants modified protective effect of tea consumption against Colorectal cancer (CRC), colon cancer and rectal cancer. All participants were recruited from Jan 2006 to April 2008. The information about tea consumption was collected by structured questionnaire. CRC patients were diagnosed based on histology. Four single nucleotide polymorphisms (SNPs) in PLA2G4A gene were selected based on HapMap and NCBI datasets and genotyped by restricted fragment length polymorphism. The joint effects between tea consumption and SNPs on CRC, colon cancer and rectal cancer were also assessed, using multiple logistic regression models. 300 patients with CRC and 296 controls were used in final analyses. The significant associations between four SNPs (rs6666834, rs10911933, rs4650708 and rs7526089) and CRC were not observed. But their CTAC haplotype was significant associated with the increased risk of CRC (Odds ratio(OR) = 3.06; 95% confidence interval(CI) = 1.52-6.19), compared with TCAC haplotype. Drinking tea was correlated with a decreased risk of CRC after adjustment for covariates (OR = 0.61; 95%CI = 0.39-0.97). Meanwhile, compared with no-tea drinker with TT/CT genotype of rs6666834, tea-drinker with TT/CT or CC had significant lower risk of CRC (OR = 0.6 and 95%CI = 0.36-1.00 for TT/CT genotype; 0.38 and 0.19-0.74 for CC genotype). The joint effects between remaining three SNPs and drinking tea on CRC were observed as well. Tea consumption and haplotype of selected four SNPs in PLA2G4A gene was respectively associated with the risk of CRC. PLA2G4A mutants modified the protective effect of tea consumption against CRC in Chinese population.

054-S

WITHDRAWN

056

THE GENE-GENE INTERACTION OF H-RAS AND L-MYC ONCOGENES WITH COLORECTAL CANCER SUSCEPTIBILITY. Q Ni, Y-j Zhang, S-c Zhang, *K Chen (Department of Epidemiology & Health Statistics, School of Public Health, Zhejiang University, Hangzhou, Zhejiang 310058, China)

There is evidence showing that the ras and myc oncogenes cooperate in tumor induction in animal models. L-myc and H-ras oncogenes are representative genetic trait responsible for individuals' susceptibility to several cancers. However, there have been no reports concerning their gene-gene interaction related to colorectal cancer. We conducted a case-control study including 373 cases and 838 controls to evaluate the associations of L-myc rs3134613, H-ras rs12628 polymorphisms with colorectal cancer risk. The genotypes were determined by polymerase chain reaction-based restriction fragment length polymorphism. We used stratified analysis and logistic model to detect the gene-gene interaction. And the interaction was validated in multifactor dimensionality reduction (MDR) software. The individual single nucleotide polymorphism (SNP) model showed that the polymorphisms of H-ras and L-myc gene were not related to colorectal cancer risk ($P > 0.05$). Stratified analysis revealed that among the L-myc LS+SS genotype carriers, those with H-ras TC+CC genotype showed significantly increased risk of rectal cancer than those with TT genotype (odds ratio (OR) = 1.81, 95% confidence interval (CI) = 1.20-2.72). The Breslow-Day test showed that there was significant difference between different stratum ($P = 0.023$). The OR of the interaction effect was 2.74(95% CI = 1.14-6.59, $P = 0.024$). This result was confirmed in the MDR model, with 54.83% testing balanced accuracy and 10/10 cross-validation consistency, and the model was still significant after the 1000 times permutation test ($P = 0.001$). Our findings suggest that there is a synergy between H-ras and L-myc polymorphisms related to rectal cancer, and this finding needs to be validated.

057-S

CIGARETTE SMOKING, GENETIC POLYMORPHISMS IN CARCINOGEN METABOLIZING ENZYMES, AND PANCREATIC CANCER RISK. *J H Jang, S P Cleary, M Cotterchio, A Borgida, S Gallinger (Prosserman Centre for Health Research, Samuel Lunenfeld Research Institute, Toronto, Ontario, Canada M5G 1X5)

To determine if pancreatic cancer risk associated with cigarette smoking is modified by genetic predisposition in the ability to metabolize carcinogens, we used a population-based case-control design with 455 pathology-confirmed pancreatic cancer cases and 893 controls. Smoking data (smoking status, pack-years of smoking, smoking duration) was collected with self-administered questionnaires and polymorphisms of 32 carcinogen metabolism genes were determined by mass-spectrometry. Age-, sex-adjusted odds ratio (ASOR) and multivariate-adjusted odds ratio (MVOR) estimates were obtained using multivariate logistic regression. Interactions between each polymorphism and smoking were investigated with stratified analyses and the likelihood ratio statistic. Current smoker status (MVOR = 2.29, 95%CI:1.62,3.22), 10-27 pack-years (MVOR = 1.57, 95%CI:1.13,2.18), > 27 pack-years (MVOR = 1.77, 95%CI:1.27,2.46), and longer durations of smoking (19-32 years: MVOR = 1.46, 95%CI:1.05,2.05; > 32 years: MVOR = 1.78, 95%CI:1.30,2.45) were associated with increased pancreatic cancer risk. *CYP1B1*-4390-GG (ASOR = 0.36, 95%CI:0.15,0.86) and *UGT1A7*-622-CT (ASOR = 0.77, 95%CI:0.60,0.99) genotypes were associated with reduced risk. *NAT1*-640-GT and GG genotypes were associated with increased risk (ASOR = 1.75, 95%CI:1.00,3.05) as were *GSTM1* (rs737497)-GG (ASOR = 1.41, 95%CI:1.02,1.95) and *GSTT1*-gene-deletion (ASOR = 4.41, 95%CI:2.67,7.29). Interactions were observed between pack-years and *EPHX1*-415 ($p = 0.04$), and smoking status and *NAT2*-857 ($p = 0.03$). Our study supports the growing body of evidence that gene-environment interactions play key roles in pancreatic cancer development.

059

THE PHENX TOOLKIT: FLEXIBLE NAVIGATION USING MULTI-DOMAIN COLLECTIONS. *J Hammond, N Whitehead, Y Qin, J Levy, W Huggins, T Hendershot, H Junkins, E Ramos, H Pan, L Strader, C Hamilton (RTI International, Research Triangle Park, NC)

The PhenX (consensus measures for Phenotypes and eXposures) Toolkit offers high-quality, well-established, standard measures of phenotypes and exposures from 21 research domains for use in Genome-wide Association Studies (GWAS) and other large-scale genomic research efforts. By using the same measures across studies, data sets from multiple studies that include the same risk factor variables and disease phenotypes can be combined to increase the statistical power, thus increasing the ability to detect both more subtle and potentially complex gene associations. The Toolkit contains 291 measures with 11,388 variables. The most recent domains added to the Toolkit include Social Environments, Psychosocial, Psychiatric, Neurology, Gastrointestinal and Speech and Hearing. While measures were initially grouped by research domains, researchers are likely to use measures from multiple domains to meet their study needs. To facilitate browsing the Toolkit, Collections provide a categorical structure of related risk factors and other sets of measures. A Collection is defined as a group of measures with shared topics. Within the category of risk factors there are currently 11 Collections. They include topics such as Behaviors and Attitudes, Chemical and Physical Exposures and Medical History. Chemical and Physical Exposures includes 30 measures drawn from 10 research domains. Behaviors and Attitudes has 43 measures and Medical History includes 70. While keywords and other search techniques are utilized within the Toolkit, the development of Collections provides an alternative to browsing the Toolkit, allowing users to select groups of related measures that cut across research domains.

058-S

GENES POLYMORPHISM AND ACCELERATED GROWTH INTERACTION WITH SYSTOLIC BLOOD PRESSURE IN KOREAN CHILDREN. *H A Lee, J Min, E A Park, S Cho, Y J Kim, H Lee, E H Ha, H Park (Department of Preventive Medicine, School of Medicine Ewha Womans University, Seoul, Korea)

High-blood pressure(BP) in childhood has a relationship with BP in adulthood. We aim to show the interaction effect of PON1 Q192R, ACE ID polymorphisms and accelerated growth on high systolic blood pressure(SBP) in childhood. We investigated the children born at Ewha Womans University Hospital from 2001-2004. We followed up study subjects at their 3 years old. Accelerated growth is defined weight change Z score from birth to 3 years of age, when those who had above 1.52 SD score of weight change assigned in accelerated growth. The effect of the gene polymorphism and accelerated growth has been estimated using logistic regression and Generalized Multifactor Dimensionality Reduction($n = 310$). The proportion of high SBP was 10.7%. Those who experienced accelerated growth had 2.5(95%CI 1.2-5.3) times more risk of high SBP than others. Moreover, those who were had QR and RR genotype of PON and ID and II genotype of ACE were higher risk to high SBP although there was no statistic significant. Interaction between PON, ACE genotypes and accelerated growth was considered to be the final best model to predict risk high SBP, resulting the highest testing accuracy of 63.0%($p = 0.01$ by sign test) and crossvalidation consistency of 10/10, even after adjusting for sex and height. This study shows that two major genotypes interacted with growth trajectory to high SBP. Therefore, we need to monitor growth pattern with individual genetic susceptibility through childhood for preventing high SBP. This work was supported by National Research Foundation of Korea Grant funded by the Korean Government (2009-0064004).

060

COMMON GENETIC VARIANTS IN METABOLISM AND DETOXIFICATION PATHWAY GENES AND RISK OF PAPILLARY THYROID CANCER. B A Schebrook-Kilfooy, G Neta, A V Brenner, R P feiffer, A Hutchinson, EM Sturgis, L Xu, W Wheeler, E Ron, M A Tucker, S J Chanock, *A J Sigurdson (Radiation Epidemiology Branch, Division of Cancer Epidemiology and Genetics, NCI, NIH, DHHS, Bethesda, MD)

Several enzymes are involved in the metabolism or detoxification of exogenous and endogenous agents and hormones, but few studies have addressed these processes in thyroid cancer risk. Genetic variation in these enzymes could affect the ability to mitigate effects of various environmental exposures or impact the rate of thyroid hormone conjugation. We evaluated the association between papillary thyroid cancer (PTC) and 1,750 single nucleotide polymorphisms (SNPs) in 128 candidate gene regions involved in exogenous xenobiotic and endogenous hormone metabolism, including phase I and II, oxidative stress, and metal binding pathways. In a case-control study of 344 PTC cases and 452 controls frequency matched on age and gender, we used unconditional logistic regression models to calculate odds ratios and p-values for log-additive trends with genotype. Gene region- and pathway-level associations were evaluated using combinations of SNP trend p-values with the adaptive rank truncated product method. We found evidence of an altered risk for PTC for 40 SNPs with p-values ≤ 0.05 . Seven gene regions had p-values of < 0.05 (SOD1, CYP8B1, UGT2B7, MTF2, GSTT1, DHRS9, and FMO3). No significant associations at the pathway level were found. No SNPs or gene regions remained significant after correction for the false discovery rate. Our results suggest a role of some genetic variants in detoxification and hormone metabolizing enzymes in the etiology of PTC. Future studies should be conducted with greater power and by environmental exposure status to evaluate this hypothesis further.

061-S

RISK CLASSIFICATION WITH AN ADAPTIVE NAIVE BAYES KERNEL MACHINE MODEL. *J Minnier, J Liu, and T Cai (Harvard School of Public Health, Boston, MA 02115)

As genetic studies of human diseases progress, it is becoming increasingly evident that genetics often play a major and complex role in many types of diseases. Therefore, the complexity of the genetic architecture of human health and disease makes it difficult to identify genomic markers associated with disease risk or to construct accurate genetic risk prediction models. Accurate risk assessment is further complicated by the availability of a large number of markers that may be predominately unrelated to the outcome or may explain a relatively small amount of genetic variation. Standard risk prediction models often rely on additive or marginal relationships of markers and the phenotype of interest. These models perform poorly when associations involve interactions and non-linear effects. We propose a multi-stage method relating markers to disease risk by first forming gene-sets based on biological criteria. With a naive bayes kernel machine model, we estimate gene-set specific risk models that relate each gene-set to the outcome. Second, we aggregate across gene-sets by adaptively estimating weights for each set. The KM framework models the potentially non-linear effects of predictors without specifying a particular functional form. Estimation and predictive accuracy are improved with kernel PCA in the first stage and adaptive regularization in the second stage to remove non-informative regions from the final model. Prediction accuracy is assessed with bias-corrected ROC curves and AUC statistics. Numerical studies suggest that the model performs well in the presence of non-informative regions and both linear and non-linear effects.

063

GENETIC ANCESTRY, SKIN REFLECTANCE AND PIGMENTATION GENOTYPES IN ASSOCIATION WITH SERUM VITAMIN D METABOLITE BALANCE. *R T Wilson, A Roff, P Dai, T Fortugno, J Douds, G Chen, G Grove, S Nikiforova, J Barnholtz-Sloan, T Frudakis, V Chinchilli, T Hartman, L M Demers, MD Shriver, K C Cheng (Penn State, Hershey, PA 17033)

Lower serum vitamin D levels among African Americans are attributed to skin pigmentation. However, genetic influences controlling for skin melanin content have not been investigated. Purpose: Identify differences in non-summer serum vitamin D levels by pigmentation gene variants, ancestry, and skin melanin index. Healthy participants, reporting at least 1/2 African American or 1/2 Caucasian American heritage, were matched (age +/- 2 yrs, sex, and race/ethnicity) and values for genetic ancestry (via autosomal ancestry informative markers), skin melanin index (via reflectance spectroscopy), and three serum vitamin D metabolites (25(OH)D3, 25(OH)D2 and 24,25(OH)2D3 via LC-MS/MS) were determined. Results: Compared with African Americans, both 25(OH)D3 (67.7 v. 36.1 nmol/L, $p < 0.001$) and 24,25(OH)2D3 (9.8 v. 4.4 nmol/L, $p < 0.001$) were significantly higher among Caucasian Americans. The percent 24,25(OH)2D3 differed between African American and Caucasian American women only (9.5 v. 13.1, respectively, $p < 0.001$). Skin pigmentation genotypes remained significantly associated with vitamin D metabolites, controlling for the independent effects of tanning bed use, vitamin D/fish oil supplement use, race/ethnicity, genetic ancestry, and/or skin melanin index. These associations were not confounded by the use of glucocorticoids, or statins. Conclusion: The significantly lower percent 24,25(OH)2D3 among African American women suggests a relatively lower catabolic rate. Questions regarding the public health definition of sufficient vitamin D levels remain.

062-S

LOCI ASSOCIATED WITH ATRIOVENTRICULAR CONDUCTION IN A GENOME-WIDE ASSOCIATION STUDY OF SEVEN AFRICAN AMERICAN POPULATIONS GENERALIZE TO PREVIOUSLY IDENTIFIED LOCI IN EUROPEAN AND ASIAN POPULATIONS. *A M Butler and J W Magnani (on behalf of the COGENT-CARe African American Electrocardiogram (ECG) Consortia, University of North Carolina, Chapel Hill, NC 27514)

PR interval duration (PR) as measured by the resting, standard 12-lead ECG reflects length of atrial / atrioventricular nodal depolarization and is a potent risk factor for atrial fibrillation, heart failure, stroke, and mortality. Substantial evidence exists for a genetic contribution to PR, including that from genome-wide association studies of its common genetic determinants in European and Asian populations. However, such studies of African Americans are uncommon. We present results from the largest genome-wide association study to date of PR in 12,395 adults of African descent from seven cohorts. We tested for association between PR (ms) and approximately 2.5 million genotyped and imputed single nucleotide polymorphisms. We performed imputation using the HapMap YRI and CEU panels. Associations were adjusted for admixture and clinical PR correlates. We meta-analyzed study-specific results using the inverse variance method. There was little evidence for inflation of genome-wide test statistics (lambda range: 1.0 – 1.1). Five loci achieved genome-wide significance ($p < 2.5 \times 10^{-8}$). They were located in or near MEIS1 (chromosome 2), SCN5A (chromosome 3), ARHGAP24 (chromosome 4), CAV1 (chromosome 7), and TBX5 (chromosome 12). There was modest evidence for heterogeneity of effects at each locus (Cochran's $Q p > 0.1$). These findings illustrate the generalizability across European, Asian and African-American populations of genome-wide associations between PR and its common genetic determinants.

064

COMMON GENETIC VARIANTS IN IMMUNE GENES AND RISK OF PAPILLARY THYROID CANCER. *A V Brenner, G Neta, E M Sturgis, R M Pfeiffer, A Hutchinson, L Xu, S Balasubramaniam, W Wheeler, E Ron, M A Tucker, S J Chanock, A J Sigurdson (NCI, Bethesda, MD 20892)

There is accumulating evidence that alterations in immune function might be implicated in the etiology of papillary thyroid cancer (PTC). To identify genetic markers in immune-related pathways, we evaluated 3,985 tag single nucleotide polymorphisms (SNPs) in 230 candidate gene regions that included genes from adhesion-extravasation-migration, arachidonic acid metabolism/eicosanoid signaling, complement and coagulation cascade, cytokine signaling, innate pathogen detection and antimicrobials, and leukocyte signaling and TNF/NF-kB signaling pathways. In a case-control study of 344 PTC cases and 452 age and gender frequency-matched controls, we used logistic regression models to estimate odds ratios and calculate P values of linear trend (Ptrend) for the association between tag SNPs and risk of PTC. To correct for multiple comparisons, we applied the false discovery rate method (FDR). Gene region- and pathway-level associations (Pgene and Ppathway) were assessed by combining individual SNP Ptrend values using the adaptive rank truncated product method. Two SNPs (rs6115, rs6112) in the SERPINA5 gene in the complement and coagulation cascade pathway were significantly associated with risk of PTC (Ptrend FDR/ Ptrend = 0.02/10-6 and Ptrend FDR/ Ptrend = 0.04/10-5, respectively). At the gene region level, SERPINA5 was significantly associated with risk of PTC (Pgene = 0.0003). In addition, three other genes (HEMGN, TICAM1, and FCGR2A) each within a different pathway were significantly associated with risk of PTC at $0.001 < Pgene < 0.01$. Overall, the complement and coagulation cascade pathway was the most significant pathway (Ppathway = 0.02) associated with PTC risk largely due to the strong effect of SERPINA5. Our results require replication but suggest that the SERPINA5 gene might be a new important susceptibility locus for PTC.

065

SINGLE NUCLEOTIDE POLYMORPHISMS(SNPS) IN DNA REPAIR GENES MAY BE ASSOCIATED WITH DECREASED BOWEL HEALTH-RELATED QUALITY OF LIFE FOLLOWING EXTERNAL BEAM RADIATION THERAPY TREATMENT FOR PROSTATE CANCER. *M Conlon, M Bewick, J Bowen, R Bissett. (Regional Cancer Program of the Hôpital régional de Sudbury Regional Hospital, Sudbury, ON, Canada P3E 5J1)

To investigate the association between Single Nucleotide Polymorphisms (SNPs) in candidate DNA repair genes and the development of adverse health-related quality of life (HRQOL) in men who received External Beam Radiation Therapy (EBRT) for intermediate to high-risk prostate cancer, we defined a consecutive cohort of men ($n = 35$) who attended a regional cancer program. All men completed the Expanded Prostate Index Composite (EPIC) questionnaire prior to and at the end of treatment, and provided a saliva sample (DNA Genotek Inc, Ottawa, Can.) for genetic analyses. Logistic regression defined Odds Ratios (OR)s and 95% Confidence Intervals (95% CI)s. Overall, EPIC bowel summary scores were significantly decreased at end of treatment (mean difference -16.4, standard deviation (sd) 17.6; $p < 0.001$ Wilcoxon), with evidence of inter-individual variability. Following classification into cases (largest decreases in bowel HRQOL, $n = 21$) or controls ($n = 14$) none of the individual variant genotypes of XRCC3 Thr241Met rs861539, Lig4 Asp568Asp rs1805386, XRCC1 Arg399Gln rs25487, or ERCC1 Gln504Lys rs3212986 appeared significantly associated. When combined into an increasing number of variants score, results were significant with an OR of 10.4 (95% CI 1.62-66.9) for men with 2 variants compared to a referent group with 0 or 1 variants; and an OR of 24 (95% CI 1.74-331) for 3 or 4 variants compared to the referent, and supported by a significant test of trend, $p = 0.009$. Interpretation was not substantively different following assessment of other covariates for potential adjustment including radiation treatment variables (% rectal volume above 6000cGY), the presence of hypertension or diabetes, or length of time between final questionnaire completion and end of treatment. This study supports an association of increasing number of SNPs in DNA repair genes with decreased bowel HRQOL following EBRT for prostate cancer.

067

FAMILIAL RISK FOR NOISE-INDUCED HEARING LOSS (NIHL) AND PRESBYCUSIS: THE NORD-TRØNDELAG HEARING LOSS STUDY, 1996-1998. *H J Hoffman, G W Reed, K Tambs, E Kvestad, N Krog, B Engdahl (National Institute on Deafness and Other Communication Disorders, Bethesda, MD 20892)

To investigate risk factors for hearing loss, 50,722 adults had hearing tests and answered questions for a Health Survey in Nord-Trøndelag County, Norway. Linkage of family relationships was performed by Statistics Norway. Pure-tone, air-conduction testing was conducted in sound-treated booths (thresholds assessed at 0.5–8 kilohertz (kHz) in each ear). Presbycusis or age-related hearing loss (ARHL) is defined by a bilateral, pure-tone average of thresholds at 0.5, 1, & 2 kHz > 25 decibels (dB) hearing level (HL). NIHL is defined by bilateral high frequency “notches”. A notch is present if a high frequency threshold at 3, 4, or 6 kHz exceeds by 15 dB HL the average of thresholds at 0.5 and 1 kHz, and if the 8 kHz threshold is at least 5 dB HL better (lower) than the maximum threshold at 3, 4, or 6 kHz. The prevalence of NIHL was 16.7%; it increased from 7.5% for young adults (age 20–24) to 22.4% at age 55–64, and then declined to 11.8% for older adults (age 85–101). Males had more noise exposure and NIHL. A mixed-model logistic regression with random effects for family was used to analyze 4,656 male siblings (> 1 per family, range 2–7). After adjusting for age and hours/week of work-related noise exposure, the within-family correlation was 0.14 ($p < 0.001$). Alternative logistic regression models of familial risk used “proportion of affected siblings” as a covariate. Restricting age < 55, the odds ratio (OR) = 1.61 (95% confidence interval: 1.23–2.10) for familial risk was comparable to that for tinnitus, OR = 1.45 (1.15–1.83). If age ≥ 55 , the familial risk of ARHL had an OR = 3.72 (1.44–9.60) and for tinnitus the OR = 3.53 (1.89, 6.61). These findings indicate familial risk contributes to NIHL susceptibility, as well as to presbycusis.

066-S

THE ENDOTHELIAL PROTEIN C RECEPTOR (EPCR) 4600A/G VARIANT AND RISK OF COMMON THROMBOTIC DISORDERS: A HUGE REVIEW AND META-ANALYSIS OF EVIDENCE FROM OBSERVATIONAL STUDIES. *J Dennis, A Adediran, C Johnson, P Morange, D Tregouet, F Gagnon (University of Toronto, Toronto, ON, Canada M5T 3M7)

The endothelial protein C receptor (EPCR), found primarily on the endothelium of large blood vessels, limits thrombus formation by enhancing activation of the protein C anticoagulant pathway, and therefore may play a role in the etiology of thrombotic disorders. The *EPCR* gene variant 4600A/G (rs86718) resulting in a Serine to Glycine substitution at codon 219 has been associated with increased plasma levels of soluble EPCR and reduced activation of the protein C anticoagulant pathway. However, its association with thrombosis risk remains unclear. We undertook a systematic review and meta-analysis to evaluate the evidence for an association between the *EPCR* 4600A/G variant and two common thrombotic outcomes: venous thromboembolism (VTE) and myocardial infarction (MI), which are hypothesized to share some etiologic pathways. MEDLINE, EMBASE, and HuGE Navigator were searched through November 2010 to identify relevant epidemiologic studies. Thirteen candidate gene studies (5 MI and 8 VTE) were analyzed (3645 cases, 12139 controls) and data were summarized using random-effects meta-analysis. None of the investigated genotype contrasts reached statistical significance at $p < 0.05$, with the exception of a weak association with VTE for the AG + GG versus AA contrast (odds ratio = 1.23, 95% confidence interval 1.00, 1.52, based on 2069 cases and 7974 controls). The study populations were heterogeneous, and the analysis may have been underpowered to detect an association. Overall, the evidence for an association between the *EPCR* 4600A/G variant and common thrombotic disorders is weak.

068

GENOMIC DNA METHYLATION IN A MULTI-ETHNIC URBAN COHORT. *J Flom, K Gonzalez, Y Liao, P Tehranifar, D Reynolds, L Fulton, R Santella, M B Terry (Columbia University New York, NY 10032)

Genomic DNA demethylation is associated with diseases including cancer, and has been associated with exposures including smoke, age at menarche, and physical activity. DNA methylation changes may be a pathway through which the environment impacts disease. We investigated differences in genomic DNA methylation by race and epidemiologic factors in a multi-ethnic population of 116 cancer-free women age 40-60 in Brooklyn, New York. Participants completed an interview and provided blood samples. Satellite 2 (Sat2) methylation in DNA from monocytes (MN) and granulocytes (Gran) was measured using MethyLight. Lower methylation levels indicate greater DNA demethylation. Sat2 methylation levels in MN and Gran were correlated ($r = 0.59, p < .001$). We used multivariable linear regression to adjust for all measures significantly associated with Sat2 methylation. In Gran, Oral Contraceptive (OC) use and smoking status were univariably associated with Sat2 methylation, but in multivariable models, only smoking status remained significant ($\beta = -14.1, 95\% \text{ Confidence Interval(CI):-24.2, -3.9}$; $\beta = -5.2, 95\% \text{ CI:-18.6, 8.2}$, for former and current smokers versus never smokers, respectively). In MN, those with 110 minutes or more of exercise per week had lower levels of Sat2 methylation compared to those who did not exercise ($\beta = -23.3, 95\% \text{ CI:-39.5, -7.1}$). OC users had significantly lower Sat2 methylation ($\beta = -14.4, 95\% \text{ CI:-25.0, -3.8}$). There were no differences in Sat2 methylation by race, age, BMI, income, education, alcohol and other reproductive factors. Overall, OC use, smoking and exercise were associated with genomic DNA demethylation. Future studies should investigate how changes in exposures impact changes in genomic DNA methylation over time.

069

A COMPREHENSIVE ANALYSIS OF COMMON GENETIC VARIATION IN ADIPONECTIN WITH COLORECTAL CANCER AND BIOMARKERS OF INSULIN RESISTANCE: THE MULTIETHNIC COHORT. *S M Conroy, I Cheng, C P Caberto, M Tiirikainen, L Kolonel, B E Henderson, L Le Marchand (University of Hawaii Cancer Center, Honolulu, HI 96813)

Accumulating epidemiologic evidence supports an association between circulating levels of adiponectin and colorectal cancer risk. In this study, we investigated the association between common genetic variation in the adiponectin gene (*ADIPOQ*) and colorectal cancer risk among 2,072 colorectal cases and 2,607 controls of African American, Caucasian, Japanese American, Native Hawaiian, and Latino ancestry nested within the Multi-ethnic Cohort Study. To capture the common genetic variation in *ADIPOQ*, we selected and genotyped 30 tag SNPs (minor allele frequency $\geq 5\%$) from 20-kb upstream and 10-kb downstream of the gene using TaqMan OpenArrays. Unconditional logistic regression was used to examine the effect of these SNPs on colorectal cancer risk, adjusting for age, gender, and ethnicity. Analysis of covariance was used to test for differences in mean levels of biomarkers of insulin resistance by genotypes. Of the 30 SNPs tested, 5 SNPs (rs6810075, rs2036373, rs266769, rs9877202, rs7641507) were associated with colorectal cancer ($p = 0.001-0.05$) with 1.5 associations expected by chance alone. Evidence for heterogeneity by ethnicity was observed for 2 SNPs (rs1501299, $p_{\text{het}} = 0.05$ and rs6444175, $p_{\text{het}} = 0.02$). Furthermore, we observed associations ($p = 0.01-0.03$) between 3 SNPs (rs1249594, rs1403696, rs7641507) and biomarkers of IGF1, IGFBP1, IGFBP3, and/or HOMA-IR in a subset of 1,629 controls. Our results suggest that common genetic variants in *ADIPOQ* may influence colorectal cancer risk and biomarkers of insulin resistance.

071-S

UPTAKE AND ADHERENCE OF THE QUADRIVALENT HUMAN PAPILLOMAVIRUS VACCINE IN AN ONTARIO COHORT OF GRADE 8 GIRLS. *L M Smith, P Brassard, J Kwong, S Deeks, A Ellis, L E Lévesque (Queen's University, Kingston, ON, Canada K7L 3N6)

Background: While hundreds of millions of dollars have been invested in offering the quadrivalent human papillomavirus (HPV) vaccine to young girls in Canada, there continues to be very little information about its usage. Methods: Linking administrative databases, we conducted a population-based, retrospective cohort study of girls eligible for Ontario's Grade 8 HPV vaccination program in Kingston, Frontenac, Lennox, and Addington. We determined the vaccination/uptake (≥ 1 dose) and adherence (3 doses) status of girls according to demographics, vaccination history, health services utilization, and medical history and used multivariable logistic regression to estimate the strength of associations between individual factors and uptake and adherence. Results: We identified a cohort of 2519 girls, 56.6% of whom were vaccinated. Among vaccinated girls, 85.3% were adherers. Vaccination history was the strongest predictor of uptake in that girls who received the measles-mumps-rubella, meningococcal C, and hepatitis B vaccines were almost five times more likely to also receive the HPV vaccine. Still, HPV vaccine uptake was $\geq 20\%$ lower than uptake of these other vaccines. While uptake was not influenced by income, adherence was. In particular, girls of low income were the least likely to receive all three doses (odds ratio: 0.45, 95% confidence interval: 0.28-0.72). Interpretation: The low level of HPV vaccine use in Ontario will likely have important implications in terms of the health benefits and cost-effectiveness of its publicly funded program. We identified factors that influence uptake and adherence that should be considered in efforts to guide future HPV vaccine programming.

070

MEASUREMENT ERROR IN MENDELIAN RANDOMIZATION STUDIES: THE EFFECT OF SUB-OPTIMAL CALIBRATION. *Brandon L Pierce (University of Chicago, Chicago, IL)

Mendelian randomization (MR) refers to the use of instrumental variable analysis to assess the causality of exposure-disease associations for exposures that have known genetic determinants. In MR studies, data on such a genetic determinant (i.e., an instrumental variable) is analyzed jointly with data on the exposure and the outcome. In theory, MR generates effect estimates that are not biased by unmeasured confounding or "reverse causation". In this work, we examine the effects of measurement error for a continuous exposure and a continuous outcome on bias in the MR estimates. We show that random measurement error in the genotype, the exposure, and the outcome does not bias the MR estimate. However, poor calibration of the exposure or the outcome does bias the MR estimate. Poor calibration can be conceptualized as a regression of the measured variable on the true variable, where the regression slope does not equal one. We demonstrate our results analytically and using simulations. Substantial measurement error for biomarkers can occur for a variety of reasons, including temporal variation in the exposure, limitations of the measurement method, suboptimal handling/storage of bio-specimens, errors in measurement protocol, and measurement outside of the relevant etiologic time window. In conclusion, for MR studies, random error will not bias the MR estimate, although MR studies with exposure and outcome measures prone to poor calibration should be interpreted with caution.

072-S

HISTORY BEHIND THE IVF EGG: ARE WOMEN'S COMPREHENSIVE HISTORIES ASSOCIATED WITH THE NUMBER OF EGGS COLLECTED, OR FERTILISED NORMALLY, FROM REPEATED IVF CYCLES? *D L Herbert, J C Lucke, A J Dobson (University of Queensland, Brisbane, Australia)

Most studies of in vitro fertilisation (IVF) outcomes use cycle-based data and fail to account for women who use repeated IVF cycles. The objective of this study was to examine the association between the number of eggs collected (EC) and the percentage fertilised normally, and women's self-reported medical, personal and social histories. This study involved a cross-sectional survey of infertile women (aged 27-46 years) recruited from four privately-owned fertility clinics located in major cities of Australia. Regression modeling was used to estimate the mean EC and mean percentage of eggs fertilised normally: adjusted for age at EC. Appropriate statistical methods were used to take account of repeated IVF cycles by the same women. Among 121 participants who returned the survey and completed 286 IVF cycles, the mean age at EC was 35.2 years (SD 4.5). Women's age at EC was strongly associated with the number of EC: < 30 years, 11.7 EC; 30.0- < 35 years, 10.6 EC; 35.0- < 40.0 years, 7.3 EC; 40.0+ years, 8.1 EC; $p < 0.0001$. Prolonged use of oral contraceptives was associated with lower numbers of EC: never used, 14.6 EC; 0-2 years, 11.7 EC; 3-5 years, 8.5 EC; 6+ years, 8.2 EC; $p = 0.04$. Polycystic ovary syndrome (PCOS) was associated with more EC: have PCOS, 11.5 EC; no, 8.3 EC; $p = 0.01$. Occupational exposures may be detrimental to normal fertilisation: professional roles, 58.8%; trade and service roles, 51.8%; manual and other roles, 63.3%; $p = 0.02$. In conclusion, women's age remains the most significant characteristic associated with EC but not the percentage of eggs fertilised normally.

073

THE RISK OF HOSPITALIZATION IN THE ELDERLY – CONSIDERING MULTIPLE HEALTH DOMAINS. *A V Perruccio, E Losina, E A Wright, J N Katz (Brigham and Women’s Hospital, Harvard Medical School, Boston, MA 02115)

Objective: To investigate the effects of several health domains on the likelihood of hospitalization among the elderly. Study Design: Medicare recipients (n = 958) completed a survey 3 years post hip replacement surgery. A structural equation model with probit regressions was employed. Latent constructs: ‘Predisposing’ (age, sex, race, living situation, physical activity); ‘Enabling’ (income, education, State, urban/rural, ancillary benefits); and ‘Need’ (medical comorbidity, function (musculoskeletal (MSK), physical, social), mental health, geriatric functional problems, self-rated health). Health domain effects on Need and subsequently on 1-year hospitalization were investigated. A traditional approach considered all variables in a single probit regression. Results: Physical and social limitations were strong indicators of Need, and poor mental health, MSK limitations and medical comorbidity the strongest determinants. Need significantly predicted hospitalization. Predisposing and Enabling did not predict hospitalization. However, Predisposing predicted Enabling, and Enabling predicted Need. All measures were significantly associated with a latent construct. With the traditional approach, fewer than 5 measures predicted hospitalization. Conclusion: Besides medical comorbidity, poor mental health and MSK limitations have a salient role in predicting hospitalization among the elderly. Efforts aimed at delaying or minimizing hospitalizations in this population should consider a broad array of health domains for potential targeted intervention. Additionally, multiple domains should be considered when developing and implementing planning, design and evaluation policies.

075-S

PREDICTING THE RISK OF DEEP INFECTIONS FOLLOWING TOTAL KNEE REPLACEMENT: A PRAGMATIC, PROGNOSTIC RISK SCORE. *E W Paxton, E S Johnson, R W Platt, A L Adams, J Q Wang, M L Thorp, E A Bayliss, A Ferrara, C Nakasato, S A Bini, R S Namba (Kaiser Permanente, San Diego, CA)

Surgeons and patients need a tool to predict deep infections following total knee replacement. We developed a pragmatic, points-based risk score to predict knee deep infections for clinical decision making. Using a large health care organization’s joint replacement registry, we identified deep infections associated with 38,094 primary total knees performed between 2001 and 2009. Infections were validated through chart review according to Centers for Disease Control and Prevention guidelines. Patient characteristics were extracted from the registry and our electronic health record. We observed 241 deep infections, a one-year incidence of 6.4 per 1,000 patients (95% Confidence Interval, 5.7 to 7.3). The risk score, derived from a Cox regression with stratification by region, included the following risk factors: age (less than 55 and greater than 80), male gender, race (black and white versus other), diagnosis other than osteoarthritis, diabetes with complications, and higher body mass index. Agreement (calibration) was adequate for the highest and lowest-risk deciles. Patients in the highest-risk decile were 6.7 times more likely to suffer a deep infection when compared with patients in the lowest-risk decile (2.7 per 1,000). Body mass index is one characteristic that is potentially modifiable through intervention. We believe this risk score is the first of its kind for predicting knee deep infections and may be useful for decision-making by orthopedic surgeons and patients. Additional risk scores are needed for predicting other complications and clinical outcomes in knee replacement surgery.

074

HEALTHY PEOPLE 2010: FINAL ASSESSMENT OF PROGRESS AND DISPARITIES. *L Gurley (National Center for Health Statistics, CDC, Hyattsville, MD 20782)

For three decades, Healthy People has provided a comprehensive set of national 10-year health promotion and disease prevention objectives aimed at improving the health of Americans. It is grounded in the principle that establishing objectives and providing benchmarks to track and monitor progress over time can motivate, guide, and focus action. Healthy People 2010 (HP2010) continued in this tradition by identifying a wide range of public health priorities and specific, measurable objectives with targets to be reached by the end of the year 2010. It has two overarching goals: 1) increase the quality and years of healthy life and 2) eliminate health disparities. An evaluation of progress toward the HP2010 target for each objective and toward eliminating racial/ethnic (r/e) disparities among all population-based objectives was conducted. Progress was measured using the percentage of targeted change achieved. Disparities were defined as the percent difference between the r/e group with the best or most favorable rate and the rates for each of the other r/e groups. A summary index was used to describe the average percent difference from the best r/e group rate for all of the other group rates and to evaluate changes in disparity over time among all r/e groups. Preliminary results from the evaluation of progress show that 71% of the objectives with tracking data are moving towards the target (19% of these met their targets), 23% were moving away from their targets, and 6% showed no change. Preliminary results for disparities show that between the baseline and the most recent data point, the number of objectives with increasing disparities was similar to the number of objectives with decreasing disparities and there was no change in disparity for most objectives.

076-S

RISK FACTORS ASSOCIATED WITH TOTAL KNEE REPLACEMENT FAILURE IN A LARGE COMMUNITY BASED TOTAL JOINT REPLACEMENT REGISTRY. *M C S Inacio, E W Paxton, C Ake, R S Namba, M Khatod (Kaiser Permanente/UCSD, San Diego, CA)

Increased utilization of Total Knee Replacement (TKR) has led to the need to further identify risk factors associated with TKR failure, defined as revision of at least one implant component. This study examined whether patient, surgeon/hospital, procedural, and implant characteristics are associated with risk of revision TKR. Sex specific risk factors were also explored. TKR patient characteristics (age, race, sex, comorbidities, BMI, and diagnosis), procedure information (bilateral, operative time, surgical approach, patellar resurfacing), surgeon/hospital (volume, training), implant characteristics (design, fixation) and subsequent revision procedures were obtained from a Total Joint Replacement Registry. Descriptive statistics were generated and survival analyses (Kaplan-Meier and multivariate proportional hazards regressions) were conducted. 47339 primary TKR cases were performed between 2001-2009. Patients (mean age = 67.5, BMI = 31.6kg/m²) were 63% female and had a 21.9% prevalence of diabetes. The overall revision rate was 1.9% (N = 881), including 0.8% for septic revisions (N = 366). The following were risk factors for aseptic revision: younger age (P < 0.001), black race (P < 0.001), diabetes (P = 0.011), unresurfaced patella (P = 0.030), and Low Contact Surface (LCS) implant designs (P < 0.001). Bilateral procedures were protective (P = 0.003). In females, risk factors were the same as the overall model except for diabetic status. In males, unresurfaced patellar procedures and black race were not significant risk factors and Asian race was found to be a protective factor (P = 0.027). Patient risk factors dominated the overall risk profile, with younger age, race, and diabetes all being important in aseptic revisions. The surgical factors found to be associated with aseptic revision were unresurfaced patellae techniques, LCS implants, and bilateral cases. Males and females have slightly different risk profiles.

077

DISABILITY AND ACCESS TO HEALTH CARE IN FLORIDA. E D Bouldin, *E M Andresen, M B Cannell, A G Hall (University of Florida, Gainesville, FL 32610)

Disability may include physical, mental, cognitive, emotional, and sensory impairments that occur across the life span. We measured the prevalence of disability in Florida using data from the 2009 Behavioral Risk Factor Surveillance System (BRFSS) and several classifications of disability. We also assessed access to health care, health behaviors, and health conditions among people with and without disability. The BRFSS is a random digit-dialed cross-sectional telephone survey of non-institutionalized state residents age 18 and older. The standard BRFSS definition of disability includes people who report an activity limitation. In 2009, additional questions assessed respondents' need for routine and personal care assistance and the duration of their activity limitation. We created a measure of disability severity ranging from no disability to long-term disability (disability greater than 6 months) with personal care needs. There were 8,335 respondents with no disability and 3,374 with disability. Health insurance coverage and having a recent physical exam were similar across all respondents. Respondents with disability were significantly less likely to have visited a dentist in the past year (38% vs. 71% with no disability). Cost and transportation were significantly more likely to be barriers to health care for people with disability (54% vs. 15% and 16% vs. 3%). People with a disability were significantly less likely to engage in physical activity outside of work (61% vs. 80%) and significantly more likely to be current smokers (24% versus 16%) compared to people without a disability. For most variables, a gradient existed such that as disability severity increased, access and health measures were poorer and barriers to care were higher.

079

MATCH LENGTH: ITS' ASSOCIATION WITH TRAJECTORIES OF BEHAVIORAL AND PSYCHOLOGICAL FUNCTIONING IN CHILDREN PARTICIPATING IN CANADIAN BIG BROTHERS BIG SISTERS (BBBS) COMMUNITY MATCH PROGRAMS. *D De Wit and E Lipman (Centre for Addiction & Mental Health, London, ON, Canada)

Background: Research has shown that children matched to an adult mentor in the context of BBBS match programs experience positive behavioral and psychological outcomes compared to unmatched children. However, how long children spend in a BBBS match and its association with distinct long term trajectories of behavior is not fully understood. Objective: To determine if length of time in a BBBS match successfully discriminated between groups of children following distinct patterns of growth in psychological and behavioral outcomes. Method: Latent class growth analyses were conducted on 744 children ages 7-16 (391 boys; 353 girls) newly enrolled in 20 BBBS agencies and followed longitudinally at 6 month intervals from baseline (before match exposure) to 18 months. Outcomes included peer self-esteem, personal self-image, symptoms of depression and social anxiety, emotional problems, peer difficulties, victimization, conduct problems, and inattention-hyperactivity. Results: Match status at 18 months: 22% never matched, 17% matched 1-6 months, 19% 7-11 months, and 43% 12+ months. While the overall trend was toward improved functioning, children followed distinct patterns of growth for several outcomes (i.e., high, medium, and low variants). Matches lasting 7-11 or 12+ months were associated with an increased likelihood of group membership among children displaying high and increasing personal self-image (vs. low and increasing group) and a decreased likelihood of group membership among those displaying high and decreasing emotional problems, anxiety, and depression (vs. low and decreasing group).

078

REDISTRIBUTING THE U.S. HEALTH SERVICES WORKFORCE TO ADDRESS HEALTH DISPARITIES. *R Fang, J Umar, S Smith (American Academy of Physician Assistants, Alexandria, VA 22314)

The United States has the highest health expenditure per capita, yet attains the poorest health outcomes among the Western nations. In 2006, the U.S. had a physician-population ratio of 242:100,000, which was well above Japan (209), Canada (215) and the WHO proposed level (100). In this study, we examined the relationship between state density of physicians and other care providers and health outcomes in the U.S. through a socio-geographic lens. Socio-geographical patterns of practicing care providers in the U.S. were examined with data from HRSA, the U.S. Census and national databases for non-physician clinicians. Health outcomes were measured by mortality rates from vital statistics. We found high disparities in physician and non-physician clinician population ratios across states, from Mississippi (174 physicians, 3 PAs and 63 NPs) to Massachusetts (405 physicians, 25 PAs and 86 NPs). Among states with higher poverty rates, a majority have densities of practicing physicians and non-physician clinicians that are well below the national average. We further found a significant shortage of both physicians and PAs in the states with the ten highest mortality rates. This study shows that the U.S. currently maintains a moderate national care provider level but maldistributed. Since poverty is strongly associated with poor health, the lower care provider numbers in these areas could population health indicating the need for policy solutions aimed at incentivizing the redistribution of these resources to address higher needs in high-poverty areas. Otherwise, merely expending national health workforce supply may further widen currently existing health disparities in the country.

080

ACCESS TO SPECIALIST SERVICES FOR ARTHRITIS: A STUDY OF NEED AND AVAILABILITY. *M Canizares, A M Davis, E M Badley (Toronto Western Research Institute, Toronto, ON, Canada M5T 2S8)

Equitable adequate access to specialist care is essential to management of chronic diseases. To investigate access to specialists (orthopedic surgeons, rheumatologists) for arthritis within Ontario, Canada, taking into account need (prevalence of arthritis, age, socioeconomic status (SES), rurality) and availability of specialists. An ecologic analysis based on small areas (n = 101) in Ontario. Access: person visit rate with arthritis diagnoses per 1000 population for specialist office visits or surgery. Need: prevalence of arthritis from the 2008 Canadian Community Health Survey or percent of the population aged 65+ years; SES (% low income or education); % aboriginal population; Statistics Canada index of rurality. Provision: data from surveys of orthopedic surgeons and rheumatologists ascertaining hours per week of service by location, using geographic information system analysis to derive an index of local accessibility. Analysis by Poisson regression. Orthopedic surgeon office visit access appears to align with need and provision as shown by significant associations with higher quintiles of arthritis, older age, % aboriginal population, and no gradient with specialist accessibility. However, access to surgery was higher for high SES quintiles. For rheumatology, there was no association with need (quintiles of arthritis prevalence, age or % aboriginal), access was highest for areas with higher SES quintiles, with a marginal positive association with rheumatology provision. Findings suggest there are inequities in access to rheumatologists and for orthopedic surgery in low SES areas. Access to office visits with orthopedic surgeons is more equitable.

081

URBAN VS RURAL PATTERNS OF EMERGENCY DEPARTMENT UTILIZATION IN QUEBEC: A POPULATION STUDY, 2004. *S Sanche, J McCusker, R Borges da Silva, A Ciampi, P Tousignant, A Vadeboncoeur and J-F Levesque (St. Mary's Research Center, Montreal, QC, Canada H3T1M5)

The province of Quebec has the highest rate of emergency department (ED) utilization in Canada. Our study aimed to compare rural and urban patterns of ED utilization in a sample of Quebec's adult users of the health care system ($n = 579,669$) and to evaluate whether differences are explained by age and comorbidity. Provincial administrative data for the 2004 financial year were used with information on the physician billings and hospitalizations. The population proportion with any ED visit, the proportion of ED visits resulting in hospital admission and the proportion of total ambulatory physician visits that take place in an ED, were estimated using logistic regression with latter variance estimates corrected for the clustering of visits within users. These were examined by area of residence (metropolitan, other urban, and rural), with and without adjustment for age and comorbidity (Charlson Comorbidity Index). The estimated population percent using the ED was lowest in metropolitan areas (19.6%), intermediate in urban regions (25.6%) and highest in rural areas (33.1%). The percentage of ED visits resulting in admission was higher in metropolitan areas (11.1%), average in urban areas (10.2%) and lower in rural areas (7.9%). The percentage of ambulatory visits occurring in the ED was lower in metropolitan areas (5.3%), average in urban areas (8.5%) and higher in rural areas (14.7%). All 95% confidence intervals lengths were smaller than 0.6. Adjustment for age and comorbidity did not affect the above-mentioned relationships. These findings underline the different role of the ED in the healthcare system in urban vs rural areas.

083-S

THE RELATIONSHIP BETWEEN SHIFT-OF-ADMISSION AND SURGICAL DELAY FOR HIP FRACTURE PATIENTS: A MULTILEVEL MULTINOMIAL ANALYSIS. *U C Ogbu, G P Westert, K Stronks, O A Arah (Dept of Public Health, Academic Medical Center, University of Amsterdam, The Netherlands)

Hip fracture patients admitted during the weekend appear to achieve time-to-surgery standards at the same rate as those admitted during the weekdays. This may indicate that they do not experience the poorer quality of care typically associated with weekends. This study examines the association between time-of-admission and time-to-surgery among hip fracture patients using two definitions of time-of-admission. In this retrospective cohort study, we used data on 43,967 elderly hip fracture patients admitted to Dutch hospitals from 2003 through 2007. The data were analyzed using two-level multivariable multilevel multinomial logistic regression. Time-of-admission was defined as on/off-hours, and as the weekday/end shift of admission. Patients admitted during the off-hours had lower odds of surgical delay. Admissions during weekday or weekend day- and night-shifts were associated with decreased odds of surgical delay when compared to weekday evening-shift admissions. For instance, compared to weekday evening-shift admissions, the odds ratios for surgical delay until the 3rd day or later among those admitted during the weekend and weekday day-shifts were respectively 0.67 (95% CI: 0.54 - 0.83) and 0.75 (95% CI: 0.69 - 0.82). Similarly, the odds ratios for surgical delay until the 3rd day or later were 0.52 (95% CI: 0.38 - 0.72) and 0.53 (95% CI: 0.41 - 0.69) for weekend and weekday night-shift admissions respectively. Compared to weekday evening-shifts, admissions during the weekday day- and night-shift, and throughout the weekend were less likely to experience surgical delay. These findings could reflect the impact of resource distribution and quality standards for hip fracture patients.

082

VALIDATION OF MEASURES OF EMPOWERMENT, AN IMPORTANT OUTCOME OF SUPPORT PROGRAMS IN THE EXPANDING CANCER POPULATION. *E Maunsell, S Lauzier, J Brunet, S Campbell, R H Osborne (Unité de recherche en santé des populations (URESP), Université Laval, Québec, QC, Canada)

Empowerment refers to feelings of being able to manage the disease experience, and is a desired outcome of support programs. Few validated measures of empowerment exist for evaluating services in the expanding cancer population. We evaluated the psychometrics of the Australian Health Education Impact Questionnaire (heiQ) evaluation system, developed for evaluating effects of disease self-management programs and used widely across diseases and interventions. The five scales considered conceptually relevant to empowerment in cancer were emotional wellbeing, constructive attitudes/approaches, skill/technique acquisition, social integration/support, and health services navigation. We recruited Canadians diagnosed < 27 months earlier with different cancers randomly selected from the Manitoba Cancer Registry, and users of Canadian Cancer Society telephone support programs. 731 subjects completed a mailed questionnaire with the heiQ scales, related constructs and demographic questions. Traditional psychometric analyses and modern confirmatory factor analysis (CFA) were used to examine psychometric structure and construct validity. Ordinal CFA with robust maximum likelihood estimation gave very good model fit ($\chi^2(265) = 528.17$, RMSEA = .04, NNFI = .99, CFI = .99, SRMR = .06). Mean factor loadings ranged from .76 to .85, Cronbach alphas from .76 to .85. A priori hypotheses about correlations of certain heiQ scales with cancer self-efficacy were supported. These results provide strong evidence that the 5 constructs conceptualized as representing empowerment perform well in cancer patients/survivors. These scales will fill an important gap in cancer research and evaluation.

084-S

THE ASSOCIATION BETWEEN SOURCE OF REPRODUCTIVE HEALTH INFORMATION, KNOWLEDGE, AND SEXUAL RISK BEHAVIORS AMONG HIGH-END FEMALE ENTERTAINMENT CENTER WORKERS IN KUNSHAN, JIANGSU, CHINA. *Y Encarnacion, J E Mantell, X Sun, J Zhou, T M Exner, S Hoffman, F Zhou, T G M Sandfort, E A Kelvin (Hunter College, NY, NY 10010)

Misinformation about HIV/STIs is common among entertainment center workers in China and might play a role in the recent increased rates of infection. We conducted a self-administered survey among 689 employees of a high-end entertainment center in Kunshan, China. We used regression to examine the association of source information about sexual/reproductive health with risk behaviors and outcomes (STIs & unintended pregnancy). Significant associations were found between receiving information from peers/sex partners and having sex with ≥ 1 partner in the past month (odds ratio (OR) = 1.7, $p = 0.005$), with having ≥ 1 casual partner in the past month (OR = 1.7, $p = 0.007$), with having ≥ 1 partner in the past week (OR = 1.7, $p = 0.005$), and with using a condom during most recent sex act (OR = 0.6, $p = 0.021$). Receiving information from professionals (doctors, nurses, teachers) was associated with having ≥ 1 unwanted pregnancy in past year (OR = 1.908, $p = 0.007$). Obtaining information from the media was associated with increased HIV knowledge ($\beta = 0.192$, $p = 0.001$). We found no evidence that HIV knowledge was a mediator between source of information and risk behavior. HIV knowledge alone is insufficient to reduce risk behaviors in this population, possibly due to environmental social norms that encourage these behaviors.

085

GENERAL HEALTH STATUS: TRACKING HEALTHY PEOPLE 2020 FOUNDATION HEALTH MEASURES. *D T Huang, R J Klein (National Center for Health Statistics, CDC, Hyattsville, MD 20782)

Healthy People 2020 (HP2020), the U.S. national disease prevention and health promotion agenda for the next decade, includes new broad, cross-cutting Foundation health measures which will be tracked but not have national targets. General health status measures, one of four Foundation section components, are of particular interest as national measures of overall population health. These measures consist of life expectancy, healthy life expectancy, years of potential life lost (YPLL), physical and mental unhealthy days, respondent-assessed health status, limitation of activity, and chronic disease prevalence. Estimates from the past decade were obtained based on data from the National Health Interview Survey (NHIS), National Vital Statistics System (NVSS), and Behavioral Risk Factor Surveillance System (BRFSS). SUDAAN was used to control for complex sample design, and estimates were age-specific or age-adjusted. Our analysis includes trends for the total population and disparities for selected race/ethnicity, sex, and age subgroups. Results suggest improving national health over the past decade based on these measures; however, the U.S. fares relatively poorly compared to other Organization for Economic Cooperation and Development (OECD) countries. Among subgroups, whites (race) and females (sex) generally had the most favorable levels of general health status, while results by age varied. Disparities at the most recent data point and changes in disparity over time also varied, though it is noteworthy that the most recent absolute disparity in life expectancy at birth between whites and blacks (4.8 years in 2007) was the smallest ever recorded. This work highlights the need for continued work on general health status measures.

087-S

CO-MORBIDITIES AND OUTCOMES IN PATIENTS WITH PARKINSON'S DISEASE IN UNITED STATES HOSPITALS, 2005 - 2008. *A M Parriott, O A Arah, & B Ritz (Department of Epidemiology, University of California, Los Angeles School of Public Health, Los Angeles, CA)

Parkinson's disease (PD) is the second most common neurodegenerative disease, and results in substantial medical expenses, disability and loss of quality of life. Yet, there is little information about factors that influence hospitalization, progression and mortality. We used Nationwide Inpatient Sample to estimate the prevalence of co-morbidities, the risk of death prior to discharge, and the mean length of stay in inpatients age 55 and older with and without PD. We identified 174,123 (81,863 women and 92,260 men) admissions in patients with PD and 10,760,743 (5,968,234 women and 4,792,509 men) non-PD admissions. The risk of death in PD patients was 3.3% (95% confidence interval: 3.2 - 3.4) for women and 4.0% (95% CI 3.9 - 4.2%) for men, similar to non-PD patients with a risk of 3.4 (95% CI 3.4 - 3.4%) for women and 4.0% (95% CI 4.0 - 4.0%) for men. PD patients had lower prevalence of AIDS, alcohol and drug abuse, chronic blood loss anemia, coagulopathy, liver disease, cancer and solid tumors, obesity, peripheral vascular disease, pulmonary circulatory disorders, renal failure, and peptic ulcer disease, but higher prevalence of depression, hypothyroidism, and weight loss. The geometric mean length of stay was 4.4 days in women and 4.2 days in men with PD, compared to 3.8 days and 3.7 days in women and men without PD. These results should not be generalized to non-hospitalized populations. Smoking and other life-style related behaviors known to be less prevalent in PD patients likely contribute to the lower prevalence of many co-morbidities. These data also suggest some interesting differences in co-morbidities (such as hypothyroidism) that warrant further investigation.

086-S

A COST-UTILITY ANALYSIS OF COMMON NONSURGICAL TREATMENTS FOR NECK PAIN. *O Schieir, C Hincapié, S Hogg-Johnson, M Krahn, P Coté, G van der Velde. (University of Toronto, Toronto, ON M5T 3M7; Canada)

Neck pain is a common and burdensome condition resulting in high health care costs. There are several available treatments for neck pain and cost-effectiveness studies can help inform policy makers regarding optimal allocation of health services. The objective was to compare the cost-effectiveness of 5 common nonsurgical treatments for neck pain in Canada and the United States (exercise, nonsteroidal anti-inflammatory drugs, cyclooxygenase-2 selective inhibitors, mobilization, and manipulation) using a lifetime time horizon and taking a health care system perspective. We conducted a cost-utility analysis of 5 nonsurgical treatments for neck pain using a decision analytic Markov model. The primary outcome measure was the quality-adjusted life year (QALY). Model inputs included: 1) probability estimates for treatment effectiveness, gastrointestinal, cardiovascular and cerebrovascular adverse events and background risks for adverse events in the general population, obtained from a systematic literature review; 2) quality of life weights estimated from a convenience sample of 220 neck pain patients seen in general practice clinics using the standard gamble method; and, 3) direct and out-of-pocket health care costs. Cost-effectiveness was estimated with the incremental cost-utility ratio and probabilistic sensitivity analysis was performed to account for model uncertainty. At a willingness to pay threshold (WTP) of \$50,000 CAD per QALY, manipulation was cost-effective. In probabilistic sensitivity analysis, NSAID was cost-effective at a WTP of < \$24,000 CAD, and manipulation was cost-effective at a WTP between \$24,000 and \$50,000 CAD.

088-S

INVASIVE METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* INFECTIONS IN OBSTETRIC INPATIENTS, UNITED STATES, 2005-2008. *A M Parriott, J M Brown and O A Arah (Department of Epidemiology, University of California, Los Angeles, CA)

While methicillin-resistant *Staphylococcus aureus* (MRSA) is recognized as a serious and common nosocomial infection, the epidemiology of invasive infections in obstetric patients is not well characterized. We sought to estimate the burden and predictors of invasive MRSA infection in obstetric inpatients in the United States. Using the Nationwide Inpatient Sample (2005 through 2008), we identified 3,974,825 admissions of obstetric patients and 2,150 cases of invasive MRSA infection. Of these cases, 723 women were admitted prenatally, 567 for delivery, and 739 postpartum or post-abortion. Timing of admission was unknown in 121 cases. The skin and subcutaneous tissues were the most common sites of infection in women admitted prenatally (54% of infections) and for delivery (31% of infections). The breast was the most common site in postpartum/post-abortion women (27% of infections). Compared to women without MRSA admitted for delivery, women with MRSA infection were more likely to live in low income zip codes, have Medicaid, be black, have diabetes, and be obese but less likely to live in the Northeast, have private insurance, and be white, Asian, or Hispanic. Mean age for MRSA cases was 26.5 years (95% confidence interval 26.2-26.7) vs. 27.5 (95% CI 27.5-27.5) for women without MRSA. In multivariate analysis of delivering patients MRSA was associated with Hispanic or Asian (vs. white) ethnicity, insurance type, region, diabetes, obesity, and age, but we found no associations with black ethnicity, age, and low income zip codes. We estimate that there were 2,608 cases of invasive MRSA infections per year in obstetric inpatients in the United States from 2005 to 2008.

089

A SYSTEMATIC REVIEW OF HEPATITIS C INFECTION IN GENERAL POPULATION OF IRAN. SM Alavian, M Ahmadzad-Asl, K Bagheri Lankarani, M A Shahbabaie, A Bahrami Ahmadi, *A Kabir (Research Center for Gastroenterology and Liver Disease, Baqiyatallah, Iran)

Background: There is not an overall estimation of hepatitis C infection (HCV) in Iran. We reviewed all published and unpublished evidences about HCV infection in Iran in order to accurately estimate the HCV infection prevalence in Iranian general population for the subsequent health system programs. Methods: In this systematic review, all national papers, medical congresses, HCV related reports, projects of Iranian research centers and medical universities, reports of Deputy for Health affairs (published or unpublished) and online theses were included. We selected descriptive/analytic cross-sectional studies/surveys related to prevalence of HCV infection in Iranian general population between 2001 and 2008 that have sufficiently declared objectives, proper sampling method with identical and valid measurement instruments for all study subjects and proper analysis methods regarding sampling design and demographic adjustments. We used survey data analysis method to calculate nationwide prevalence estimation. Results: Eight studies reported prevalence of HCV infection in the general population. They were from 6 (out of 30) provinces in which about 43 percent of the country population live. The HCV infection prevalence in Iran is calculated to be 0.16% (95% CI: 0% – 0.59%). Conclusions: In comparison with similar studies, prevalence of HCV infection in Iran is low. This might be related to preventive programs in high risk groups and strict blood screening programs.

091

PREPAREDNESS FOR MALARIA PREVENTION IN RELIEF CAMPS FOR FLOOD AFFECTEES - A CROSS SECTIONAL SURVEY FROM PAKISTAN. *B Ahmed K Nanji (Aga Khan University, Karachi, Pakistan)

The monsoon floods in Pakistan affected about 3.2 million people, including 1.4 million children and 133,000 pregnant women. 1.3 million people were internally displaced. Stagnant water forms a breeding ground for mosquitoes, poses a serious threat. A survey in the relief camps of (IDP's) to evaluate the malaria prevention preparedness was conducted. A cross sectional study was conducted during October to November 2010. Interviews were conducted with 500 eligible individuals, recruited through multi-stage cluster sampling. The study comprised of two phases. In the 1st phase the camps were visited and a complete checklist containing the information regarding the availability of bed nets, insecticidal sprays, mosquito repellents, coils were collected. Camps and its surrounding were also observed for water and sanitary conditions. In the 2nd phase of the study, the administrations of these camps were also interviewed regarding the measure taken for malaria prevention. Five hundred (13.5%) families were interviewed. Average number of children \leq 5 years of age per family was 4. Pregnant women were 110. None of the family reported to receive any preventive intervention. Sanitary conditions were poor with open drainage system, surrounded by stagnant water. Accessibility to clean water was difficult. 96% individuals reported not practicing any preventive measure for malaria. Inadequate Chloroquine was available in the medical camps, arthrometer was not available. The doctors reported, visiting of 8-10 patients daily with malaria symptoms. Malaria is a major epidemic and public health concern particularly during flood catastrophe. Transparent policy making is required to design strategies for the preparedness of malaria in Pakistan.

090

EVALUATION OF THE INCIDENCE OF HERPES ZOSTER AFTER CONCOMITANT VACCINATION OF A POLYSACCHARIDE PNEUMOCOCCAL VACCINE AND A ZOSTER VACCINE. H F Tesng*, N Smith, L S Sy, S J Jacobsen (Kaiser Permanente, Pasadena, CA, 91101)

In 2009, a revision to the zoster vaccine package insert was approved stating that the zoster vaccine and the pneumococcal vaccine should not be given concurrently because concomitant use resulted in reduced immunogenicity of the zoster vaccine. We conducted an observational study to evaluate if concomitant vaccination reduces the protective effect of the zoster vaccine. The study was conducted in Kaiser Permanente Southern California. Incidence of herpes zoster (HZ) after vaccination with a zoster vaccine in the population receiving both vaccines on the same day was compared to that in the population receiving a pneumococcal vaccine within one year to 30 days prior to zoster vaccine. Vaccinations and incident HZ cases were identified by electronic health records. The hazard ratio for incident HZ associated with concomitant vs. nonconcomitant vaccination was estimated using the Cox proportional hazard model. There were 56 incident HZ cases in the same day vaccination cohort and 58 in the different day vaccination cohort, yielding a HZ incidence of 4.54 (95% Confidence interval [CI], 3.43-5.89) and 4.51 (95% CI, 3.42-5.83) per 1,000 person-years, respectively. The hazard ratio comparing the incidence rate of HZ in the two cohorts was 1.19 (95% CI, 0.81-1.74) in the adjusted analysis. In this study, we found no evidence of an increased risk of HZ in the population receiving a zoster vaccine and a pneumococcal vaccine concomitantly. The revision of the product information needs to be carefully assessed to avoid introducing barriers to patients and providers who are interested in these two important vaccines.

092

REDUCED HERPES ZOSTER-ASSOCIATED HEALTHCARE UTILIZATION IN ADULTS VACCINATED WITH SHINGLES VACCINE. *N Smith, H F Tseng, S J Jacobsen (Kaiser Permanente, Pasadena, CA 91101)

In 2006, herpes zoster vaccine received approval for use in healthy adults aged 60 and older. Little were known as to whether the burden to healthcare was reduced among zoster vaccine recipients who developed zoster. We conducted a retrospective cohort study in Kaiser Permanente Southern California to assess the effect of zoster vaccine on reducing HZ-associated healthcare utilization (HCU). The cohort consisted of both vaccinated and unvaccinated HZ incidence cases identified during 2007-2009 with 1-year follow-up after their first diagnoses of HZ. Rate ratios (RR) for HZ associated HCU comparing vaccinated and unvaccinated cases were estimated using negative binomial regression models. There were 4197 HZ patients diagnosed in an outpatient setting, among whom 649 were previously vaccinated. Comparing vaccinated and unvaccinated patients during 1-year follow-up, there were, on average 0.59 vs 0.81 subsequent HZ associated outpatient visits and 0.01 vs 0.03 subsequent HZ associated emergency department (ER) visits. After adjustment for age, sex, race, Charlson's Comorbidity Index, and the number of outpatient visits, ER visits, and inpatient visits in 1 year prior to HZ, the adjusted RR was 0.68 (95% confidence interval [CI] 0.58-0.81) for subsequent outpatient visits and 0.28 (95% CI 0.12-0.81) for subsequent ER visits. Those cases diagnosed in an ER or inpatient setting were excluded from the analysis due to small sample size. In conclusion, HZ significantly reduced the number of subsequent outpatient and ER visits by an average of 32% and 72%, respectively. The data support the hypothesis that zoster vaccine alleviates the symptoms of HZ and reduces the HZ associated HCU.

093-S

MOLECULAR EPIDEMIOLOGY OF BRUCELLOSIS IN IRAN: SCREENING OF HUMAN AND LIVESTOCK BLOOD SAMPLES. M Sohrabi, A M Mobarez, *R H Doust, N Khoramabad. (Department of Bacteriology, Faculty of Medical Sciences, Tarbiat Modares University; Tehran, Iran)

Brucellosis is endemic in some parts of Iran especially in western and eastern cities. In Iran, human brucellosis is occurred nearly by animals infected. Control and eradication of brucellosis requires correct relationship between human and animal brucellosis. We describe in this study epidemiology of brucellosis of the suspicious serum samples in animals. One hundred serum samples were collected from east (25%) and west (75%) of Iran. DNA extraction was performed by QIAamp DNA Mini kit (Qiagen). Taq-Man Real-Time PCR assay was designed on genus-specific *bcsp31* gene (brucella cell surface protein 31kDa). All assays ran in 20µl final volumes on an ABI 7500 sequence detection system (Applied Biosystems). Our results showed that 80 samples were positive. Out of 70 (93.3%) samples which collected from west of Iran and 10 (40%) from east of Iran. Regarding to high sensitivity and specificity of Real-Time PCR, it could be shown accurate epidemiological statue of brucella infections.

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IMPACT OF A HAND HYGIENE INTERVENTION ON THE RISK OF TRANSMITTING A POSITIVE METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS CULTURE. *B Oloyede, J Rohrer, and N Rea (Community Hospital, Durham, NC 27704)

Methicillin resistant *Staphylococcus aureus* (MRSA) poses a threat to patients in many hospitals. The effectiveness of hand hygiene policies in reducing pathogen counts on the hands of health care workers was unknown. The purpose of the study was to assess whether a simple environmental change could prevent MRSA from growing on the hands of health care workers. The health belief model provided the conceptual framework for this study. This was a single site study in which 4 bed-sections (80 employees) of a community based hospital were randomly assigned to the intervention group and the remaining 2 bed-sections (70 employees) served as the comparison group. Hand cleaners were placed in prominent locations inside and outside patient rooms. MRSA culture was the dependent variable (positive versus negative). Samples were obtained for culture on chocolate agar plates. The primary independent variable was the group (intervention or control). Other personal characteristics and characteristics of the work environment were included to adjust for group differences. Multiple logistic regressions were used in the analysis. The findings showed that a simple environmental change by placing hand-hygiene products inside and outside patient rooms significantly reduced MRSA infection by health care workers. The results impact social change by demonstrating that placing hand hygiene products in patient rooms could help health care workers in cleaning their hands before and after patient contacts which helps reduce the threat of spread of infection.

094-S

LOW SENSITIVITY OF URETHRAL SCREENING FOR CHLAMYDIA OR GONORRHEA DETECTION AMONG MEN WHO HAVE SEX WITH MEN. *J L Marcus, K T Bernstein, R P Kohn, M Pandori, and S S Philip (San Francisco Department of Public Health, San Francisco, CA 94603)

The Centers for Disease Control and Prevention recommends that men who have sex with men (MSM) with relevant exposures be screened for urethral and rectal gonorrhea and chlamydia, and for pharyngeal gonorrhea, at least annually. Although nucleic acid amplification tests (NAATs) for detection of rectal or pharyngeal chlamydia or gonorrhea have not been approved by the Food and Drug Administration, laboratories can internally validate NAATs for extragenital use. Because extragenital infections are mostly asymptomatic, urethral-only screening could leave those infections unidentified. We conducted a retrospective, cross-sectional study of asymptomatic MSM who visited San Francisco's municipal sexually transmitted disease clinic during 2008–2009 and were screened for urethral, pharyngeal, and rectal chlamydia and gonorrhea, to identify the proportion of infected persons that would be missed by different screening practices. Specimens were tested by NAAT at the San Francisco Department of Public Health Laboratory, which previously validated the test for rectal and pharyngeal use. Among 3398 MSM, 549 (16.2%) had chlamydia or gonorrhea. Prevalence of infections by anatomic site ranged from 0.4% (95% confidence interval [CI], 0.2–0.6%) for urethral gonorrhea to 7.8% (95% CI, 6.9–8.8%) for rectal chlamydia. Urethral screening would miss the most infected persons (83.8%; 95% CI, 80.4–86.8%), while screening the rectum and pharynx would miss the fewest (9.8%; 95% CI, 7.5–12.6%). Wider availability and use of NAATs for extragenital screening among MSM would identify more infections than urethral screening alone.

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THE ROLE OF SMOKING AND ORAL HYGIENE IN PREVALENCE OF HELICOBACTER PYLORI IN DENTAL PLAQUE AND STOMACH OF DYSPEPTIC PATIENTS. K Mona, *M M Ashraf, A Mohsen, T Omid (Dept of Bacteriology, Tarbiat Modares University, Faculty of Medical Sciences. Tehran, Iran)

Helicobacter pylori is major causative of gastric diseases. Lifestyle is a very important risk factor for *Helicobacter pylori* prevalence. One hundred patients who had dyspepsia aged 5-65 years were selected. Socio-demographic status of each subject was determined by filling up a questionnaire about age, sex, blood group, occupation, level of education, frequency of smoking, oral hygiene such as frequency of use tooth brush, dental floss, mouth wash and details about dietary such as frequency of consumption meat, vegetable, fruit, milk, yoghurt, tea, coffee, salty and fast foods. Dental plaque and gastric biopsy samples earned from every patient for isolation of *Helicobacter pylori*. Biopsy and dental plaque samples were evaluated with culture and PCR. Prevalence of *H. pylori* infection in smoker patients was higher than non smoker. One hundred percent and 67.5% of dental plaque and biopsy's smoker patients and 80.9% and 60.3% dental plaque and biopsy's non smoker patients were *Helicobacter pylori* positive after PCR and cultivation. Tooth brushing, dental floss and mouth wash habit result in reduction of *H. pylori* colonization in dental plaque. The highest infection rates (81.8 %) were seen in poor oral hygiene. We found relation between daily consumption of yoghurt and decreasing of *H. pylori* colonization in dental plaque and gastric biopsy. According to results of our investigation, poor oral hygiene, diet and smoking were related to high prevalence of infection and dental plaque colonization of *H. pylori* in Iran.

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ACUTE ILLNESS SYMPTOMS ASSOCIATED WITH PRIMARY HUMAN BOCAVIRUS INFECTION IN INFANTS. *E T Martin, J Kuypers, A Wald, J A Englund, D M Zerr (Wayne State Univ., Detroit, MI 48201)

The role of human bocavirus as a causative agent of disease is not well understood. We have previously documented that this virus can shed from saliva consistently for over a year in young infants, making cross-sectional studies difficult to interpret. We analyzed banked saliva samples and symptom data from children followed from birth up to two years of age with weekly saliva collection and daily symptom diaries of signs and symptoms. Bocavirus DNA was detected by polymerase chain reaction. A case-cross-over analysis using conditional logistic regression was performed to evaluate symptoms recorded during the 3 weeks surrounding primary infections, defined as initial detection of bocavirus in the saliva, compared to symptoms occurring 4 to 7 weeks prior to and following primary infection. 87 children were followed from birth for a median of 705 days (range 551 to 778 days). 80 (92%) of 87 had bocavirus detected at least once. Primary infection events lasting at least 1 week were captured in 66 children. Median age at primary infection was 11 months (interquartile range: 7 to 16 months). Acquisition of bocavirus was associated with new onset of coughing (Odds Ratio (OR): 2.35, 95% Confidence Interval (C.I.): 1.20, 4.62; $p = 0.01$) and illness visits to the child's physician (OR: 2.63, 95% C.I.: 1.02, 6.82, $p = 0.05$). Presence of fever was also increased, but not significantly (OR: 2.00, 95% C.I.: 0.93, 4.29, $p = 0.08$). Vomiting, diarrhea, and rash were not associated with acquisition. These data provide the most complete longitudinal analysis of bocavirus acquisition and associated illness available to date, and support the role of primary bocavirus infection as an etiology of acute respiratory illness.

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GENITAL CHLAMYDIA AND GONORRHEA ARE INDEPENDENT PREDICTORS OF HPV PREVALENCE. *T R Soong, P E Gravitt, S B Gupta, K Liaw, E Kim, A Tadesse, C Phongnarisorn, V Wootipoom, P Yuenyao, C Vipupinyo, S Sriplienchan, D D Celentano (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205)

This study evaluated the associations of recent sexually transmitted infections (STIs) with cervical HPV prevalence. Data came from a prospective study conducted in 1046 women aged 20-38 years with normal cervical cytology in Thailand. We assessed whether baseline HPV prevalence was predicted by STIs which were newly detected and laboratory-confirmed within 2 years prior to enrollment. Prevalence ratios (PRs) with 95% confidence intervals were estimated using generalized linear models. Baseline prevalence of any HPV and high-risk (HR)-HPV were 19.9% and 8.7% respectively. Having genital chlamydia (CT) or gonorrhea (NG) in the past 2 years was associated with increased risk of HR-HPV infection after controlling for current and past sexual behaviors, age and contraceptive use [adjusted PRs (aPRs): CT: 2.9(1.3-6.5); NG: 3.4(1.7-6.7)]. Association between CT and prevalent HR-HPV was statistically significant only among non-hormonal contraceptive users [aPR: 2.7(1.2-6.3)] but *not* among those using hormonal contraceptives in the past 2 years [aPR: 1.2(0.7-2.2)]. Association of NG with prevalent HR-HPV was observed among those who used combined oral [aPR: 6.2(2.2-17.7)] or progestin-only contraceptives [aPR: 3.5(1.1-10.9)] during the past 2 years but *not* among non-hormonal contraceptive users [aPR: 1.9(0.3-10.3)]. The differential impact of recent hormonal contraceptive use on the associations of CT and NG with HPV prevalence suggests that the observed correlations may be attributed to biologic interactions between the pathologies of CT or NG with HPV, and not merely residual confounding by shared sexual risks.

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VITAMIN D AND S. AUREUS CARRIAGE – NEW TARGET FOR PREVENTION. *K Olsen, B M Falch, K Danielsen, G S Simonsen, I Thune, M Johannessen, J U E Sollid, G Grimnes, R Jorde, A-S Furberg (*University Hospital of North Norway, N-9038 Tromsø, Norway)

Staphylococcus aureus carriage is a major risk factor for S. aureus infection, yet only smoking has consistently been identified as a modifiable determinant of carriage (1). Vitamin D stimulates immune responses (2). Thus, we studied the association between serum 25-hydroxyvitamin D levels [25(OH)D; electrochemiluminescence immunoassay (Roche)] and S. aureus carriage (median time between two nasal swab cultures = 31 days; carrier = S. aureus growth in both cultures) in 1,574 female and 1,240 male participants aged 30-87 years in the 6th Tromsø Study 2007-08, a population-based health survey including clinical examinations and questionnaires on health and lifestyle. Logistic regression analysis stratified by sex and smoking and adjusted for potential confounders was used. In non-smoking men ($n = 1,017$; 33.7% carriers; mean 25(OH)D = 53.2 nmol/l) each 5 nmol/l increase in 25(OH)D was associated with a 6.3% drop in the risk of S. aureus carriage ($p = 0.002$), and high (3rd tertile > 58.2 nmol/l) versus low (1st tertile < 44.7 nmol/l) vitamin D was associated with a 33% reduced risk of carriage [Odds Ratio (OR) = 0.67; 95% Confidence Interval (CI) = 0.47, 0.94]. In non-smoking men aged 44-60 years, the OR was 0.52 (95% CI = 0.29, 0.92) in the high vitamin D group. In women and smokers there were no associations between vitamin D and S. aureus carriage. Our study strongly supports that serum vitamin D may be a determinant of S. aureus carriage. Prospective trials may assess the preventive effect of improved vitamin D status on S. aureus carriage and infection. (1) van Belkum et al. *Inf Gen Evol* 9;2009;32-47; (2) Chesney, *J Ped* 156;2010;698-703

100-S

ARE THERE MUTUAL ASSOCIATIONS BETWEEN THE INCIDENCE OF HPV INFECTION AND OTHER SEXUALLY TRANSMITTED INFECTIONS? *T R Soong, P E Gravitt, S B Gupta, K Liaw, E Kim, A Tadesse, C Phongnarisorn, V Wootipoom, P Yuenyao, C Vipupinyo, S Sriplienchan, D D Celentano (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205)

We aimed to determine (i) if other sexually transmitted infections (STIs) increase the risk of incident HPV infection and (ii) if HPV infection predicts the incidence of other STIs. Women aged 20-38 years were followed semi-annually for 18 months in Thailand ($n = 1200$). Assessment was made on cervical HPV genotypes, cervical cytology, sexual behavior, demographic factors and diagnoses of other STIs including chlamydia, gonorrhea, syphilis, genital herpes and trichomoniasis. Incident detection was defined as any type-specific HPV or other STIs which was detected at current visit but not at previous visit. Associations were measured by odds ratios (ORs) with 95% confidence intervals estimated in generalized estimating equation models. During follow-up, 241 new cases of HPV, 110 incident cases of high risk(HR)-HPV and 47 new cases of other STIs were observed. Diagnosis of other STIs at previous visit was statistically significantly associated with 2-fold increased odds of any HPV but not HR-HPV after adjustment for sexual behavior, age, pap smear status and contraceptive use [adjusted ORs (aORs): any HPV: 2.1(1.1-4.3); HR-HPV: 1.9(0.7-5.4)]. Positive HPV detection predicted nearly 2-fold increased odds of other STIs with the estimate bordering on statistical significance [aOR: 1.8(0.9-3.4)]. We show that other STIs increase the risk of HPV incidence after controlling for sexual behavior. The data qualitatively suggest mutual associations of HPV with other STIs, warranting further studies to evaluate if these reflect true biologic interactions or confounding from unmeasured sexual risks.

CHILDHOOD INFECTIOUS DISEASES AND PREMATURE ADULT MORTALITY: RESULTS FROM THE NEWCASTLE THOUSAND FAMILIES STUDY. P W G Tennant, L Parker and *M S Pearce (Institute of Health and Society, Newcastle University UK)

Early life infections may negatively influence health in later life, but there have been few studies of the association, due to the difficulty of simultaneously obtaining data from early and later life. This study utilised unique longitudinal data from the Newcastle Thousand Families Study, a prospective cohort of 1147 individuals born in Newcastle-upon-Tyne (UK) in 1947, to assess the impact of various childhood infectious diseases on mortality between ages 18 and 60 years. Methods: Detailed information was collected prospectively at birth and during childhood on a number of early life factors. Study members were 'flagged' by the UK National Health Service Central Register when they died or emigrated. Death between ages 18 to 60 years was analysed in relation to childhood infections, adjusting for potential confounders, using Cox regression. Results : History of infection with either tuberculosis or whooping cough was independently predictive of mortality between ages 18 and 60 years [Adjusted hazard ratio, aHR = 2.00 (95% confidence interval, CI: 1.17-3.41) and 1.95 (95% CI: 1.21-3.14) respectively]. Of the other variables examined, adult mortality was significantly more common among men [aHR = 0.62 (95% CI: 0.39-0.97)] and among first-born children [aHR = 2.95 (95% CI: 1.52-5.73)]. The effect of whooping cough on mortality was largely attributable to a higher risk of death from cancer, particularly non-smoking related cancers. Conclusion: In a pre-vaccination cohort from northern England (UK), childhood infection with either tuberculosis or whooping cough was associated with an increased risk of premature adult mortality independent of other childhood circumstances. Further studies are required to investigate this association among different populations.

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URBAN MALARIA IN DAKAR: RAPID DIAGNOSTIC TEST IMPLEMENTATION AND PRESUMPTIVE DIAGNOSIS. *A Diallo, S Dos Santos, A Diop, L Barbosa, J-Y Le Hesran (Institut de Recherche pour le Développement, BP 1386 Dakar, Sénégal)

Dakar, the capital city of Senegal, is located in a low malaria endemic area. However, the use of antimalarial drugs is reported to be very important. In 2007, malaria Rapid Diagnostic Test (RDT) and Artemisinin Combination Therapy were introduced to improve the management of fever cases. To assess the impact of RDT on burden of malaria at hospital, seven public health structures were selected throughout the Dakar area. The registers of attendance were investigated from March 1st 2008 to April 30th 2009. Following information was collected: number of patients, episode of fever, the use of RDT and the results, presumptive diagnosis of malaria, antimalarials prescription (Artemisinin Combination Therapy). 23% of the patients presented fever. According to fever, the global rate of RDT achievement was about 28%; this rate was variable between health structures. The rate of positive RDT was 39 %. 46 % of fevers were defined as presumptive diagnosis of malaria, without using a RDT. Global diagnosis of malaria was about 13.5 %, with huge variations between health structures. Health structures with high level of presumptive diagnosis are more likely to diagnose malaria. Prescription of Artemisinin Combination Therapy is variable between health structures and seems to be linked to the use of Rapid diagnostic Test. Despite RDT implementation, presumptive diagnosis remains important in this urban setting. The use of the RDT is not optimal, and this impairs adequate prescription of antimalarials. Further studies in a large scale are therefore needed to assess the policy of RDT in malaria diagnosis in Dakar area.

EFECAB – STUDY DESIGN OF MANAGING PIGS TO PREVENT EPILEPSY. *H Carabin, LD Cowan, A Millogo, R Ganaba, J B Ouédraogo, P Dorny, N Praet (University of Oklahoma Health Sciences Center, Oklahoma City, OK, 73104)

Neurocysticercosis (NCC), caused by the human-to-pig transmitted tapeworm *Taenia solium*, is increasingly recognised as an important cause of epilepsy and other neurological outcomes in developing countries. Yet, no cohort study has been conducted to estimate the incidence of infection with the larval stages of cysticercosis and the development of symptoms of NCC. Based on our pilot study in which the proportion of people with epilepsy with CT evidence of NCC was 45% in two pig-raising villages and 0% in one pig-free village, we designed a large community-based randomized trial to assess the effect of an educational programme on pig management and community-lead total sanitation on the incidence rate of cysticercosis and NCC. In each of 60 villages, 80 persons will be followed for the development of neurological outcomes (epilepsy, seizure, severe chronic headaches) and 60 will be followed serologically for a baseline period of 12 months. After 12 months, the educational package will be block-randomized (by department) to 30 of the 60 villages. All participants will be followed 24 months after the intervention. This study, which is planned to start on February 1, 2011, will be the largest randomized trial and cohort study of cysticercosis ever conducted. Challenges specific to conducting large community-based randomized trials in the developing world, issues of clustering of environmental risk factors (eggs of the parasite in this case) and of measurement error will be discussed.

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DISCREPANCIES BETWEEN PATIENT, PROVIDER, AND EVIDENCE-BASED RISK ESTIMATES REGARDING HIGH INFECTIOUS RISK DONOR ORGANS. *L M Kucirka, R L Ros, C Bone, R A Montgomery, D L Segev. (Johns Hopkins Medicine, Baltimore MD 21231)

Deceased organ donors are classified as CDC high risk donors (HRDs) if they meet 1 of 7 behavioral criteria thought to increase risk of a window period (WP) HIV or Hepatitis (HCV) infection (men who have sex with men, injection drug users (IDUs), hemophiliacs, commercial sex workers, sex with someone in preceding categories, percutaneous HIV exposure, inmates). While the indicator is binary, we hypothesized there might be significant variation in risk by behavior category. The goals of our study were to (1) assess patient and provider perceptions of risk by behavior category, and (2) conduct a systematic review of actual WP infection risk by behavior category. Methods: We performed 2 surveys: 1) 142 patients on our center's kidney transplant waitlist, 2) 422 transplant surgeons throughout the US. Patients were asked to rank each behavior from most to least risky. Providers were asked what percentage of organ offers they accepted in each category. We then performed a systematic review and meta-analysis of HIV and HCV incidence among persons in each HRD behavior category, and used pooled incidence estimates to rank the actual risk, based on best evidence available, of WP HIV and HCV infection in each category. Results: Perceptions of which behaviors carried the most risk differed significantly between patients and providers, and both differed significantly from the evidence-based estimates. In particular, both groups underestimated the relative risk of IDUs. The infectious risk of hemophiliacs was overestimated, possibly due to a high perceived prevalence (which does not drive risk of WP infection) but a very low incidence (which does drive risk of WP infection) in this population. Conclusions: Future CDC guidelines should include quantitative summaries of the evidence on which guidelines are based to better inform patient and provider decision making.

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PARAMETERS ESTIMATES IN THE PROBABILISTIC LINKAGE BETWEEN BRAZILIAN DEATH AND HOSPITALIZATION DATABASES, ACCORDING TO THE QUALITY OF THE RECORDS OF UNDERLYING CAUSE OF DEATH. *C Coeli, F Barbosa, R Pinheiro, R Medronho, K Camargo Jr., A Brito, K Bloch (Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil, 21941-598)

Probabilistic record linkage can be a powerful tool in epidemiological and health services research, but the accuracy of the process is affected by data quality, and may vary within subsets of the databases to be linked. The purpose of the study was to compare the linkage parameter estimates between Brazilian hospitalizations and deaths databases calculated separately for the subsets of deaths with underlying ill-defined causes and defined causes. Data came from the 2001 Rio de Janeiro State databases. All records of deaths with underlying ill-defined causes (N = 12,000) and a random sample of deaths with defined causes (N = 12,000) were separately linked to the records of hospital admissions that ended in death (N = 35,418). The m parameter (m-probabilities) estimates were made using the Expectation-Maximization (EM) algorithm considering two strategies: (1) first name, last name, day, month and year of birth, (2) full name and date of birth. In the first strategy, the m parameter estimates for the first and last name fields were equal to or greater than 97% in both analyzed sets. The fields days, months and years, however, showed small values in both sets. In the second strategy there was an important difference between the two groups, with much smaller values in the ill-defined causes subset for full name (91% vs. 61%) and, especially, date of birth (91% vs 0.001%). Our results stress the need for pilot studies to evaluate possible internal heterogeneity of the databases during the planning stage of linkage projects.

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PREVALENCE OF SELECTED HEALTH OUTCOMES AND HEALTH PREDICTORS FOR THE STATE OF CALIFORNIA: A COMPARISON TO U.S. NATIONAL ESTIMATES (NHANES 1999-2006). *D Kruszon-Moran, K Porter, G McQuillan, R Fay, W VanDeKerckhove, R Hirsch and L Curtin (Centers for Disease Control and Prevention, Hyattsville MD 20782)

The 1999-2006 National Health and Nutrition Examination Survey (NHANES) was a cross-sectional, nationally representative survey of the U.S. civilian non-institutionalized population. Sample weights were calculated for the national sample and recently recalculated for participants examined in the state of California. Seropositivity to infectious diseases measured for all four two-year cycles and the distribution of 1) demographic and 2) health behaviors for disease were examined and compared for the U.S. and California. As compared to the total U.S. population, California was found to have 1) fewer persons in the oldest age group (60 years or older), more of Mexican American or Other race/ethnicity as compared to non-Hispanic white or non-Hispanic black, more born outside the U.S., more with lower levels of education, and fewer who own a home; 2) fewer who can identify a regular health provider, more who ever tried cocaine, more who self-report Hepatitis A virus (HAV) or Hepatitis B virus (HBV) immunization, more seropositive to HBV due to vaccination; and 3) for disease outcomes, more seropositive to HAV and HBV (due to chronic disease) (all p-values < 0.05). These differences between the U.S. and California varied by race/ethnicity. The sample design and the number and types of California counties sampled in NHANES during 1999-2006 enabled the calculation of weights and sample design parameters for California, permitting the comparison of national estimates with those for a smaller geographic area for the first time.

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A COMPARISON OF RELIGIOUS ORIENTATION AND HEALTH BETWEEN WHITES AND HISPANICS. * P Maticco, R M Merrill, P Steffen (Brigham Young University, Provo, UT 84602)

The study of religious orientation has neglected the influence of race/ethnicity as well as all four religious orientations (intrinsic, extrinsic, pro-religious, and nonreligious) in explaining differences in both physical and psychological health. A statewide representative sample of 250 Hispanics and 236 non-Hispanic Whites was drawn and analyzed for differences in health (self-rated health, life satisfaction, exercise) according to race/ethnicity, religious orientation, and religious attendance. Responses on the Religious Orientation Scale differed significantly by race/ethnicity, indicating that future studies of religious orientation should take cultural context into account. For both Whites and Hispanics, pro-religious individuals reported the highest life satisfaction scores, which highlights the utility of employing the four-fold religious orientation typology.

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BUILDING CAPACITY AND RECRUITING FOR HIV EPIDEMIOLOGIC STUDIES WITH AFRICAN, CARIBBEAN AND OTHER BLACK COMMUNITIES IN UNDERSTUDIED URBAN-RURAL LOCALES: THE BLACCH STUDY. *S Baidooobonso, G Bauer, the BLACCH Study Team (Univ. of Western Ontario, London, ON, Canada N6A 5C1)

London reportedly has Ontario's 3rd-highest HIV infection rate, and a small (2.2%) but growing African, Caribbean and other Black (ACB) population. Although targeted for HIV prevention efforts, ACB people are hard to reach for research and programming, especially in London and similar urban-rural locales with few ACB-specific resources. In Canada's ACB population, HIV is most commonly spread through heterosexual contact, yet cultural and religious norms often discourage discussions about sex or sexuality. Homophobia, racism and stigma discourage ACB people from seeking information about HIV/AIDS. In addition, few researchers have worked with local ACB communities; trust is lacking between ACB communities and service providers; and there are ethnic divisions in ACB communities. The BLACCH Study is a cross-sectional study about health and HIV in London's ACB population. To build research capacity and enhance recruitment, a variety of methods and strategies were employed. These included: following community-based research (CBR) principles; networking with stakeholders (ACB people, service providers, and researchers); performing semi-ethnographic work; forming a multi-stakeholder team; interviewing stakeholders; partaking in community events; sending periodic e-bulletins; engaging media; and employing venue-based and snowball sampling. These methods helped: identify relevant survey topics and recruitment methods; build relationships with stakeholders; promote the study; identify individuals to help with recruitment; and learn about community dynamics. CBR is necessary for conducting quality epidemiologic research with hard to reach populations.

CREATING A MODEL OF INTEGRATED SURVEILLANCE FOR VACCINE-PREVENTABLE DISEASES: THE COSTA RICAN EXPERIENCE. *T Barrantes, J Rodríguez, M Barrantes, A Ruiz, J Lara, H Bolaños, G Chanto, E Sáenz, (Hospital San Vicente de Paul, Costa Rica)

In 2007, CDC and PAHO asked Costa Rican Ministry of Health to develop an integrated model for vaccine-preventable diseases surveillance. Costa Rica starts a cooperation work between the Ministry of Health, the Caja Costarricense de Seguro Social (responsible for health care) and INCIENSA as National Reference Laboratory. Hospital San Vicente de Paul and its Pediatrics department is chosen as sentinel unit, with the 11 primary care centers close to it. Surveillance is integrated in 3 levels. First, diseases are integrated in syndromes according to their clinical presentation. The 5 syndromes are: acute severe respiratory infection (ASRI) for *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Bordetella pertussis*, and Influenza virus; acute severe diarrheal disease (ASD) for rotavirus surveillance, meningial syndrome for *Streptococcus pneumoniae*, *Haemophilus influenzae* and *Neisseria meningitidis* surveillance, acute febrile rash illness for measles, rubella, chicken pox and dengue fever surveillance and acute flaccid paralysis (AFP) for polio virus surveillance. During the first year of surveillance (September 2009 to October 2010), the integrated surveillance system for vaccine-preventable diseases captured 401 patients, 72% for ASRI, 13% for ASD, 12% for febrile rash illness and 1% for meningitis and AFP. Median age was 2.5 years for both male and female. 74% patients had a complete vaccine scheme according to age; only 3% had incomplete vaccines. The 98% of them were inpatients, and 2% required to be transferred to third level. The laboratory confirmed 85 cases of vaccine-preventable diseases: 48 for weeping cough, 32 for influenza virus, 8 for rotavirus, 3 for invasive pneumococcal disease and 3 for chicken pox. By these integrated surveillance 2 deaths were confirmed, like vaccine-preventable disease. This integrated surveillance model is effective for increasing sensibility in the capture of patients with vaccine-preventable diseases. The syndromes integration facilitates data and adequate sample collection, and improves surveillance.

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THE ROLE OF SELECTION BIAS IN PANCREATIC CANCER CASE-CONTROL STUDIES *Z Hu, K Anderson (University of Minnesota, Minneapolis, MN 55414)

We investigated the potential for selection bias for pancreatic cancer case-control studies based on the Iowa Women's Health Study (IWHS) dataset, a cohort of 41,837 post-menopausal women with 18 years of follow-up. Risk factors under our investigation included smoking, body mass index (BMI), type-II diabetes and alcohol consumption. Kaplan-Meier analyses and logrank tests were used to estimate survival rates for categorical variables, and a Cox proportional hazards model was applied to calculate hazard ratios (HR). Then, for each risk factor, a total of 5 case-control groups were simulated based on the IWHS cohort in a way that reflects how cases and controls being recruited in population-based studies. The reference group included all pancreatic cancer cases in the IWHS cohort. For the 4 others, we excluded cases whose survival time was less than 1.5 months, 3 months, 4.5 months and 6 months, respectively. Odds ratios (OR) were then estimated via conditional Logistic regression. We quantitatively compared the differences between ORs based on a "delay category", a dichotomous variable indicating the interaction between risk factors and survival time. Overall, BMI shows a significant inverse relationship with survival after controlling for confounding via Cox regression (HR = 1.23, P -value < 0.01). We observed a similar pattern when comparing the ORs for the simulated case-control pairs. The OR for BMI shows a significant decrease after the exclusion of cases with relatively low survivals. The interaction between BMI and the delay category with a cut-point of 3 months is also statistically significant (P -value < 0.01). In conclusion, our findings suggest that case losses could result in selection bias when estimating OR of pancreatic cancer associated with BMI.

ESTIMATING EFFECTS OF ALCOHOL CONSUMPTION AND DRUG INJECTION FREQUENCY ON HIV ACQUISITION USING JOINT MARGINAL STRUCTURAL MODELS. *C J Howe, S R Cole, S H Mehta, G D Kirk (University of North Carolina, Chapel Hill, NC 27599)

Previously we presented evidence for an effect of alcohol consumption on HIV acquisition among African American injection drug users in the AIDS Link to Intravenous Experience (ALIVE) cohort using marginal structural models. We now extend these results to the joint effects of alcohol consumption and drug injection frequency to demonstrate heretofore underused joint marginal structural models. The ALIVE study recruited and followed participants with semiannual visits in Baltimore between 1988 and 2008. Pooled logistic regression models were used to estimate stabilized inverse probability weights for alcohol consumption, drug injections, death, and drop out. These four weights were multiplied together and over visits. Covariates used in the weight estimation included socio-demographic factors, alcohol consumption, drug use, and sexual activity. Hazard ratios (HR) were estimated from a weighted Cox proportional hazards model which included age, education, alcohol consumption, drug injections, and the product of alcohol and injections. During the 8,181 person-years of follow up, 155 of 1,525 participants seroconverted with HIV. Weighted HRs for participants reporting 21-140 drinks/week in the prior two years compared to participants who reported 0-20 drinks/week were 2.09 (95% confidence limits [CL]: 1.34, 3.27) and 0.97 (0.59, 1.62) among participants reporting 7-38 drug injections/week and 0-6 drug injections/week in the same period, respectively. The robust P value for the Wald test for interaction was 0.01. The weighted analysis indicates that the hazard of HIV acquisition for high alcohol consumption is solely elevated among frequent drug injectors.

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CLUSTERING OF DETERMINANTS OF STROKE AND MYOCARDIAL INFARCTION AT THE NEIGHBORHOOD LEVEL: A POPULATION HEALTH PLANNING APPROACH. *A Pedigo and A Odoi (University of Tennessee, Knoxville, TN 37934)

Although socioeconomic, demographic, and geographic factors are known to be important determinants of stroke and myocardial infarction (MI), little is known regarding the clustering of these risk factors in neighborhoods. Research has overwhelmingly found that an individual's health can be influenced by the socioeconomic and demographic characteristics of their neighborhood. Thus, the objective of this study was to classify neighborhoods (census tracts) in East Tennessee using multivariate techniques based on demographic, socioeconomic, and geographic risk factors for stroke and MI to better identify and understand population characteristics and health needs. To our knowledge, this is the first study to investigate the clustering of population characteristics that may be risk factors of stroke or MI at the neighborhood level. Four peer neighborhoods (PNs) with unique population profiles were identified using fuzzy cluster analysis. Nearest neighbor discriminant analysis and decision trees were used to assess classification accuracy and the best discriminating variables. The proportion of the population below poverty, median housing value, and the urban/rural classification of the neighborhood were important variables. The highest risk of stroke and MI mortality tended to occur in urbanized, less affluent neighborhoods while the suburban, most affluent neighborhoods had the lowest risk. These findings provide population health planners a unique opportunity to better understand and effectively plan for neighborhood health needs. Careful integration of these findings into health is useful in guiding resource allocation, service provision, and policy decisions to address neighborhood health disparities.

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A PROBABILISTIC MULTIPLE-BIAS MODEL APPLIED TO A STUDY OF MOBILE PHONE USE AND RISK OF GLIOMA. *F Momoli, M-E Parent, J Siemiatycki, R Platt, L Richardson, D Bedard, E Cardis, M McBride, D Krewski (University of Ottawa, Ottawa, On, Canada)

We assessed the risk of glioma in relation to mobile phone use, as part of an international collaboration of case-control studies. The study population consisted of 170 cases of glioma and 653 population controls, from Montreal, Ottawa, and Vancouver. Using logistic regression, comparing regular users (at least one call per week for six months) to non-regular users, the odds ratio was 0.9 (95% CL: 0.6-1.3). Information on biases was then incorporated into the model in a probabilistic iterative procedure. First, with validation data on recall error, adjustments were applied to recalled number of calls and call durations. Second, to address selection bias, a dataset of individuals who refused participation in the study was simulated by sampling from the responders, according to a reasonable scenario of selection factors and assuming the same exposure distributions as in the completed data. With this reconstituted study population, we adjusted for confounding by age, education, sex, and region. Finally, random error was reintroduced and a median value and simulation interval were read from the distribution of estimates. Accounting for systematic and random error changed the odds ratio for regular users from 0.9 to 1.0 (0.8-1.3). Considering another exposure metric, the highest quartile of lifetime cumulative hours of use (greater than 558 hours) compared to non-regular users, resulted in a conventional odds ratio of 1.6 (1.0-2.7), and with the multiple-bias model, 1.8 (1.2-2.8). Application of bias modelling had marginal impact on results. Although our modelling incorporated limited correction for recall and selection biases, other biases may still be present.

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AN APPROACH TO COMPARING NATIONS FOR INCLUSION OF STUDIES IN HEALTH-BASED SYSTEMATIC LITERATURE REVIEWS. *R Deonandan, H Schachter, M Ly, A Girardi, D Lacroix, N Barrowman, C Moore, I Abdulkadir (Interdisciplinary School of Health Sciences, University of Ottawa, Ottawa, ON, Canada)

Objective: To develop and demonstrate a systematic approach for comparing nations, for the purpose of deciding whether to include or exclude studies in a systematic review of a health research question pertinent to the Canadian population. Method: A dialogical, discursive process was employed to identify criteria for describing a population. These criteria were then applied to select papers for inclusion in a large systematic review on paediatric mental illness prevalence. Results: a template of nine criteria was developed, including both sociodemographic and systemic indicators, and was applied to 68 jurisdictions, of which 19 were deemed sufficiently comparable to Canada to be included in the review. Conclusion: Subsequent systematic reviews should employ a similar process, with indicators and characteristics specific to the research questions, to ensure that political, economic, historical or ethnic biases are not influencing the selection or rejection of relevant papers.

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QUALITY ASSESSMENT OF THE COMPUTERIZED QUEBEC BCG VACCINATION REGISTRY AND LINKAGE WITH ADMINISTRATIVE DATABASES: A PILOT STUDY. *M-C Rousseau, M El-Zein, F Conus, M-E Parent, J Li (INRS-Institut Armand-Frappier, Laval, QC, Canada H7V 1B7)

The BCG (Bacillus Calmette-Guérin) Vaccination Registry for the Canadian province of Quebec comprises some 4 million vaccination records from 1926-1993. Its content, available in paper format, has recently been computerized using optical character recognition. In this pilot study, we aimed to: 1) compare the computerized database with the paper format, and; 2) determine the proportion of successful linkages with demographic and medical administrative databases. For the first aim, about 0.1% of the BCG records were systematically selected from the paper format. For each record, discrepancies with the database for any of 13 variables including names, birth date, gender, and characteristics of vaccination were documented. Exact agreement was observed for 99.6% of the 4,987 sampled records; no more than one error per record was present. For the second aim, a random sample of 3,500 subjects born in 1961-1974 and vaccinated from 1970-1974 was selected from the computerized BCG registry. Using personal identifiers (names, father's given name, sex, and birth date), separate linkages were conducted with the provincial medical insurance registration file (deterministic) and birth registry (probabilistic). The proportion of successful linkages was 69.5% with the medical insurance file and 77% with the birth registry, and varied greatly by birth year. In conclusion, the computerized data of the BCG registry was of excellent quality. Linkage of the BCG registry to administrative databases, as a first step to create a retrospective cohort, was feasible. The linkage method, birth year, and missing values in personal identifiers impacted on linkage success across years.

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COMBINING BIOMARKERS AND SELF-REPORTED DIET TO ANALYZE THE ASSOCIATION BETWEEN FISH-DERIVED N-3 POLYUNSATURATED FATTY ACIDS AND ATRIAL FIBRILLATION – THE ARIC STUDY. *N N Gronroos, A M Chamberlain, A R Folsom, E Z Soliman, S K Agarwal, J A Nettleton, A Alonso (University of Minnesota, Minneapolis, MN 55454)

Background: Results from observational studies investigating the association between n-3 fatty acids and atrial fibrillation (AF) have been inconsistent. We investigated whether the use of biomarker data in addition to self-reported diet changed associations between the fish-derived n-3 polyunsaturated fatty acids (PUFAs) eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) and AF. Methods: Dietary intake of fish-derived n-3 PUFAs was measured at baseline using a food frequency questionnaire (FFQ) and plasma phospholipids in 3,743 ARIC participants from the Minnesota field center. We identified 270 incident AF events over 18 years (1987-2005). Multivariable Cox proportional hazard models were run using five different exposures: (1) tertiles of FFQ-measured DHA+EPA; (2) tertiles of plasma-measured DHA+EPA; (3) subjects in the highest tertiles of intake for both FFQ and plasma measures vs. those in lower tertiles vs. all others (3-level categorical variable); (4) Howe's method with three categories (tertiles); (5) Howe's method with n categories (n = 3,743). Howe's method ranks individuals' by categories of self-reported diet intake, then again by biomarkers, then sums the two ranks. Results: Associations between n-3 PUFAs and AF risk were null for all 5 exposure characterizations. Hazard ratios (95% CI) comparing extreme categories were (1) 1.0 (0.7-1.5), (2) 0.9 (0.7-1.2), (3) 1.1 (0.7-1.6), (4) 1.0 (0.7-1.5), (5) 1.0 (0.7-1.2). Discussion: In this subgroup of the ARIC cohort fish-derived n-3 PUFA intake was not associated with AF. Use of dietary biomarkers did not impact estimates of association.

INFLUENZA VACCINE SURVEILLANCE IN REAL-TIME USING MOBILE PHONES AND SMS. *R Chunara, D Scales, D Diamond, J S Brownstein (Children's Hospital Boston, Boston, MA 02115)

We explored the use of mobile phones and Short Messaging Service (SMS) to monitor influenza vaccine coverage of a university community in real-time. Traditionally, influenza vaccine coverage is monitored by surveys with a significant time lag between vaccination and data collection. Individual reporting via SMS also eliminates recall-bias and can be used to provide real-time feedback about vaccination coverage within a specific geographic area or time. In this cross-sectional pilot study, subjects who received an influenza vaccine at the Massachusetts Institute of Technology medical center were solicited to self-report their gender, age and home zip code through their own mobile phones. Using linear regression analysis to estimate regression coefficients and 95% confidence intervals (CI), we found that the SMS reports generally were representative of the entire population that was vaccinated for each day of the study (coefficient: 1.64, CI: 1.49-1.80). Correlation by age gave coefficient: 1.26 and CI: 0.04-2.49 when considering all age groups and was highest without the 34-45 age group (coefficient: 1.73, CI 0.81-2.66). We also found that neither gender significantly reported vaccine coverage preferentially by SMS. Spatial coverage was also captured and mapped in real-time. These results indicate that with careful study design, specifically how the request for SMS reporting is advertised, SMS and mobile phones can be used as a method to gather vaccine coverage information representatively and quickly from a population.

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MULTIPLE METHODS USED TO RECALCULATE LOCAL BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM MEASURES FROM CITY TO NEIGHBORHOOD LEVEL. *D Bruckman, L Danosky, E Borawski (Prevention Research Center for Healthy Neighborhoods, Case Western Reserve University, Cleveland, OH 44106)

To examine epidemiological and behavioral measures in city-level Behavioral Risk Factor Surveillance System (BRFSS) taken to zip codes and neighborhood cluster(NC) levels, we combined several methods to generate point measures and confident intervals for measures in three and two successive years of BRFSS survey data for Cleveland (2005-07, 2008-09). The latter cohort included the nearest intersection. All years included self-identified neighborhood and zip code. Some zip codes overlapped neighborhood cluster boundaries. We will discuss the improvement in the adding street intersection in determining neighborhood cluster and limitations to several resampling methods applied: 1) resampling with replacement, 2) jackknife and 3) small area estimation (SAE). Resampling and jackknife were adjusted by determining the underlying census population of census tracts within the bisected zip code, and using that proportion for resampling. Original sample weights were revised using a proportional fraction method (Korn and Graubard, 1999), assessing variation across cohorts. NC were determined by geography, commonality of demographics, sample size > 200 and were vetted for face validity by key informants. Results: Seven NC were identified. Consistent location measures provided NC identification in 65% of data initially, improved to 71% using free text entries. Nearest intersection improved NC identification from 63% in earlier cohort lacking the question to 83% of records the latter cohort. Resampling, jackknife and small area estimation (using demographic distribution in bisected zip codes to adjust resampling) improved identification to near 95%. Agencies needing BRFSS measures at levels lower than existing county or city levels are encouraged to include respondent-identified neighborhood and nearest intersection (cross streets) questions to surveys, and to consider revising sample weights. Resampling and SAE methods can be applied as needed.

* = Presenter; S = The work was completed while the presenter was a student

USING PARAMETRIC G-FORMULA TO ESTIMATE THE EFFECT OF MULTIPLE LIFESTYLE AND DIETARY INTERVENTIONS FOR PREVENTING TYPE 2 DIABETES IN A PROSPECTIVE COHORT. *G Danaei, M A Hernán, F B Hu (Harvard School of Public Health, Boston, MA)

Prospective observational data is often used to estimate the effect of hypothetical interventions on disease risk. Standard analyses (e.g., Cox models) face three challenges: (i) appropriate adjustment for time-varying confounders affected by prior exposure, (ii) generation of adjusted estimates of absolute risk and population attributable risk, and (iii) consideration of complex interventions not easily coded by the variables in the model. The parametric G-formula is an emerging analytic alternative that can handle these three problems (under the assumptions of no unmeasured confounding and no model misspecification). We used the parametric G-formula to estimate the causal effect of multiple lifestyle and dietary interventions on the risk of type 2 diabetes among U.S. women. The interventions include weight loss, physical activity, dietary changes, moderate alcohol drinking and quitting smoking. The parametric-g formula can appropriately adjust for time-varying confounders affected by prior exposure (e.g., past diet), and can readily estimate the absolute risk of diabetes under the intervention of interest. One can then calculate effect on the risk ratio and difference scale, population attributable risk, and number-needed-to-treat for each intervention. Finally, the g-formula can be used to estimate the effects of joint interventions on several risk factors, and naturally lends itself to articulating complex, but more realistic, interventions. For example, rather than proposing naïve weight loss interventions of the sort "instantly reduce body mass index (BMI) to 25 if above 25 kg/m²", one can consider interventions of the sort "reduce BMI by 5% in each 2-year period until it reaches 25 kg/m²". In this presentation we will illustrate the advantages of this method by presenting effect estimates from a large prospective cohort study for a variety of interventions.

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CONSIDERATIONS IN DEVELOPMENT OF TRANSGENDER SURVEY ITEMS FOR POPULATION HEALTH STUDIES. *G R Bauer (University of Western Ontario, London, ON, Canada N6H 2B1)

Trans (transgender, transsexual or transitioned) people represent a broad range of individuals who share the common experience of knowing themselves to be a gender that is not congruent with the sex they were assigned at birth. There has been a recent increase in research on, knowledge of, and interest in, trans health issues, sparked by evidence of extreme health-related inequities. Existing quantitative data on trans health come primarily from convenience samples of trans people at the local, state or provincial, or national levels. Attempts to collect and analyse data on trans participants in large population health studies are relatively new. Measures developed for studies within trans populations are not appropriate for inclusion in these broader population studies, as such measures often include community-specific language that would be confusing to many non-trans participants. While consensus guidelines have been developed for measuring sexual orientation in population surveys, no such guidelines exist for measuring sex and gender in a way that can capture data on trans participants that can be meaningfully analyzed. Considerations in developing such survey measures are explored. These include: 1) Accurate identification of all trans participants; 2) Minimizing respondent burden; 3) Protecting against misclassification of the much larger group of non-trans participants as trans; 4) Minimizing item non-response; 5) Understanding dimensions of sex and gender and deciding which to incorporate, and; 6) Ensuring data from trans participants is collected in a way that allows it to be used in full-sample analyses and sex-stratified analyses, so that trans participants will not simply be dropped from these analyses. Based on these considerations, preliminary recommendations are made for measures to be incorporated into population studies, and an example provided of such measures developed for a large population cohort study.

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RELIABILITY OF SELF-REPORTED HOUSEHOLD PESTICIDES USE. C Fortes, S Mastroeni, P Boffetta, V Salvatori, N Melo, S Bolli, P Pasquini. (Clinical Epidemiology Unit, IDI-IRCCS, Rome, Italy)

Background: Household pesticide exposure has been associated with cancer risk in both adults and children. We investigated the reliability of reported lifetime household pesticide exposure through repeated administration of a standardized questionnaire. Methods: A questionnaire including detailed questions on lifetime frequency and duration of pesticides use in non-occupational circumstances was administered on two occasions to 163 cutaneous melanoma cases and 113 controls. We investigated the agreement between the two measurements taken on average 12 months apart and studied the association between differences in the two measurements and a set of explanatory variables. According to the results of the reliability analysis we also corrected OR estimates from the main study. Results: Agreement for duration and frequency of use of pesticides outdoors was 89.5% (Cohen's Kappa = 0.48) and 92.0% (Cohen's Kappa = 0.40) respectively while for duration and frequency of use of pesticides indoors agreement was 75.4% (Cohen's Kappa = 0.32) and 77.4 % (Cohen's Kappa = 0.28) respectively. Agreement was higher for duration (97.4%; Cohen's Kappa = 0.72) and use of pesticides on domestic animals (86.4%; Cohen's Kappa = 0.68). The corrected OR showed a moderate increase with a reinforcement of the effect of pesticides. Conclusion: Overall, there was a good reproducibility in self-reported exposure to pesticides. This findings may reinforce previous studies which showed that residential pesticides may cause cancer.

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WEIGHT TRAINING AND RISK OF SUBSITE-SPECIFIC COLORECTAL CANCER. *T Boyle, J Heyworth, F Bull and L Fritschi (The University of Western Australia, Perth, Western Australia, 6009)

There is convincing evidence that physical activity reduces colon cancer risk. However it is unclear whether different types of activity, such as aerobic and anaerobic activity (e.g. weight training), have a different effect on risk. We conducted a case-control study to investigate whether weight training was associated with the risk of subsite-specific colorectal cancer. A total of 918 cases and 1021 controls participated in a case-control study of colorectal cancer in Western Australia in 2005-07. Cases were histologically confirmed incident cases of colorectal cancer and age and sex matched controls were randomly selected from the electoral roll. Data were collected on demographic and lifestyle-related colorectal cancer risk factors, including recreational physical activity performed over the adult lifetime. The estimated effect of weight training on the risk of cancers of the proximal colon, distal colon and rectum was analyzed using multinomial logistic regression. After adjusting for potential confounders, including energy expenditure in recreational physical activities other than weight training, participants who did any weight training had a non-significant 37% lower risk of distal colon cancer than those who did no weight training (Adjusted Odds Ratio = 0.63, 95% Confidence Interval 0.32, 1.24). Weight training was not associated with rectal cancer or proximal colon cancer. These results suggest that weight training may be inversely associated with distal colon cancer risk, independently of other recreational physical activity, although the low prevalence of the exposure resulted in insufficient power to detect a significant difference. Further studies are needed to confirm this novel finding.

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THE BENEFIT STUDY: DOES REIMBURSING THE COST OF COMMERCIAL WEIGHT CONTROL PROGRAMS INFLUENCE WEIGHT LOSS? *S Lu, L Shack, T Mottershead, C Parker and F D Ashbury (Alberta Health Services, Calgary, AB, Canada T2S 3C3)

To investigate the effect of financial incentives on weight loss outcomes, a community-based controlled trial was conducted in six health regions (3 intervention, 3 control), matched on obesity prevalence and population density. A cohort of 591 participants 20-65 years old, with a BMI of ≥ 25 , and who lived in the selected communities, voluntarily enrolled in either intervention or control groups. Intervention participants received up to 70% reimbursement for program fees of commercial weight control programs (max \$600) if they attended 75% of sessions. Participants' weekly weight values were recorded by the weight control programs. Multiple imputation was used to impute 13.5% missing weight measures. Mixed model analysis was used to analyze short-term repeat weight values in two treatment groups to measure the effect of financial incentives over time. In the first 12 weeks of participation, both intervention and control group members lost weight. Receiving financial incentives significantly increased the percentage of body weight loss (intervention 4.4%; control 3.1%). Weight loss was significantly higher for participants who were men, had more social support, had a higher initial BMI, and had not previously enrolled in a weight control program. Repeated financial incentives enhance weight loss for individuals participating in commercial weight control programs in the first 12 weeks. Reimbursing the cost of weight control programs may be a potential population health obesity-prevention intervention, however, further analysis of the impacts on longer term outcomes is necessary. Key Words: weight loss, multiple imputation, mixed model, incentives, obesity

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FINANCIAL INCENTIVE FOR PROMOTING GOOD-HEALTH BEHAVIORS IN THE WORKPLACE. * P Matiaco, R M Merrill, S G Aldana, J G Garrett, C Ross (Brigham Young University, Provo, UT 84602)

Background: Companies are increasingly turning to worksite wellness programs to improve employee health, increase company productivity and lower absenteeism. This study measures the effectiveness of a financial incentive worksite wellness program. Methods: Assessment is based on 3,737 (72% men) continuously employed workers from a large agribusiness, 2007 through 2009. Biometric measures are evaluated for improvement and assessed using standard statistical methods. Results: The number of employees completing biometric screening was around 60% each year, with women more likely to be screened than men. Reward points were submitted by about 85% of those undergoing screening. A higher percentage of women submitted reward points and those in the age range 30-59 and employed more years with the company were more likely to submit reward points. Significant improvements occurred over the study period in those who were underweight, those with high systolic or diastolic blood pressure, high total cholesterol, high LDL, low HDL, high triglycerides, and high glucose. Among obese employees in 2007, significant improvements occurred in selected mental health and dietary variables. Among those who lowered their Body Mass Index (BMI), significant decrease occurred in fat intake, and significant increase resulted in weekly aerobic exercise and feelings of calmness and peace, happiness, ability to cope with stress, and more physical energy. Conclusion: Employees participating in the incentive wellness program experience greater physical and mental health and improved health behaviors, particularly among those in the at risk categories of health at baseline.

THE ASSOCIATION OF FOOD INTAKE PATTERNS WITH BREAST CANCER RISK: A COHORT STUDY. R S Kim, *G C Kabat, A B Miller, T E Rohan (Albert Einstein College of Medicine, Bronx, NY 10461)

Assessment of the role of dietary patterns in the etiology of various cancers may provide a more informative approach than the assessment of individual foods and nutrients. Methods to identify dietary intake patterns fall into two categories: partitional clustering and hierarchical clustering. We used agglomerative hierarchical clustering, which, unlike partitional clustering, does not require a priori knowledge of the number of clusters (k) or selection of initial clusters. In addition, this method accommodates subjects with uncertain food patterns better than partitional methods, and it has the additional benefit of enabling visual inspection of the clusters. For the purpose of identifying dietary intake patterns in a large prospective cohort study and relating them to risk of subsequent breast cancer, we performed agglomerative hierarchical clustering analysis on data from the Canadian National Breast Screening Study (NBSS) dietary cohort, in which a food-frequency questionnaire containing 86 food items was completed by 49,654 women. Over 16.4 years of follow-up, 2,545 cases of breast cancer were identified. A heatmap diagram was created displaying diverse food intake patterns and breast cancer incidence among 10,000 randomly selected members of the cohort. These data are being used to test the association between food patterns and risk of breast cancer using Cox proportional hazards regression models. In a preliminary analysis, we identified a cluster containing 7% of subjects with very heavy alcohol (wine, beer, liquor) and non-diet soda intake. After adjustment for covariates, the hazard ratio for this cluster, relative to all others, was 1.42 (1.06, 1.91, $p < 0.02$).

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ASSOCIATION BETWEEN PHYSICAL ACTIVITY AND RISK OF STROKE SUBTYPES: THE ATHEROSCLEROSIS RISK IN COMMUNITIES (ARIC) STUDY. *C S Autenrieth, K R Evenson, H Yatsuya, E Shahar, W D Rosamond (Department of Epidemiology, Gillings School of Global Public Health, University of North Carolina, Chapel Hill, NC)

Background: The evidence for the relationship between stroke subtypes and physical activity is not clear. Methods: Using data from 13,280 men and women aged 45-64 years who participated in the ARIC Study, sport and leisure physical activity were assessed by self-report using the Baecke questionnaire at baseline (1987-1989). Stroke and its subtypes were ascertained from physician review of medical records. Multivariable adjusted hazard ratios (HR) and 95% confidence intervals (CI) were calculated using Cox regression models. Results: During a median follow-up of 18.8 years, a total of 757 incident stroke cases occurred. Compared with the lowest quartile of sport physical activity, age-, sex-, and race-field center adjusted HR (95% CI) for the highest activity quartile were 0.76 (0.61-0.95) for total, 0.80 (0.64-1.02) for total ischemic, 0.53 (0.24-1.19) for hemorrhagic, 0.87 (0.50-1.51) for lacunar, 0.89 (0.55-1.44) for cardioembolic, and 0.74 (0.54-1.00) for non-lacunar stroke. Further adjustments for confounders and mediators attenuated the HR for total (0.92; 0.73-1.15), total ischemic (0.99; 0.78-1.25), hemorrhagic (0.61; 0.27-1.39), lacunar (1.12; 0.64-1.95), cardioembolic (1.07; 0.66-1.74) and non-lacunar (0.90; 0.66-1.23) stroke. There was little evidence for dose-response association between quartiles of physical activity and stroke subtypes. Similar results were obtained for leisure activities. Conclusion: These data suggest a trend toward a reduced risk of total and non-lacunar stroke with higher levels of physical activity that is explained by measured confounders and mediators.

NUTRITIONAL KNOWLEDGE, ATTITUDES AND DIETARY BEHAVIOUR AMONG STATE EMPLOYEES IN TRINIDAD AND TOBAGO. *R Arthur and S Nichols (The University of the West Indies, St. Augustine, Trinidad and Tobago)

In this cross sectional study, we examined the nutritional knowledge, attitudes and dietary behaviour of 303 employees from fifteen state organisations. Participants completed a self administered questionnaire on their nutritional knowledge, attitudes and dietary behaviour. The findings revealed that taste, health and safety were the top three factors which influenced food choices. Additionally, only 44.6% reported viewing food labels, 40.9% reported consideration of nutrition information and 43.6% reported using from all food groups. Less than 40% were likely to consider Trans fat, fibre, saturated fat and sodium when purchasing foods. Nutritional knowledge was inversely correlated with reported consumption of meat ($p = .040$), sugar/jam ($p = .034$), snacks ($p = .001$), fats/oils ($p = .001$) and staples ($p = .057$) and positively correlated with the consumption of fish ($p = .051$). Person reporting good a good knowledge of nutrition were significantly more likely to consider nutrition information when purchasing foods ($p < .001$), purchase and use foods from the six food groups ($p < .001$) and consider all nutrition contents on labels ($p < .001$). These findings suggest that introduction of programmes on nutrition at the workplace may provide a vehicle for improving nutrition behaviours.

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APPLYING FEDERAL PHYSICAL ACTIVITY GUIDELINES TO HEALTHY PEOPLE 2020 OBJECTIVES. *A Ryskulova, R Klein, R Hines (National Center for Health Statistics, CDC, Hyattsville, MD 20782)

Regular physical activity (PA) is associated with decreased risk for chronic diseases and premature mortality. Healthy People 2010 (HP2010) included objectives measuring PA among adults. In 2008 Federal PA guidelines were published and new PA standards were used for developing HP2020 objectives. Federal PA guidelines recommend 2 hours and 30 minutes a week of moderate-intensity, or 1 hour and 15 minutes a week of vigorous-intensity PA for adults. Additional health benefits can be provided by increasing to 5 hours a week of moderate-intensity PA, or 2 hours and 30 minutes a week of vigorous-intensity PA, or a combination of both. The HP objectives were modified to follow the new PA guidelines. Data from the 2008 National Health Interview Survey (NHIS) were analyzed to produce the baseline data for HP2020 objectives addressing regular adult PA. More than 43% of adults met federal PA guidelines in 2008. Men, adults ages 18-24, white non-Hispanic, and persons without disabilities were more likely to be physically active than their counterparts. The prevalence of PA was two times as high among adults with bachelor or advanced degrees as those who did not graduate high school. About 28% of adults reported being engaged in moderate PA for at least 5 hours a week or 2.5 hours of vigorous PA. Similar patterns were observed among population subgroups: males, younger adults, persons with higher income and education levels had higher rates of PA. It should be noted that the self-reported NHIS data may not reflect the actual PA status. HP2020 objectives will be tracked during the decade to further promote benefits of PA and to monitor the PA status of Americans with a focus on eliminating disparities.

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CALCIUM INTAKE, DEMOGRAPHIC AND ANTHROPOMETRIC FACTORS ASSOCIATED WITH TOTAL AND IONIZED CALCIUM LEVELS IN SERUM: RESULTS FROM THE THIRD NHANES SURVEY. *H G Skinner, G G Schwartz (University of Wisconsin, Madison, WI 53726).

Serum concentrations of calcium and dietary calcium intake have been independently associated with risk for fatal prostate cancer in prospective studies. Understanding the relationship between dietary calcium and serum calcium may provide insight into the relationship of these variables to prostate cancer risk. Moreover, a better understanding of the relationship between dietary calcium and serum calcium is important for epidemiologic studies because it is commonly stated that, over a wide range of dietary intake, intake of calcium does not influence serum calcium concentrations. We examined associations between the concentrations of total serum calcium and ionized calcium, the physiologically active fraction of serum calcium, and intake of calcium and phosphorous, among 14,262 adults in the Third National Health and Nutrition Examination Survey. We also examined the relationship between serum calcium and demographic and anthropometric factors. In multivariate linear regression analyses accounting for the complex sampling design, we observed positive (log-log) associations between the dietary intake of calcium and both the concentration of ionized calcium in serum (Beta = 3.6e-03; SE = 1.1e-03; p = 0.002), and total calcium concentration in serum (Beta = 3.2e-02; SE = 1.8e-03; p = 0.08). We observed an inverse association between height and both total (Beta = -3.53e-05; SE = 7.5e-05; p = 4.5e-05) and ionized serum calcium concentrations (Beta = -2.63e-05; SE = 8.73e-06; p = 0.005), and a positive association between weight and ionized calcium concentration (Beta = 2.13e-06; SE = 9.97e-07; p = 0.04). Our findings of a positive association between dietary intake of calcium and serum calcium, in a large, nationally representative sample, may resolve an important issue in prostate cancer epidemiology and has broad implications for other epidemiologic studies of calcium intake.

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PREVALENCE OF MICRONUTRIENT INTAKE INADEQUACY IN OLDER RESIDENTS IN THE MEDIUM SIZED CITY OF SÃO PAULO STATE, BRAZIL. L Bronzi de Souza, *J E Corrente (Department of Biostatistics - Biosciences Institute - UNESP - Botucatu, São Paulo, Brazil)

Ageing and its implications in morbidity rates are frequently associated with increased risk for food intake inadequacy of several nutrients. Hence, this study aimed at evaluating the prevalence of nutrient intake inadequacy in 96 older residents in the city of Botucatu, São Paulo, Brazil. To that end, nutritional data were obtained by applying three 24-hour recalls. The Nutwin software, v.1.5, was used to obtain the quantity of nutrients reported in the food inquiries. The data were processed by SAS for Windows, v.9.2. Nutrient intake distribution was estimated using the routines proposed by Tooze et al (A New Statistical Method for Estimating the Usual Intake of Episodically Consumed Foods with Application to Their Distribution, JADA, 2006). Inadequacy prevalence was estimated by using the values from the Dietary Reference Intake as cut-off points. The Adequate Intake (AI) was utilized when the nutrient did not have the Estimated Average Requirement (EAR) value. With respect to the prevalence of micronutrient intake inadequacy, approximately half of the nutrients evaluated showed low inadequacy prevalence (< 20%), namely: phosphorus, iron, riboflavin, thiamine, niacin and vitamin B12 for both genders, except for vitamin B6, which showed low intake inadequacy only for males. Folate, vitamin E and magnesium were the nutrients with the highest intake inadequacy prevalences. Calcium, pantothenic acid and manganese did not show EAR values; hence, it was not possible to reach any conclusions about its inadequacy prevalence. Calcium, pantothenic acid and manganese showed intake below AI. Policies encouraging the intake of healthy foods could help overcome the nutritional deficiencies herein described, thus improving older persons' nutritional status.

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ASSOCIATION BETWEEN QUALITY OF LIFE AND NUTRITION STATUS OF OLDER PEOPLE IN A CITY OF SÃO PAULO STATE, BRAZIL. L Bronzi de Souza and *J E Corrente (Department of Biostatistics - Biosciences Institute - UNESP - Botucatu, São Paulo, Brazil)

In the last few decades, population growth patterns have shown high figures for older adults. The accentuated increase in the number of older individuals, particularly in developed countries, has brought consequences to society, and in order to face such challenge, it is necessary to identify the determinant causes of older persons' present health and life conditions. Knowledge concerning the multiple facets that involve the ageing process is also required. Hence, this study aimed at evaluating the existence of an association between quality of life and nutritional status in a sample of older residents in the city of Botucatu - SP, Brazil. It was an epidemiological, cross-sectional, population-based study on individuals aged 60 years or older. A home interview was conducted with 96 individuals at a mean age of 75.11 ± 7 years. Most of them were females (60%), poorly educated, married (62,11%) and retired (84,21%). When questioned about their quality of life, 72,62% reported to be satisfied about it. As to nutritional status, it was found that 41% of the participants were overweight. Anthropometric measurements reduced as age advanced, even though such reduction was not always significant. No significant association between anthropometric measurements or nutritional status with quality of life was observed. Hence, it is possible to conclude that most of the older individuals evaluated were females, married, retired, poorly educated and overweight. It was also observed that there was no association between nutritional status and quality of life.

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REDUCTIONS IN MEDICATIONS WITH SUBSTANTIAL WEIGHT LOSS WITH BEHAVIORAL INTERVENTION. *M Jhaveri, J Anderson (University of Louisville, Louisville, KY)

Medical costs of obesity in the United States exceed \$147 billion annually with medication costs making a sizable contribution. We examined medication costs associated with substantial weight losses for patients treated in intensive behavioral weight loss program. Inclusion criteria were medication use for obesity co-morbidities: hypertension, diabetes, dyslipidemia, degenerative joint disease (DJD), or gastroesophageal reflux disease (GERD). Group 1, 83 consecutive obese patients on medications who completed 8 weeks of classes lost 19 kg in 20 weeks. Group 2, 100 consecutive severely obese patients who lost more than 45 kg (59 kg total in 45 weeks). Medications were discontinued: Group 1, 18%; Group 2, 64%. The numbers of medications per day decreased significantly for all conditions. Numbers of medications, initial and final, respectively were: Group 1, total, 3.0 to 1.7; diabetes, 1.7 to 0.6; Group 2, total, 2.5 to 0.5; hypertension, 1.8 and 0.5; diabetes, 1.9 and 0.6; dyslipidemia, 1.1 and 0.3; DJD, 1.1 and 0.2; and GERD, 1.1 and 0.3. Monthly costs for all medications decreased significantly and were as follows for Group 1, total, \$249 and \$153; diabetes, \$287 to \$130; Group 2: total, \$237 and \$65; hypertension, \$111 and \$29; diabetes, \$371 and \$125; dyslipidemia, \$130 and \$30; DJD, \$62 and \$9; and GERD, \$157 and \$51. Average reduction in monthly medication costs were: Group 1, \$96; Group 2, \$172. Weight loss in medically supervised intensive behavioral weight loss program is a very effective approach to improving diabetes and cardiovascular risk factors and reducing medical costs.

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FRAILITY, DIETARY INTAKE, AND FOOD INSUFFICIENCY IN OLDER ADULTS. *E Smit, K Winters-Stone, A M Tang, C J Crespo (Oregon State University, Corvallis, OR 97331)

We examined frailty, energy and protein intake, and food insufficiency in US adults (age ≥ 60 years) who participated in The Third National Health and Nutrition Examination Survey (n = 4731). Frailty was defined as meeting ≥ 3 criteria and pre-frailty as meeting 1-2 of the 5 item criteria adapted to the available data (low body mass index (BMI), slow walking, weakness, exhaustion, and low physical activity). Intake was assessed by 24-hour dietary recall. Food insufficiency was assessed as self reported "sometimes" or "often" not having enough food to eat. Analyses were adjusted for gender, race, age, smoking, education, income, BMI, other comorbid conditions, and complex survey design. Frail people were more likely to be female, less educated, smokers, and obese than people who were not frail. Independent of BMI, energy intake was lowest in people who were frail, followed by pre-frail, and highest in people who were not frail (mean kilocalories (kcal) \pm standard error: 1535 \pm 62, 1675 \pm 20, 1757 \pm 18, respectively, $p < 0.01$). Excluding the low BMI (< 18.5) criteria from the frailty definition also showed lower energy intake in frail than not frail people ($p < 0.01$). For each of the frailty criteria, kcal were significantly lower in people who met the criteria than people who did not. Energy adjusted grams of protein and percent of kcal from protein intake were similar in people with and without frailty. Frail (adjusted odds ratio (AOR) = 3.7, 95% confidence interval (CI) = 1.3, 10.4) and pre-frail (AOR = 2.2, 95% CI = 0.9, 5.4) people were more likely to be food insufficient than people who were not frail. Our results suggest that targeted interventions are needed to promote availability and access to nutritious foods among older US adults with frailty.

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THE ROLE OF PUBLIC TRANSPORT IN ACHIEVING RECOMMENDED MINUTES OF PHYSICAL ACTIVITY: A CASE STUDY FROM MONTRÉAL, CANADA. *R A Wasfi, N A Ross and A M El-Geneidy (McGill University, Montreal, QC, Canada H3A 2K6)

The use of active transportation (walking, cycling backed up by public transit) is well known to have public health benefits, yet the extent to which public transit helps individuals achieve daily recommended levels of physical activity is unknown. This paper measures the amount of daily walking associated with the use of public transit in Montréal, Canada. It also examines the underlying individual and contextual factors associated with walking to transit stations. Total walking distances are calculated from a travel behaviour survey (n = 10,305 respondents) within a geographic information system. Multilevel regression modelling is used to assess the influence of individual, neighbourhood and transit service characteristics on walking distances. The average walking distance per day to and from public transit stops is 1,447 meters (15.87 minutes) for females and 1,596 meters (17.5 minutes) for males. Individuals with low household income (less than \$20K) walked approximately 173.7 metres (1.9 minutes) less per day compared to individuals with household income more than \$80K. Commuter train trips that link suburban areas to the downtown are associated with the maximum walking minutes. Recommended minutes of daily physical activity can be achieved for transit users, especially for train users, just through walking to and from transit stations. The physical activity benefits of using public transit vary along gender and socioeconomic lines, however, public health interventions that call for increased public transit use might inadvertently increase health inequalities associated with physical activity. Keywords: Active transport, public transit, physical activity, walking, health inequalities

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URBAN SPRAWL AND THE RISK OF OVERWEIGHT AND OBESITY IN THE NURSES' HEALTH STUDY. *P James, J E Hart, SV Subramanian, F Dominici, P J Troped, J D Spengler, and F Laden (Department of Epidemiology and Department of Environmental Health, Harvard School of Public Health, Boston, MA 02215)

There is a growing body of literature linking overweight and obesity to the built environment. We conducted a survival analysis linking the county sprawl index, a measure of residential density and street accessibility, to risk of incident overweight and obesity. Our sample consisted of Nurses' Health Study participants living throughout the continental United States from 1986-2006 who were either free of overweight (n = 64,852) or free of obesity (n = 85,994) at baseline. Participants were 94% white and 41-68 years old at baseline (mean 55 years, standard deviation 7.16 years). Adjusting for age, race, disease status, smoking status, education, marital status, and husband's education, a one standard deviation (24.9) increase in the county sprawl index (indicating a more dense, more compact county) was associated with a 3.55% (95% Confidence Interval (CI) 2.25%, 4.83%) decreased risk of becoming overweight and a 4.57% (95% CI 2.99%, 6.14%) decreased risk of becoming obese. In summary, we found that women living in denser, more compact counties were at lower risk of becoming overweight or obese.

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DIET QUALITY IN RELATION TO GEOGRAPHICAL LIFE HISTORY FACTORS. *C Frankenfeld, J Poudrier, N Waters, P Gillevet, and Y Xu (George Mason University, Fairfax, VA, 22030)

Poor diet quality is a risk factor for numerous diseases. Studies of acculturation and diet suggest that individuals' diets change when they move to a different area. Less is known about the influence of diversity of residential history on diet quality. The objective of this study was to evaluate lifetime residential history and current diet quality. Adults are being recruited from the Northern Virginia area. For this preliminary analysis, 62 out of a target 125 individuals have completed residential history interviews and self-reported personal characteristics. A Healthy Eating Index (HEI) was calculated for each individual based on two days of diet reported using the National Cancer Institute Automated Self-Administered 24-Hour Dietary Recall. The mean HEI was 54.2 (range: 30.0-83.1). After adjustment for age, sex, completing college, and being single, having lived internationally in the past five years was associated with a 16-point higher HEI ($p < 0.001$), having lived internationally as a child was associated with an 8.3-point higher HEI ($p = 0.004$), and an increasing number of unique states lived in was positively associated with HEI (p -trend = 0.038). After mutual adjustment in regression, international residence in past five years, but not as a child, remained statistically significant. These preliminary results suggest that recent residences are more influential on diet quality than residences as a child and that residential diversity is associated with a better diet quality. Future analyses on the completed sample will include dietary intake from four-day food records and geocoding of residential history, with linkage to census and environmental data to evaluate lifetime spatial-related risk factors for poor diet quality.

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ENROLLMENT AND COMPLIANCE IN A NATIONAL PHYSICAL ACTIVITY ACCELEROMETER STUDY. *V J Howard, J D Rhodes, A Le, B Hutto, N Colabianchi, J E Vena, V Seshadri, M S Stewart, S Blair, S P Hooker (School of Public Health, University of Alabama at Birmingham, Birmingham, AL 35294)

Background: Innovative clinical trials and epidemiologic studies examining physical activity (PA) now use objective measurement devices (e.g., accelerometers) over self-report. Herein we describe the experience of a national epidemiologic study using accelerometers. Methods: This is an ancillary study to REGARDS, a national, US, population-based, longitudinal study of 30,239 blacks and whites, aged > 45 years, enrolled January 2003-October 2007. Participants are followed every 6 months by telephone for stroke events, and also asked about willingness/availability to wear an accelerometer for 7 days. Device, instructions, and stamped addressed envelope for return are mailed to consenting participants. Postcard acknowledgement, reminders, and up to two calls are made to encourage compliance with wearing device and its return. Summary results but no financial compensation are provided. Results: By November 1, 2010, 9,502 were asked to participate: 56% consented, 17% deferred, 27% declined. Consent rate for blacks was 35% vs. 66% for whites. Devices were shipped to 5,147 with return rate of 84%; 397 are lost (not returned > 120 days.) Of accelerometers returned/analyzed (n = 4016), 81% provided usable data, 4% not worn sufficient amount of time, 15% had incomplete/missing log sheet or device malfunction. Initial inventory of accelerometers was 600, increased to 900. After processing, cleaning, and battery change of returned devices, maximum number of devices ever shipped in a week was 200. A challenge is determining when the device was actually worn. The usual algorithms substantially overestimate non-wear in the REGARDS-PA sample. Conclusions: While our results compare favorably to NHANES, a limiting factor is availability of accelerometers. Budget and protocol could be re-examined towards consideration of incentives to participate and return devices.

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PROCESSED MEAT CONSUMPTION AND STOMACH CANCER: A META-ANALYSIS OF PROSPECTIVE EPIDEMIOLOGIC STUDIES. *V Perez and D D Alexander; D L Weed (Center for Epidemiology, Exponent Inc., Wood Dale, IL, 60191)

Several epidemiologic studies have suggested a relation between processed meat consumption and stomach cancer risk in adult populations. To estimate the statistical association between intake of processed meat and stomach cancer, we performed a meta-analysis using random-effects models of prospective studies published up to January 2011 in PubMed. Population group, study design and setting, type and amount of processed meat consumed, risk estimates and corresponding 95% confidence intervals [CI], and covariate adjustments were extracted from all studies included for analysis (N = 11). The summary relative risk estimate for high vs. low processed meat intake was 1.14 (95% CI: 1.00-1.30), however, statistically significant heterogeneity was indicated (p = 0.044). These findings should be interpreted within the context of various methodological challenges such as inconsistency in processed meat exposure definitions and consumption patterns; cultural differences in the different study populations; variability in the length of follow-up between studies; potential effect modification by helicobacter pylori status; differences in risk according to gastric cardia and non-cardia tumors; and confounding by other dietary (e.g., fruit and vegetable intake) and lifestyle (e.g., smoking, physical activity) characteristics. In summary, our findings do not provide evidence of a consistent and statistically significant association between processed meat intake and stomach cancer in adults. Future epidemiologic research accounting for these methodological limitations is needed.

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RED MEAT CONSUMPTION AND COLORECTAL CANCER: A META-ANALYSIS OF PROSPECTIVE EPIDEMIOLOGIC STUDIES. *D D Alexander, V Perez, C A Cushing, D L Weed, (Exponent, Inc, Wood Dale, IL)

Controversy about the potential role of red meat consumption in colorectal carcinogenesis has been especially pronounced. One approach to partially resolving controversies, with issues of consistency at their core, is to perform a meta-analysis. Therefore, we conducted a meta-analysis of prospective studies of red meat intake and colorectal cancer to estimate the statistical association, examine potential sources of heterogeneity, and determine the magnitude of effect over time. Thirty-four prospective studies of red meat and CRC were identified, of which, 25 represented independent non-overlapping study populations. Summary relative risk estimates (SRREs) for high vs. low intake and dose-response relationships were calculated using random effects models. In the analysis of high vs. low intake, the SRRE was 1.12 (95% CI: 1.04-1.21), although significant heterogeneity (p = 0.014) was present. Summary associations were modified by tumor site and gender. The SRREs for colon cancer and rectal cancer were 1.11 (95% CI: 1.03-1.19) and 1.19 (95% CI: 0.97-1.46), respectively. The SRREs among men and women were 1.21 (95% CI: 1.04-1.42) and 1.01 (95% CI: 0.87-1.17), respectively. The SRRE for studies published before 2000 was 1.30, whereas the SRRE was 1.12 for the studies published between 2000 and 2010. Based upon summary associations that are weak in magnitude, heterogeneity across studies, inconsistent patterns of associations across the sub-groups analyses, and the likely influence of confounding by other dietary and lifestyle factors, the available epidemiologic data are not sufficient to support an independent and unequivocal positive association between red meat intake and CRC.

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PARITY AND BODY MASS INDEX IN U.S. WOMEN: A PROSPECTIVE 25-YEAR STUDY. B Abrams*, B Heggeseth, E Davis and A Lindquist. (School of Public Health, University of California, Berkeley, CA 94720)

Weight gain during the childbearing years is common in United States (U.S) women, especially among minorities, but little is known about the prospective relationship between pregnancy and body size at midlife. We used multivariable longitudinal regression analysis with generalized estimating equations to model change in body mass index (BMI) and weight over time for primiparas and multiparas, compared to nulliparas, by race-ethnicity and baseline BMI category, adjusted for age and psychosocial and economic variables among female participants in the 1979 U.S National Longitudinal Survey of Youth from 1981 (n = 4095) to 2006 (n = 3059). Baseline height, parity and non-pregnant weight were reported in 1981, covariates were collected beginning in 1979 when women were 14-21 years old. Among nulliparas, adjusted mean BMI increases at 25 years were 5.43, 6.86 and 7.63 kg/m² for white, Hispanic and non-Hispanic black women, respectively. Any childbearing was associated with significantly increased BMI for white primiparas, black women and obese women, with results less consistent for Hispanics. The importance of a first versus subsequent birth on BMI change over time differed by race-ethnicity and baseline BMI. Combining adjusted weight gain attributable to age and other factors with that due to childbearing, 25 year gains were lowest for white, normal weight multiparas at 14.6 kg (95% Confidence Interval (CI): 13.8,15.4) and highest at 27.6 kg (95% CI: 22.7, 32.8) for black, obese multiparas. These findings suggest that parity is an independent risk factor for long-term weight gain; black women and those who are obese during young adulthood appear to be at highest risk.

ESTIMATING FREQUENCY AND MAGNITUDE OF EFFECT OF PHYSICAL SPACE OF ICU, NURSE TO BED RATIO AND INAPPROPRIATE ANTIBIOTIC THERAPY IN INCIDENCE OF NOSOCOMIAL INFECTIONS IN ICUS OF IRAN. *A Keshtkar, G Roshandel, M Zahraei, S Madani, B Khodabakhshi (Endocrine and Metabolism Research Institute, Tehran University of Medical Sciences, Tehran, Iran)

Background: This study conducted to determine frequency of nasocomial infection (NI) risk factors and estimating the magnitude of effect for predicting avoidable burden and contributing proportion of each factors in intensive care units (ICUs) in Iran. Methods: This survey was done in 90 ICUs in Iran. A structured questionnaire was completed for assessing NI risk factors (ICU structure, nurse to bed ratio, proportion of inadequate antibiotic therapy). We used generalized impact fraction (GIF) for predicting avoidable burden of these preventable risk factors. Results: Mean of ICU lifetime and the ward bed numbers were 8.7 years and 7.6, respectively. The physical space in 2 (2.2%) ICUs met international standards. The nurse to bed ratio in one (1.1%) ICU was 1. Inadequate antibiotics therapy was seen in 19.1% of patients. GIF model showed that, decreasing the frequency of ICUs with ≥ 11 beds from 15.5 to 5 percent may lead to 6.3% decrease in NI risk. Decreasing the proportion of inadequate antibiotics therapy from 19.7 to 10 percent could decrease the risk of NI almost 20%. Obtaining nurse to bed ratio equal to 1 at 30% of ICUs, could decrease NI risk almost 20%. Conclusion: Because of no methodological limitation of GIF model, it could be use for decision and policy making in NI prevention program.

STUDY OF RISKY BEHAVIOURS LEADING TO UNINTENTIONAL INJURIES AMONG HIGH SCHOOL STUDENTS IN TEHRAN IN 2009. *E Ainy, M Movahedi, H Soori (Shahid Beheshti University of Medical Sciences, Tehran, IRAN)

Objective: Since unintentional injuries are very high among children and adolescents, a study was conducted to determine risky behaviours leading to unintentional injuries among Tehrani high school students in 2009. Methods: A cross-sectional study was conducted on 727 governmental and non governmental high school students in both genders which were selected by using multistage randomizing sampling in Tehran. Eight selected districts of 20 education districts were divided to three areas (North, Centre, and South) by stratified sampling. Data was collected by cluster sampling in each district using standard questionnaire of management diseases centre of America which was validated in Iran. Subjects were healthy students aged 12-18 years (ill students were excluded). Risky behaviours on fall, burn, poisoning and road traffic injuries were studied. Results: Mean age of subjects was 16.8 ± 1.2 , range (12-18) years. Overall 44% of boys and 38% of girls exposed to risky behaviours leading to unintentional injuries. Significant differences were observed in driving without licence among boys. Non use seatbelt was more prevalent in governmental schools. Motorcycle using was more prevalent in the south of Tehran ($P < 0/001$). Significant differences was observed among boys related to poisoning substance expose, driving without licence, motorcycle driving, non helmet use during motorcycle driving ($p < 0/001$). Conclusion: About half of boys and more than one-third of girls were exposed to risky behaviours leading to unintentional injuries during their life. Children's risky behaviours should be considered as major risk factors on prevention of unintentional injuries particularly among those from deprived areas and boys. Key words: unintentional injuries fall, burn, poisoning and road traffic injuries

EPIDEMIOLOGICAL PATTERN OF ROAD TRAFFIC INJURIES IN TEHRAN-ABALI AXIS IN 2008: A PROSPECTIVE STUDY. *H Soori, H Hatamabadi, R Vafaei, M Hadadi, E Ainy, H Asnaashari (Shahid Beheshti University of Medical Sciences, Tehran, IRAN)

Background and Objective: A study was conducted to determine epidemiological pattern of road traffic injuries in Tehran-Abali axis in 2008. Materials and Methods: In a prospective study road traffic injuries data in Tehran-Abali axis on event time until one month later and information of pre hospital and hospital care of injured subjects was collected by road traffic police, six emergency stations, twelve hospitals and three clinics during one year. Pre hospital information was included: age, gender, injured organ, Revised Trauma Score (RTS), Injury Severity Score (ISS) and hospital information was duration of hospitalization, status on dismissed time and post event one month later. Results: During one year 243 accidents occurred. In scene 23 subjects have been died. 345 injured subjects were followed. Mean age of subjects was 33.6 ± 15.6 . Overall, 71.1 percent of injured subjects were male and more than 60 percent of them were 20-39 years. The most common injuries were head and face damage. Mean of (RTS) and (ISS) was 7.23 and 9.38 respectively. Intensity of injury was higher among pedestrian than vehicles and motorcycle drivers, and occupants, ($p < 0.05$). Mean of hospitalization among 75 percent of injured subjects was less than 24 hour. 66.5 percent of injured subject after dismissed was like before of accident. Conclusion: More medical services at scene, education and monitoring to novitiate youth drivers, public education and security transit place to pedestrian, educational program to protect of head and face and high quality of medical services to intend for indoor wear injured subjects needs to be predicted. Key Words: Traffic injuries, epidemiology, care, pre hospital, Revised Trauma Score (RTS) ? Injury Severity Score (ISS)

EPIDEMIOLOGIC FINDINGS SUGGEST THE SCIENTIFIC PARADIGM SHAPING UROLOGIC RESEARCH NEEDS MAJOR REVISION. *J B McKinlay (New England Research Institutes, Watertown, MA 02472)

Scientific advances follow the rise and fall of paradigms-overarching viewpoints which determine the research agenda, methods, and scientific support. Accordingly, science is essentially conservative: innovative ideas are ordered by the prevailing paradigm and changes occur only as paradigms are replaced. Data from the Boston Area Community Health (BACH) Survey (4145 subjects at baseline (2002-5) and follow-up (2006-10) (1610 men, 2535 women; 1327 Black, 1341 Hispanic, 1477 White) suggest a need to revise the current urologic paradigm. There is marked overlap between supposedly discrete urologic diseases, suggesting a need for lumping rather than diagnostic splitting. Psychosocial events and lifestyle often contribute more than traditional physiologic risk factors, suggesting a need for a multidisciplinary, biopsychosocial approach. Racial/ethnic differences are largely explained by socioeconomic influences, suggesting the search for genomic explanations may be misplaced. There are sex differences in risk factors, suggesting different pathophysiologic pathways and a need for a sex specific urology. Urologic symptoms are early predictors of major health outcomes, suggesting a need to think beyond immediate bothersome symptoms. Diagnoses depend more on who the patient and provider are than the specific symptoms presented, suggesting a need for evidence-based definitions and diagnoses, and detailed clinical guidelines for patient management. Recent epidemiologic data indicate many assumptions underlying urologic research and clinical practice lack empirical support and may perpetuate unproductive lines of enquiry, a narrow biomedical orientation and distract resources from promising areas of investigation and intervention. BACH is supported by NIH NIDDK U01 DK 56842. The content is solely the responsibility of the authors and does not necessarily represent the official views of NIDDK or NIH.

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IMPACT OF A PILOT INTERVENTION TO DECREASE OVERREPORTING OF HEART DISEASE DEATHS. *T Al-Samarrai, A Madsen, R Zimmerman, G Maduro, W Li, C Greene, E Begier (New York City Department of Health and Mental Hygiene, New York, NY 10013)

Heart disease (HD) deaths are overreported in the United States, particularly in New York City (NYC) where a study revealed overreporting of coronary heart disease deaths by 91%. We evaluated the impact of a pilot intervention to improve cause of death (COD) reporting. A pilot intervention at 8 hospitals reporting the highest proportion of HD deaths in NYC was implemented during August 1, 2009–January 31, 2010. The intervention had multiple components, including an in-service and e-learning module to educate hospital staff on COD reporting. We analyzed death certificate data and compared leading underlying COD in the 6-month pre- and postintervention periods February 1–July 30, 2009, and 2010, respectively, for all NYC hospitals. At intervention institutions, reported HD deaths declined 50.4%, from 1,589 (62.9%) of 2,527 deaths during the preintervention period to 758 (31.2%) of 2,431 deaths during the postintervention period. Reported deaths from underlying malignant neoplasms increased from 12.7% to 17.7%; influenza and pneumonia deaths increased from 4.4% to 10.0%; and chronic lower respiratory disease deaths increased from 2.7% to 5.1%. At nonintervention hospitals, reported HD deaths decreased from 37.0% to 34.9%; other leading causes changed by < 0.3%. NYC's intervention to decrease overreporting of HD deaths was effective and led to substantial changes in HD reporting and other leading COD. Intervention scale-up and monitoring the durability of this effect are planned. The marked increase in reported influenza and pneumonia deaths postintervention requires further investigation, because the preintervention NYC rate already exceeded the national average.

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BUILDING AN EVALUATION FRAMEWORK FOR A GRADUATE EPIDEMIOLOGY PROGRAM –STARTING WITH COMPETENCIES. *D C Cole, S J Bondy, Jennifer M Bell, Brendan T Smith, Leora Pinhas, Alex Martiniuk (Dalla Lana School of Public Health, University of Toronto, Toronto, ON Canada M5T 3M7)

A committee of faculty and students of our masters and doctoral programs took up the call for increased attention to epidemiology education (Gange, 2001). We drew on work by International Epidemiological Association colleagues (Armenian et al, 2001) on competency-based curricula and our own primary research on public health epidemiologist competencies. We reviewed current job descriptions for graduates in Ontario organizations and earlier mapping of both masters and doctoral curricula. Based on these inputs, we constructed visual maps of competencies, for different stages of different career paths across graduate degrees. Using a Delphi process, we conducted iterative surveys of faculty and students re: completeness and wording of the competencies; current curriculum contributions to students achieving these competencies; and gaps which exist. In parallel, we collected information on current assessment methods relevant to competencies, both students' learning of them and faculty teaching of them. These activities led to an agreed upon set of competencies and stimulated reflection on assessment practices. Although these are preliminary steps, we are convinced that a transparent competency framework and systematic analysis of data on competency teaching and acquisition will provide invaluable resources for quality improvement of both masters' and doctoral programs. Armenian H, Thompson M, Samet J. Competency-based curriculum in epidemiology. Cha 19 in Olsen J, Saracci R, Trichopoulos D (eds) Teaching Epidemiology. Oxford & IEA, 2001. pp 373-389. Gange SJ. Teaching epidemiologic methods. Epidemiology. 2008;19:353-356.

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WHAT ARE THE CORE COMPETENCIES FOR DOCTORAL-LEVEL AND MASTER-LEVEL TRAINING IN EPIDEMIOLOGY? *L R B Huber, K P Fennie (UNC Charlotte, Charlotte, NC 28223)

In recent years, there has been interest in developing competencies for a range of fields, including public health. In Spring 2009, a sample of American College of Epidemiology (ACE) members were invited to respond to on-line surveys regarding competencies (one for "established" epidemiologists and one for recent graduates of epidemiology programs). These surveys included previously identified domains (n = 19) and competencies (n = 66) and asked respondents to indicate the importance of each for individuals receiving various graduate degrees in epidemiology. A total of 183 individuals completed these surveys. Thirteen competencies were viewed as important/very important and 8 were considered unimportant for all individuals receiving graduate training in epidemiology. Twelve additional competencies were viewed as important only for individuals receiving doctoral training. There were numerous discrepancies in the importance of competencies for individuals receiving various master-level degrees. For example, interpreting research results was viewed as important for individuals with an MPH degree, but not for individuals with an MSPH or MS degree. Recent master-level graduates identified 9 domains they felt less prepared in and recent doctoral-level graduates identified 2 such domains. ACE is using these data as the basis for a series of follow-up surveys. A Delphi process will be used in order to gather expert opinions and synthesize these opinions to reach consensus on the core competencies important to graduate-level training in epidemiology, and to determine if competencies differ by degree program and/or by job setting.

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INTERNET ADDICTION, MENTAL STRESS, EATING AND SLEEPING DISORDERS: NEW PUBLIC HEALTH CHALLENGES AMONG FRENCH UNIVERSITY STUDENTS? *J Ladner, H Villet, M P Tavolacci, S Grigioni, P Déchelotte (Rouen University Hospital, Rouen, FRANCE)

Objectives: To study the prevalence and risk factors associated to Internet addiction, mental stress, eating and sleeping disorders in students in higher education in France. Methods: A cross-sectional survey was conducted in students in 7 campuses in Upper Normandy region in 2009. The students completed an anonymous questionnaire on line (www.tasanteuncluc.org). The questionnaire collected the age, gender, alcohol consumption using ADOSPA test, tobacco smoking, cannabis consumption (experimentation), practice of sport, eating disorders assessed with the Scoff questionnaire, risk of cyber addiction using the Internet Stress Scale (Orman test), and sleeping disorders. Results: A total of 601 students were included. The mean age was 20.9 years (SD = 3.1), the sex ratio M:F was 0.44. 209 of students (34.8%) were considered as stressed, 30.6% declared sleeping disorders, 22.5% were smokers and 41.4% experimented cannabis. A risk of alcohol drinking was identified in 44.8% of students (ADOSPA +). In the last 12 months, 81.2% were drunk at least once, 23.3% with more than 10 binge drinking episodes. 29.0% of students presented a risk of cyberaddiction. 24.8% of students presented risk of ED. After logistic regression, IA was significantly associated to male gender (AOR = 1.67, CI 95% = 1.10-2.57; p = 0.01), to alcohol consumption (AOR = 1.65, CI 95% = 1.14-2.30; p = 0.008) and mental stress (AOR = 2.04, CI 95% = 1.35-3.01; p = 0.001). Conclusion: Alcohol consumption, smoking and cannabis use, which were common in university student population, new risks and compartments as stress, cyberaddiction and eating and sleeping disorders, appear high. These findings stress the need to investigate health risks and behaviours and to initiate prevention interventions in student population using integrated approaches. There is an urgent need for public health practitioners working in these new areas in university campuses.

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CORRELATES OF SPENDING EXTENDED TIME IN THE SUN AND NOT PRACTISING SUN PROTECTION: RESULTS FROM THE SECOND NATIONAL (CANADIAN) SUN SURVEY. *L D Marrett, E Pichora, M T Spinks, C F Rosen (Cancer Care Ontario, Toronto, ON, Canada M5G 1X3)

Skin cancer is the most common cancer in fair-skinned populations; overwhelming evidence supports overexposure to ultraviolet radiation as its major cause. Despite this, there is a paucity of information about population exposure levels against which to measure prevention progress. The 2006 Second National Sun Survey asked 7,121 Canadian adults (aged 16+) about their summer sun exposure and use of protection. Using multiple logistic regression analysis, correlates of spending extended leisure time in the sun and of not regularly practising sun protection were explored. Only 11% of adults spend fewer than 30 leisure-time minutes in the summer sun between 11 am and 4 pm on both weekend and week days. In contrast, 30% regularly spend 3+ hours in the sun on either weekend or week days; an additional 10% spend 3+ hours in the sun only while on summer vacation. Demographic, personal and behavioural factors that significantly increase the likelihood of 3+ (vs. < 3) leisure-time hours in the sun on summer days are: younger age, male, tendency to tan, lighter hair colour, Caucasian, higher household income, not having a university degree, spending extended work-time in the sun, and trying to get and keep a tan during the summer months. Of these, younger age, male, tendency to tan, not having a university degree and trying to tan are also associated with not regularly (always/often) seeking shade/avoiding the sun, wearing protective clothing and a hat, and using sunscreen with SPF 15+ on face and body. More effective strategies to moderate sun exposure and increase use of protection are required, especially for certain population subgroups, if we are to reduce the risk of skin cancer.

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CHANGING CANCER PREVALENCE IN ONTARIO, CANADA: A GROWING BURDEN. *S Bahl, D Nishri, B Theis, LD Marrett (Cancer Care Ontario, Toronto, ON, Canada M5G 1X3)

Background: Prevalence – an estimate of the number of individuals living with cancer – is a measure of the ongoing burden of cancer for individuals, families and the health care system. Methods: One-, 1 to 5-, 5 to 10-, and 10-year tumour-based prevalence were estimated from the Ontario Cancer Registry for January 1, 1991 to January 1, 2008. Results: 311,078 (2.4%) Ontarians alive on January 1, 2008 had been diagnosed with cancer in the previous ten years. The most prevalent cancers were prostate, female breast and colorectal cancers, melanoma, lung and thyroid cancers, and non-Hodgkin lymphoma. For all cancers combined, and for breast, colorectal and lung cancers, melanoma and non-Hodgkin lymphoma, prevalence approximately doubled between 1991 and 2008. Prostate and thyroid cancer, however, had the larger increases, with 3.9 and 4.5 times higher prevalence in 2008 compared to 1991, respectively. One-, 1 to 5-, and 5 to 10-year prevalence counts for all cancers were 49,281, 140,478, and 121,319, respectively (as of January 1, 2008). Prevalence was highest at 1 to 5 years after diagnosis for all cancers and the most prevalent cancers (44-47%). Conclusion: More Ontarians are living with cancer mostly because of increasing survival, population growth and aging. This growing burden of cancer will lead to a demand for more and changing cancer services. The proportions of prevalent cases within 1, 1 to 5 and more than 5 years of diagnosis provides information about the types of services required as these periods represent different phases of the cancer journey from post-diagnosis events to palliative care. Prevalence can be used for planning and allocating resources.

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RESOURCES FOR EPIDEMIOLOGISTS EMBARKING ON REGULATED RESEARCH. E L Priest*, C D Berryman (University of North Texas Health Science Center, Addison, TX)

It is critical for epidemiologists to know when they are embarking on a research project that is regulated by the U.S. Food and Drug Administration (FDA) because non-compliance with regulations can have legal and professional implications. In addition, epidemiologists interested in learning more about FDA regulations may find themselves overwhelmed by the masses of available information. This paper provides the answers to questions that epidemiologists have about research regulated by the U.S. Food and Drug Administration such as: What types of research is regulated by the U.S. Food and Drug Association? What additional responsibilities does an investigator have when doing investigator-initiated research? What are the regulations that are important for researchers? What are the consequences of not complying with regulations? We will answer these questions and provide epidemiologists with a summary of regulatory references and resources that can be used when embarking on regulated research.

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SCHOOL STATUS, JOURNAL IF AND ABSTRACT QUALITY: PILOT STUDY ON SCIENTIFIC DISCOURSE. *J Speicher, (School of Public Health, City University of New York, New York, NY)

Epidemiologists today work in an era of tremendous advances in technology and routes of information dissemination, ideal conditions for scientific discourse. Discriminating selection at each stage of an investigation's journey—from exposure to ideas that give birth to new questions, to support of research, to peer review and journal acceptance—shapes the field. Although the effects of impact factors (IF) on this process have been questioned, no quantitative studies have examined the combined influence of institutional status and journal IF on publication. This study examined whether the status of institutions corresponds with the quality of abstracts in a high-impact journal in 2009. Primary data include all abstracts (N = 81) of longitudinal studies by authors from U.S. public health (PH) schools and other institutions. Each abstract was scored for quality using STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) criteria. Scores were correlated with the authors' schools as ranked by *US News & World Report*. The top 5 schools (N = 28) had a lower average score, 10.21, than the those ranked 6-10 (N = 11), which had the highest mean, 10.86, or those ranked 11-18 (N = 14), with 10.75; other institutions (N = 13) and schools (N=15) followed (one-way ANOVA p-value 0.003). Secondly, among all longitudinal-study abstracts the foreign (N = 68) mean score was 10.51 and US (N = 103) was 10.02 (p-value 0.060). Limits include small study size and use of only one unblinded scorer. Although abstract quality does not indicate study strength, it is important to scientific discourse. Since the abstracts from the top 5 schools did not score as well as the lower-ranked ones in a high-IF journal, further research is warranted.

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AN INTEGRATIVE APPROACH TO APPLIED EPIDEMIOLOGY IN WISCONSIN: BRIDGING RESEARCH, POLICY AND HEALTHCARE QUALITY TO IMPROVE POPULATION HEALTH. *K Malecki, F J Nieto, B Booske, M Gigot, P Remington. (University of Wisconsin, Madison, WI 53562)

There is growing recognition that diseases with the most dramatic impact on population health such as and cardiovascular disease have complex etiologies and risk factors operating at multiple levels. Furthermore, healthcare quality and population health are inextricably linked yet few studies have been designed to adequately address these relationships. Novel approaches and compound data systems (individual, healthcare and community) are needed. Three applied epidemiologic initiatives and one healthcare model have been combined to create a novel and unique infrastructure for exploring population health. Including: (1) the Survey of the Health of Wisconsin: an annual survey of representative samples of state communities and their adult residents including data on demographics, employment, medical history and health behaviors, access to health care, quality of life, as well as an individuals' physical exam and blood/urine samples; (2) the Wisconsin County Health Rankings: an annual summary of the health status of the population in all Wisconsin counties; (3) the Wisconsin Collaborative for Healthcare Quality: a consortium of health care provider organizations (physician groups, health plans) sharing health care quality data; and (4) What Works—Policies and Programs to Improve Wisconsin's Health: a compendium of programs and policies that might influence and reduce health disparities. Each component has unique features with important epidemiologic utility. The integrated network bridges data for advancing population health leading to a better understanding of how health care quality and population health interact to increase and mitigate health disparities.

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HEALTH EFFECTS OF INDUSTRIAL WIND TURBINES; A REVIEW OF THE EPIDEMIOLOGY AND ASSOCIATED RHETORIC. *C V Phillips (Populi Health Institute, Wayne, PA 19087)

Evidence is accumulating that a nontrivial portion of residents living near large electric-generating wind turbines suffer health effects including stress, vestibular problems, mood and sleep disorders, and hypertension. It is likely that the primary causal pathway is via psychological stress due to the cyclic noise and light from spinning blades, though we cannot be sure or rule out other pathways. Also uncertain due to minimal systematic research are the prevalence of susceptibility and the effects of individual or geographic variables. What is certain, from adverse event reports, informal case-cross-over studies, and a few systematic population-based studies, is that there is ample evidence to support the hypothesis that substantial health effects exist. As interesting as the epidemiology itself is the rhetoric that denies the epidemiologic evidence, trying to portray the concern as an unscientific fringe health scare. This has been effective, making the dominant message that there is no evidence of health risks. We expect this from unscrupulous industries, but governments have taken the same position due to a combination of capture, ignorance, corruption, and wanting to support a (dubiously) "green" cause. Attempts to deny the evidence include perverting the definitions of epidemiology and evidence, claiming that the observed suffering is not a health concern because it is subjective or not an official disease, and denying that causation is possible because the causal pathway is unknown, there are other component causes, or the effects are heterogeneous. These nihilistic claims, many made by card-carrying epidemiologists, have ethical and epistemic implications for the use of epidemiology in policy decisions.

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THE LIMITED APPROACH OF MALARIA PREDICTION MODELS: RESULTS FROM A SCOPING REVIEW. *K Zinszer, A Verma, J Brownstein, T Brewer, D Buckeridge (McGill University, Montreal, QC, Canada)

Malaria is a public health crisis, responsible for an estimated 300 to 500 million cases and one million deaths each year. Despite malaria control gains, there remain substantial gaps in the knowledge of the drivers of malaria and the magnitude of their impact, which is critical information for evidence-based control and prevention programs. We conducted a scoping review to determine the environmental, social, and demographic predictors of malaria risk, spread and re-emergence. Searches for primary studies with malaria morbidity or mortality as the outcome measure and having used at least one area-level variable in the analysis were carried out using the following databases: Medline, EMBASE, LILACS, Global Health, Conference Proceeding and Citation Index, ProQuest Dissertations & Theses Database, and CAB abstracts. Initially, 3,247 different citations were captured and based upon our screening criteria, 177 studies were identified for inclusion. Several area-level factors were found to be associated with malaria risk, spread, or reemergence including: temperature, precipitation, altitude, vegetation, land use, population density, migration, health status, accessibility of treatments, public health interventions, and sociodemographic factors. We determined that 40% of the studies included predictive models, of which 94% only included temperature, precipitation, humidity, and/or a vegetation index as predictors. This scoping review revealed that nearly all malaria prediction models have narrowly focused on a few environmental predictors despite substantial research demonstrating the importance of other area-level factors in influencing malaria risk. While climate may be an important predictor of malaria, a more comprehensive approach to malaria prediction is needed to advance the utility of disease forecast models.

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365 DAYS OF UNHEALTHFUL NEWS. *C V Phillips (Populi Health Institute, Wayne, PA 19087)

Substantial epidemiologic misinformation reaches the public via health news reporting. The misinformation stems from oversimplification, misunderstanding, biased choices of what to report, biased analysis, and many other factors. Guilt for these is divided among researchers, their publicists, and the news reporters. But unlike such sciences as paleontology or physics, where the average reader cannot critically evaluate claims or suffers nothing from believing misinformation, epidemiology affects people's behavior and much of the misleading epidemiology reporting can be recognized and critically evaluated (or at least doubted) by educated consumers. Unfortunately, most critical analyses of health reporting or popularized epidemiology are done by other journalists or "debunkers" who often declare epidemiology to be simplistic junk science rather than recognizing it as complicated and thus is often bungled. With some impressive exceptions, (e.g., Kabat), few who are skilled in analyzing epidemiology have tried to educate the public about how to interpret popular information. To address this, each day in 2011 I am presenting a lesson pitched for interested non-experts based on the current "unhealthful" news (unhelpful health news) in a free populist modern medium, ep-ology.blogspot.com. I employ pedagogic methods I used for teaching epidemiology-based decision making to policy and epidemiology students. Rather than introducing epidemiology by teaching simply research methods or grade-school-style history of science, this focuses on being a skilled consumer of epidemiologic information. By the June meetings I will be halfway through this project and will be able to report on the success of the project (readership, feedback), as well as summarizing the main pedagogic points needed to clarify a half year of news.

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THE ROLE OF EPIDEMIOLOGISTS IN DATA COORDINATING CENTERS. *E E Fox, D J del Junco, J B Holcomb, M H Rahbar (University of Texas Health Science Center, Houston, TX 77030)

Epidemiologists have long served within Data Coordinating Centers (DCCs) in a variety of roles including study design, project coordination, data management, statistical analysis and interpretation. Despite their unique contributions, epidemiologists are not always included in DCCs. Primarily responsibility for study design and statistical analysis in DCCs often falls upon statisticians, but the viewpoint and skills of epidemiologists can enhance efficiency as well as the scientific and public health impact of clinical and translational research. Training programs for epidemiologists concentrate on the systematic assessment and optimization of the trade-off between the logic and logistics of observational and experimental studies in terms of their capacity to support valid causal inference. The eclectic nature of the discipline (drawing from medicine, statistics, genetics, environmental and social sciences) creates epidemiologists well suited to serve as team facilitators. Too often the focus of the interaction between clinical/translational investigators and statisticians narrows down to design and analysis strategies to maximize statistical power. Inclusion of an epidemiologist on the DCC team can help to promote synergy between the clinical, statistical and basic science disciplines through a practical emphasis on both study validity and reproducibility. As the research tide turns to comparative effectiveness, the experience of epidemiologists with heterogeneous study populations in real-world settings will prove invaluable. Highlighted examples include a traumatic injury research network that incorporates epidemiologists to meet the challenges of moving from retrospective to prospective studies with highly time-dependent variables.

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EFFECT OF GESTATIONAL DIABETES MELLITUS ON PREGNANCY-INDUCED HYPERTENSION AND OTHER PREGNANCY OUTCOMES. *X Xiong, E W Harville, K Elkind-Hirsch, G Pridjian, P Buekens (Department of Epidemiology, Tulane University School of Public Health and Tropical Medicine, New Orleans, LA)

Background: The objective of this study was to examine the effect of gestational diabetes mellitus (GDM) on pregnancy-induced hypertension (PIH) and other pregnancy outcomes. Methods: We analyzed data from a prospective cohort study of the effect of a natural disaster (Hurricane Katrina) on pregnancy outcomes. Pregnancy outcomes were obtained by reviewing medical charts, including GDM, pregnancy-induced hypertension (including gestational hypertension and preeclampsia), preterm birth (< 37 weeks), low birth weight (< 2500 g), macrosomia (> 4000 g), and cesarean delivery. Results: Of the 256 pregnant women, the rate of GDM, gestational hypertension, preeclampsia was 14.5%, 7.8, and 6.3%, respectively. The rate of PIH was significantly higher in women with GDM (30.6%) than in women without GDM (11.0%), with an adjusted odds ratio (aOR): 4.2 (95% confidence interval: 1.4-12.5); after adjustment of maternal race, age, education, parity, smoking, family income, prior preterm birth, prior GDM, and hospital. Women with GDM were much more likely to having gestational hypertension (aOR: 7.4; 95% CI: 1.7-31.9) than having preeclampsia (aOR: 2.6; 95% CI: 0.4-17.9). In addition, GDM was associated with an increased risk of macrosomia (aOR: 3.3; 95% CI: 0.8-14.2), cesarean delivery (aOR: 3.1; 95% CI: 1.2-8.3), and preterm birth (aOR: 2.9; 95% CI: 1.0-8.3). Conclusion: Women with GDM are at higher risk of having pregnancy-induced hypertension and other adverse pregnancy outcomes.

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HURRICANE KATRINA EXPERIENCE AND THE RISK OF GESTATIONAL DIABETES MELLITUS. *X Xiong, E W Harville, K Elkind-Hirsch, G Pridjian, P Buekens (Department of Epidemiology, Tulane University School of Public Health and Tropical Medicine, New Orleans, LA)

Background: Little is known about the effect of natural disasters on gestational diabetes mellitus (GDM). The objective of this study was to examine the effect of exposure to Hurricane Katrina on GDM. Methods: We analyzed data from a prospective cohort study of 301 pregnant women who exposed to Hurricane Katrina. Women were interviewed about their experiences of the following eight severe hurricane events: feeling that one's life was in danger, experiencing illness or injury to self or a family member, walking through flood waters, significant home damage, not having electricity for more than one week, having someone close die, or seeing someone die. GDM and other pregnancy outcomes were obtained by reviewing medical chart. Results: The frequency of GDM in women who had none, one, two, three, and four or more of the severe hurricane experiences was 6.2%, 7.8%, 16.4%, 13.3%, and 23.3% respectively. There was a trend toward increased rate of GDM with an increasing number of severe hurricane experiences (P Trend < 0.05). Women who had two or more of the severe hurricane experience were at higher risk of having GDM, with an adjusted odds ratio (aOR): 3.1 (95% confidence interval: 1.0-9.6); after adjustment of maternal race, age, education, parity, smoking, family income, prior preterm birth, and hospital. The risk of having GDM was markedly increased in women who had four or more of the severe hurricane experiences, with aOR: 8.9 (1.2-64.3). Conclusion: Women who exposed to severe hurricane events were at an increased risk of having GDM.

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INFLUENZA VACCINATION IN PREGNANCY. *L Dodds, S McNeil, J Scott, V M Allen, A Spencer, N MacDonald (Dalhousie University, Halifax, NS, Canada B3K6R8)

In 2007, the Canadian National Advisory Committee on Immunization recommended that all pregnant women receive the influenza vaccine. In Canada, limited data are available to determine rates of influenza vaccination in pregnant women, but rates are generally thought to be very low. We began collecting data on vaccination during pregnancy in April, 2006, from women at the time of admission for delivery at the IWK Health Centre in Halifax, Nova Scotia. The cohort includes women who delivered a singleton infant prior to November, 2009 so results reflect the pre-H1N1 vaccination period. The purpose of this study was to determine influenza vaccination rates in pregnant women and to determine infant outcomes among vaccinated and non-vaccinated women. Results were obtained for high risk and low risk women separately. There were 9781 women included and overall, 20% received the influenza vaccine in pregnancy with little variation by year. Among low risk women, the adjusted odds ratio (OR) and 95% confidence interval (CI) for a small for gestational age infant (bottom 10th percentile birth weight for gestational age and sex) was 0.8 (95% CI 0.7-1.0) for vaccinated women relative to non-vaccinated women. For high risk women, the corresponding OR was 0.7 (95% CI 0.4-1.2). The adjusted OR for low birth weight (< 2500 grams) was 0.8 (95% CI 0.6-1.0) and 0.5 (95% CI 0.2-0.9) for low and high risk women respectively. A minority of pregnant women receive an influenza vaccine in pregnancy. Rates of adverse neonatal outcomes tend to be lower among vaccinated women, but most ORs are of borderline significance. As evidence supporting improved outcomes continues to mount, more public health measures are necessary to encourage pregnant women to receive the influenza vaccine.

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CUTANEOUS MELANOMA AND ENDOGENOUS HORMONAL FACTORS: A FRENCH PROSPECTIVE STUDY. *M Kvaskoff, A Bijon, S Mesrine, M C Boutron-Ruault, F Clavel-Chapelon (Inserm U1018, Team 9, Villejuif, France, 94805)

Cutaneous melanoma has been hypothesized to be a hormone-dependent tumor, which has been a strong debate in the literature over recent decades while prospective data on the topic are lacking. To assess the role of endogenous hormonal factors on the risk of melanoma, we conducted a prospective analysis of 91,972 French women, aged 40-65 years at inclusion into the E3N cohort. Between 1990 and 2005, 460 melanoma cases were ascertained. Relative risks (RRs) and 95% confidence intervals (CIs) were computed using Cox proportional hazards regression models. Risks of melanoma were reduced in women with ≥ 15 years at menarche (RR = 0.67, 95% CI = 0.46, 0.97; compared with 13-14 years), irregular menstrual cycles (RR = 0.52, 95% CI = 0.31, 0.89; compared with regular cycles of 25-31 days), < 48 years at natural menopause (RR = 0.70, 95% CI = 0.48, 1.02; compared with 48-51 years), and shorter menstrual life (RR = 0.51, 95% CI = 0.28, 0.91; for < 33 years compared with ≥ 39 years). Modest inverse associations were observed with parity, and number of pregnancies and miscarriages. There was no evidence of an association between melanoma risk and age at first birth or pregnancy, age at last birth, time since last birth, breastfeeding duration, age at menstruation regularity, or menopausal status. Results did not significantly differ according to ambient ultraviolet radiation dose, and melanoma site or subtype. These findings from a large prospective cohort may suggest a reduced melanoma risk associated with decreased exposure to ovarian hormones.

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TREATMENT OF GESTATIONAL DIABETES (GDM), WEIGHT GAIN AND PERINATAL OUTCOME – MARGINAL STRUCTURAL MODEL (MSM) ANALYSIS. *M Klebanoff for the Eunice Kennedy Shriver National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network (NICHD, Bethesda, MD 20892)

BACKGROUND: In a randomized trial (NEJM 2009;361:1339-48) treating mild GDM reduced several perinatal outcomes and also reduced weight gain (2.8 vs 5.0 kg from enrollment to delivery) with no difference in gestational age at birth. This secondary analysis estimates the effect of treatment, controlling weight gain/week by MSM; conventional regression introduces confounding by common causes of gain and perinatal outcome even though treatment was randomized. METHODS: Eligible women had fasting glucose < 95 mg/dl and 2 or 3 elevated values on a glucose tolerance test, and were randomized to intensive nutritional counseling, diet therapy, and insulin if needed or to usual care. Comparable BMI women with normal glucose tolerance were followed to mask the usual care group. The MSM used inverse probability weights from logistic regression of weight gain on treatment group. RESULTS: 958 women were randomized (485 treatment, 473 control); data on outcome and weight gain from randomization to delivery were available for 921; 4 gain outliers were deleted. Stabilized weights ranged from .54-6.6 (mean 1.01). The odds ratios for treatment (95% CI) from intent to treat and MSM analyses were 0.6 (0.4,0.9) and 0.7 (0.5,1.1) for any hypertension; 0.4 (0.2,0.9) and 0.6 (0.3,1.3) for preeclampsia; 0.7 (0.5,1.0) and 0.8 (0.6,1.1) for cesarean; 0.4 (0.2,0.9) and 0.4 (0.2,1.0) for shoulder dystocia; 0.4 (0.2,0.6) and 0.4 (0.2,0.6) for macrosomia (> 4kg); and 0.4 (0.3,0.7) and 0.5 (0.3,0.7) for LGA. CONCLUSION: MSM control of weight gain slightly reduced the apparent effect of GDM treatment, but estimates were imprecise.

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SCREENING FOR GENITAL CHLAMYDIA AMONG YOUNG PEOPLE IN COMMUNITY PHARMACIES: A META-ANALYSIS. *M Z Kapadia, P Warner, K (Fairhurst University of Edinburgh, Scotland)

To review, summarize and evaluate the evidence relating to feasibility of provision of chlamydia testing and treatment (CT&T) in community pharmacies among youth aged 15-24 years. METHODS: Systematic searches were conducted for international research in electronic databases and grey literature from January 1990 to September 2010. The evidence categories used by the UK Department of Health in the National Service Framework (2001) was applied to each paper. Data were also extracted on study population, sample size and prevalence of chlamydia to report pooled proportion of chlamydia using meta-analysis approach. RESULTS: We included 17 papers and reports. No systematic reviews and only one RCT was found. The proportional meta-analysis showed a pooled proportion of 0.077 (95% CI = 0.052 to 0.106). The reported prevalence was lower than those reported in studies of other health care settings e.g. sexual health clinics or family planning clinics. Chlamydia screening programs in community pharmacies tend to be targeted at certain patient groups e.g. patients accessing emergency hormonal contraception in pharmacies. Young people and pharmacists find chlamydia services via community pharmacy broadly acceptable. However the uptake of the service was much lower than expected and failed to reach men and ethnic minorities. CONCLUSION: CT&T programs tends to target more health conscious population (as is true for other community based screening) who are at lower risk of getting the disease. However this new approach of CT&T is acceptable to both young people and pharmacists. Encouraging men and ethnic minorities to access community pharmacy based chlamydia services remains a challenge.

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SOCIO-ECONOMIC INEQUALITIES IN THE RATE OF STILLBIRTHS: A POPULATION BASED STUDY. *S E Seaton, L K Smith, E S Draper, B N Manktelow, A Springett, D J Field (Department of Health Sciences, University of Leicester, United Kingdom)

To investigate socioeconomic inequalities in stillbirth rates in England, we used national population data on all stillbirths 1997-2007. Causes of stillbirth were coded according to the extended Wigglesworth classification and denominator data were the total number of live births and stillbirths. Deprivation was measured using a small area level deprivation index. Poisson regression models were used to estimate the relative and absolute deprivation gap (comparing the most deprived tenth with the least deprived tenth) in rates of stillbirths (both all cause and by specific cause). In the most deprived decile, the overall rate of stillbirths was double that in the least deprived areas (Rate Ratio: 2.06 95% Confidence Interval (1.98, 2.13)). Over the time period there has been a general widening of the deprivation gap (1997-1999: RR: 1.96 (95% CI: 1.83, 2.11) 2005-2007: RR: 2.12 (95% CI: 1.95, 2.31)). A similar pattern was seen for most individual causes. The widest deprivation gap in stillbirth rates was in congenital anomalies (RR: 3 (95% CI: 2.63, 3.43) and antepartum stillbirths which were small for gestational age (RR: 2.41 (95% CI: 2.25, 2.58)). Only 30% of the deprivation gap was explained by known causes such as congenital anomalies and intrapartum events. This leaves 70% of the gap accounted for by antepartum stillbirths of unknown cause. Further research is needed to understand these unexplained deaths.

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A PROSPECTIVE STUDY OF PRE-PREGNANCY DIETARY IRON INTAKE AND RISK FOR GESTATIONAL DIABETES. Katherine Bowers, Edwina Yeung, Michelle Williams, Deirdre Tobias, Lu Qi, Frank Hu, Cuilin Zhang (NICHD, NIH, Rockville, MD)

Gestational diabetes (GDM), one of the most common pregnancy complications, has been related to short- and long-term adverse maternal and infant health outcomes. It is important to identify modifiable factors that may lower GDM risk. Dietary iron is of particular interest given that iron is a strong pro-oxidant and high body iron levels can damage pancreatic β -cell function and impair glucose metabolism. We therefore evaluated the association between pre-pregnancy dietary and supplemental iron intakes and the risk of GDM. Methods: A prospective study was conducted among 13,475 women who reported a singleton pregnancy between 1991 and 2001 in the Nurses' Health Study II. A total of 867 incident GDM cases were reported. Pooled logistic regression was used to estimate the relative risk (RR) of GDM for quintiles of iron intake controlling for dietary and non-dietary confounding factors. Restricted cubic spline regression was used to model the association between continuous dietary heme iron intake and GDM risk. Effect modification by risk factors of GDM associated with iron storage, oxidative stress, and/or insulin resistance was assessed via stratification. Results: Dietary heme-iron intake was positively and significantly associated with GDM risk; adjusted RRs across increasing quintiles of heme-iron were 1.0 (reference), 1.11 (0.87, 1.43), 1.31 (1.03, 1.68), 1.51 (1.17, 1.93), and 1.58 (1.21, 2.08), respectively (P for linear trend 0.0001). The association was particularly strong among current cigarette smokers (p for interaction 0.26). These findings suggest that higher dietary heme-iron intake pre-pregnancy is associated with an increased GDM risk.

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CIGARETTE SMOKING AND RISK OF GESTATIONAL DIABETES MELLITUS IN A COHORT OF HISPANIC WOMEN. *T A Moore Simas, K Szegda, X Liao, G Markenson, L Chasan-Taber (University of Massachusetts, Amherst, MA 01003)

Cigarette smoking has been associated with an increased risk of type 2 diabetes but studies examining smoking and risk of gestational diabetes mellitus (GDM) are sparse, conflicting, and have been conducted predominantly in non-Hispanic white women. Therefore, we evaluated this relationship among 2679 Hispanic prenatal care patients (predominantly Puerto Rican) in Western and (n = 930) and Central (n = 1749) Massachusetts from 2004-2009. GDM diagnosis was abstracted from medical records and based on American Diabetes Association criteria. A total of 3.7% of participants were diagnosed with GDM. Approximately 23% of participants reported smoking prior to pregnancy, while 11% of women reported smoking during pregnancy with 8% smoking 1-9 cigarettes/day and 3% smoking 10+. As compared to nonsmokers, pregnancy smokers were more likely to be multiparous and older (p < 0.0001). Increasing age (Odds Ratio (OR) = 7.9, 95% Confidence Interval (CI) 4.3-14.6 for > 34 vs. < 25 yrs), BMI (OR = 3.5, 95% CI 2.1-5.7 for obese vs. normal), and parity (OR = 1.7, 95% CI 1.0-2.9 for 2+ vs. 0 live births) were positively and significantly associated with GDM risk. After adjusting for age, BMI, pregnancy weight gain, parity, and study site, women who smoked prior to pregnancy were not at increased risk of GDM (OR = 0.9, 95% CI 0.5-1.7) as compared to non smokers. Similarly, smoking during pregnancy was not associated with GDM risk (OR = 0.5, 95% CI 0.2-1.3). Findings did not differ according to dose of smoking in prepregnancy (ptrend = 0.6) or during pregnancy (ptrend = 0.3). In summary, we did not observe an association between smoking and risk of GDM in this high-risk population. Findings extend prior research to Hispanic women.

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CHARACTERISTICS OF WOMEN WHO RECEIVED INFLUENZA VACCINATION IN A POPULATION-BASED COHORT OF PREGNANT WOMEN IN ONTARIO. *D B Fell, A S Yasseen III, A E Sprague, M Walker, S W Wen, N Liu, G Smith (BORN Ontario, Ottawa, ON, K1H 8L6)

Influenza vaccination is recommended for all women who will be pregnant during influenza season; however, there is little population-based information on the uptake of these recommendations. We evaluated influenza vaccination rates in women who gave birth during the 2009 H1N1 pandemic and identified characteristics associated with receiving vaccination (H1N1 and/or seasonal influenza vaccine) during pregnancy. Information on influenza vaccination was collected in the population-based provincial perinatal database for women who gave birth between Nov 2, 2009 and Apr 30, 2010. Rates of influenza vaccination were calculated according to maternal, pregnancy and neighbourhood characteristics. Log-binomial regression was used to estimate adjusted relative risks (aRR) and 95% confidence intervals (CI). Among 56,654 women who gave birth during the study period, the rate of influenza vaccination was 42.6% (n = 24,134). Vaccination rates increased with increasing maternal age and were higher in women who had chronic health conditions (aRR 1.10, 95% CI: 1.07-1.13), while women who smoked during pregnancy had significantly lower rates (aRR 0.92, 95% CI: 0.89-0.95) as did women who lived in neighbourhoods with the lowest education and income levels and the highest concentration of recent immigrants. Many factors associated with influenza vaccination in this cohort of women are demographic characteristics that are not modifiable; however, they do potentially indicate subgroups of the obstetric population that may benefit from targeted public health intervention strategies to improve future vaccination rates for this priority vaccination group.

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PREDICTORS OF HEMOGLOBIN DURING EXCLUSIVE BREASTFEEDING IN HIV-EXPOSED, UNINFECTED MALAWIAN INFANTS. *E M Widen, C S Chasela, M E Bentley, D Kayira, G Tegha, A P Kourtis, D J Jamieson, C van der Horst, L S Adair (University of North Carolina Chapel Hill, Chapel Hill, NC 27599)

Infants of mothers with poor iron status in pregnancy have reduced iron stores at birth and are at an increased risk of anemia during exclusive breastfeeding. We evaluated predictors of hemoglobin (Hb) in 1,934 exclusively breastfed HIV-exposed, uninfected infants from 2 to 24 weeks postpartum. As part of the Breastfeeding, Antiretroviral and Nutrition Study, Malawian HIV-infected mothers were randomized to receive a lipid-based nutrient supplement (LNS), providing 15 mg iron/day and meeting other nutritional needs of lactation, or no LNS. Within these groups, there was further randomization to maternal antiretroviral drugs, daily infant nevirapine, or no antiretroviral regimen. We used longitudinal regression models to determine factors associated with infant Hb (g/dL) at 2, 6, 12, 18, and 24 weeks, adjusting for infant Hb at birth and drug arm, as maternal LNS arm was not significant (p = 0.28). Higher infant Hb at birth predicts higher subsequent infant Hb, but the effect diminishes over time. Rate of infant weight gain was inversely associated with infant Hb, except at 12 weeks. Higher maternal Hb was associated with higher concurrently measured infant Hb, especially at 18 and 24 weeks. Each one-unit increase in maternal Hb at 18 and 24 weeks was associated with a 0.09 g/dL (95% confidence interval: 0.04, 0.14) and 0.07 g/dL (95% confidence interval: 0.02, 0.12) respective increase in concurrently measured infant Hb. These results suggest that maternal iron status during lactation influences infant Hb when infant iron stores are more likely to be depleted. Support: CDC(U48-DP000059-01); Bill & Melinda Gates Foundation(OPP53107)

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WITHDRAWN

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THE ROLE OF TLR3 IN HBV INFECTION IN PLACENTA AND NEWBORNS OF HBSAG POSITIVE WOMEN. *S-Z Li, X-X Song, C-L Yuan, L-P Feng, Bo Wang, Y-Q Qv, S-P Wang (Dept. of Epidemiology, Shanxi Medical University, Taiyuan, Shanxi, 030001, China)

The aim of this work is to explore the relationship of Toll-Like Receptor (TLR) 3 in term human placenta and hepatitis B virus (HBV) intrauterine infection. Semi-quantitative RT-PCR and quantitative Real-time RT-PCR were conducted to detect TLR3 mRNA in term human placenta from normal and HBsAg positive women. Immunohistochemistry ABC and double labeling immunofluorescent histochemistry assay were conducted to detect TLR3 in placenta. HBV DNA were determined by fluorescence quantitative PCR. OR and 95% CI for factors of HBV infection in placenta and HBV intrauterine infection were calculated using unconditional logistic regression. TLR3 mRNA in placenta showed weaker expression in HBsAg positive women (1.7029 ± 0.2033) than normal women (1.3882 ± 0.1913) ($t = 4.698, P < 0.01$). There was significant difference in the positive rate of TLR3 between placentas of normal and HBsAg positive women (100%, 41/41 vs 73.28%, 85/116) (Fisher's exact probability test $P = 0.000$). TLR3 of term placenta (235/300) was mostly located in the cytoplasm, a part on the cell membrane. The positive rate of TLR3 gradually increased from the maternal side to the fetal side in the placental cell layers and the positive rate of HBsAg gradually decreased (trend χ^2 value were 262.715 and 109.809, respectively, $P < 0.01$). The multivariable analysis showed the expression of TLR3 in term placenta was showed a protective factor of HBV infection in placenta (OR = 0.247, 0.141–0.431) and it also was a protective factor of HBV intrauterine infection in newborns (OR = 0.438, 0.204–0.942) of HBsAg positive women. It is suggested the TLR3 take the role against HBV infection in placenta and newborns of HBsAg positive women.

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PATTERNS OF AGE OF PUBERTY IN RELATION TO EXPOSURE TO PERFLUOROOCCTANOIC ACID (PFOA) AND PERFLUOROOCCTANE SULFONATE (PFOS) AMONG CHILDREN LIVING IN AN AREA WITH PFOA-CONTAMINATED DRINKING WATER. *T Fletcher, M-J Lopez-Espinosa, B Armstrong, N Fitz-Simon, B Genser, D Mondal (Department of Social and Environmental Health Research, London School of Hygiene & Tropical Medicine, London, WC1H 9SH, UK)

Animal studies suggest that perfluorocarbons (PFCs) may alter sexual maturation. Relationships of human PFC exposure with puberty are not clear. We conducted a cross-sectional study to investigate whether perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) affect pubertal status based on sex steroid hormone levels and self-reported menarche. We analyzed patterns of puberty in a 2005-2006 survey of residents with PFOA water contamination from the Mid-Ohio Valley (3076 boys and 2931 girls aged 8-18 years). Participants were classified as having reached puberty based on either hormone levels (total > 50 ng/dL and free > 5 pg/mL testosterone in boys, and estradiol > 20 pg/mL in girls), or onset of menarche. We estimated the odds of reaching puberty and the fitted median age of reaching puberty in relation to serum PFOA and PFOS levels measured when puberty status was assigned. For boys, there was a relationship of reduced odds of reached puberty (raised testosterone) with increasing PFOS (delay of 190 days between the highest and lowest quartile). For girls, higher exposure to PFOA or PFOS was associated with reduced odds of post-menarche (130 and 138 days of delay, respectively). These are the first results indicating a delay in puberty in relation to these compounds. Exposure was assessed at the same time as puberty was classified and further work will assess timing of puberty in relation to estimates of PFC levels in utero.

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SPATIAL AND TEMPORAL TRENDS IN MATERNAL TOBACCO USE IN SAN BERNARDINO COUNTY: EFFECTS OF MIGRATION AND ECONOMIC RECESSION? *P N Singh, M Batech, S Wiafe, B Oshiro, R Chinook, T Morris, J Job (Loma Linda University, Loma Linda, CA 92350; Cal State San Bernardino, San Bernardino, CA 92407)

San Bernardino County, one of the most populous counties in the US, has undergone a recent demographic and economic shift that has resulted in 1) a younger population 2) a multiethnic population that includes a rapidly growing immigrant population 3) a spatial change in the size and demographics of residential communities due to an increase in new housing followed by one of the highest rates of mortgage foreclosures in the nation. As part of the National Children's Study sampling effort for this county, we examined spatial and temporal changes in the age, ethnicity, income, and residence of mothers on the California state birth files for years 2004-2008. We also examined how these factors impact rates of pre-pregnancy and maternal tobacco use. Unrestricted quadratic spline models were used to model trends in pre-pregnancy and maternal tobacco use. All births and births to tobacco users were spatially mapped to choropleths of demographic variables and residence type. The prevalence of pre-pregnancy and maternal tobacco use decreased in under 18 year-olds, and increased among 18-25 year olds. Hispanics were the only ethnic group to post an increase in prevalence of pre-pregnancy and maternal tobacco use. Mothers with no coverage (i.e. no medical, no private insurance, did not qualify/participate in a government program) for pre-natal care exhibited a 42% prevalence of pre-pregnancy and/or maternal tobacco use that further increased during 2007-2008. We found a strong association between changes in demographic and economic indicators and rates of pre-pregnancy and maternal tobacco use in San Bernardino County.

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EVIDENCE OF A GENETIC OR MATERNAL EFFECT ON FETAL LEPTIN AND ADIPONECTIN LEVELS AND THE IMPLICATIONS FOR FETAL INSULIN SENSITIVITY. *Z C Luo, A M Nuyt, W D Fraser, P Julien, E Delvin, E Levy (*CHU Sainte-Justine, University of Montreal, QC, Canada)

Adiponectin is an endogenous insulin sensitizer, and leptin a fetal fat content indicator. There is a lack of data on the longitudinal associations between maternal and fetal leptin and adiponectin, and whether they affect fetal insulin sensitivity. We assessed the associations between maternal (24-28 weeks and 32-35 weeks of gestation) and cord blood leptin and adiponectin concentrations, and their associations with fetal insulin sensitivity (glucose/insulin ratio) in a prospective pregnancy cohort (n = 248). Comparing cord vs. maternal blood, leptin concentrations were less than half as high, but adiponectin concentrations over 2.4 times as high. Maternal plasma levels were higher for leptin and lower for adiponectin in obese (n = 31) vs. normal weight women, and lower for adiponectin in gestational diabetic (n = 26) vs. euglycemic women. There were no significant differences in cord plasma leptin or adiponectin concentrations comparing gestational diabetic vs. euglycemic, or obese vs. normal weight women, although adiponectin levels were non-significantly lower in diabetic pregnancies. Consistent positive correlations were observed between cord and maternal plasma concentrations at 24-28 and 32-25 weeks of gestation for both leptin (r = 0.26 and 0.27, respectively, all p < 0.0001) and adiponectin (r = 0.29 and 0.32, respectively, p < 0.0001). Fetal insulin sensitivity was negatively correlated with maternal or fetal leptin, and positively correlated with maternal but not fetal adiponectin. Adjusting for fetal adiponectin or leptin, the differences in fetal insulin sensitivity attenuated in diabetic vs. euglycemic women. The results provide the first evidence of a potential genetic or maternal effect on both fetal leptin and adiponectin levels. The adverse effects of gestational diabetes on fetal insulin sensitivity may be partly mediated by adiponectin and fetal adiposity.

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RESIDENTIAL PROXIMITY TO POWER TRANSMISSION LINES AND STILLBIRTH. N. Auger, S. Yacouba, *A Park, M Goneau, and J Zayed (Institut national de santé publique du Québec, Montréal, QC, Canada H2P 1E2)

The relationship between exposure to extremely low frequency (ELF) electromagnetic fields and stillbirth has not been studied, despite data suggesting an association between ELF fields and miscarriage. We examined the association between residential proximity to ELF power transmission lines and stillbirth. Power transmission line maps for 2008 were obtained for census metropolitan areas of the province of Québec, Canada. Singleton live births (N = 514,826) and stillbirths (N = 2,033) in metropolitan areas were extracted for 1998-2007. Distance between lines and residential 6-digit postal codes (< 24, 25-49.9, 50-74.9, 75-99.9, and ≥ 100 meters) was calculated. Generalised estimating equations were used to compute odds ratios (OR) and 95% confidence intervals (CI) between distance to power lines and stillbirth, adjusted for maternal age, education, civil status, language, immigration, parity, period, neighbourhood deprivation and clustering. Early preterm (< 28 gestational weeks), late preterm (28-36 weeks), and term (≥ 37 weeks) stillbirths were examined relative to ongoing pregnancies. Distances < 100 meters of lines were not associated with statistically significant greater odds of preterm stillbirth (< 37 weeks) relative to ≥ 100 meters. Greater odds of term stillbirth were observed for < 25 meters relative to ≥ 100 meters (OR 2.25, 95% CI 1.14-4.45), but not for other distances. In summary, the likelihood of term stillbirth was elevated for residences < 25 meters from power lines but not other distances relative to ≥ 100 meters. Reasons for the elevated odds are unclear. Though it is reassuring that term stillbirth is rare, more research is needed to understand the mechanisms behind this finding.

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PEAK DAY: A SIMPLE, PROSPECTIVE METHOD TO IDENTIFY OVULATION IN ORDER TO PERFORM PERI-CONCEPTIONAL EXPOSURE ASSESSMENT. *C A Porucznik, K C Schliep, S L Willardson, J B Stanford (University of Utah, Salt Lake City, UT 84108)

Evidence indicates that very early intrauterine exposures may have both short- and long-term health effects. To obtain the most complete lifetime exposure assessment, initial monitoring should occur at or near the time of conception. Prospectively determining ovulation dates can identify precise time intervals between conception and developmental windows and allow for targeted exposure assessment during relevant times. We developed and implemented a simple, prospective method of identifying ovulation using systematic observation of fertility signs in a pilot cohort of 58 women. The majority correctly applied the method to identify the estimated day of ovulation in their first cycle of observation. Among the initial group of enrolled women, 57% followed instructions by charting continuously and an estimated day of ovulation was identified correctly according to the Peak Day algorithm in 77% of cycles. The average participant selected the estimated day of ovulation according to the algorithm in 1.3 cycles (standard deviation: 0.8, range: 1 to 4). Among the 29 women trying to achieve pregnancy, 19 (66%) conceived during the study, an indicator that they were able to apply the knowledge of their estimate day of ovulation to achieve their reproductive intention. In two pilot studies, we asked women to complete an exposure assessment task, web-based survey or biospecimen collection, at each identified ovulation and achieved 96% compliance. Peak Day is a resource efficient method for prospective ovulation determination that could be applied to large, population-based epidemiologic studies.

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PRENATAL AND NEONATAL RISK FACTORS FOR TESTICULAR GERM CELL CANCER. M van Gelder, C van Veldhoven, C Wijers, K Aben, and *N Roeleveld (Department of Epidemiology, Biostatistics and HTA, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands)

Although testicular cancer is the most common malignancy among male adolescents and young adults, the etiology of testicular germ cell cancer (TGCC) is not well understood. A prenatal etiology has been suggested, in which fetal exposure to endocrine disrupting substances is considered a risk factor for TGCC because male development strongly depends on sex hormones. We conducted a case-referent study to evaluate the role of a wide range of prenatal and neonatal characteristics in the etiology of TGCC. We included 184 men with TGCC (cases) and 278 fathers of children born in the Radboud University Nijmegen Medical Centre (referents) for whom a self-administered questionnaire and a maternal interview with information on prenatal and neonatal exposures were available. Adjusted odds ratios (ORs) with 95% confidence intervals (CIs) were calculated using multivariable logistic regression. We found several factors to be associated with the risk of TGCC, including cryptorchidism (OR, 4.02; 95% CI, 2.26-7.15), surgery for inguinal hernia (OR, 3.23; 95% CI, 1.39-7.52), gestational hypertension (OR, 0.64; 95% CI, 0.40-1.03), and regular consumption of fish during pregnancy (OR, 0.66; 95% CI, 0.45-0.97). In addition, cases were an inch taller than referents. An increased risk of nonseminomas was observed for low birth weight, preterm birth, and breast feeding ≥ 6 months, whereas being born macrosomic and prenatal exposure to iron supplements increased the risk of seminomas. Our findings support the hypothesis that prenatal and neonatal factors, and especially potential exposure to endocrine disrupting substances, play a role in the etiology of TGCC.

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PRENATAL AND ADULT EXPOSURE INVOLVED IN THE RISK OF POOR SPERM QUALITY. C Wijers, M van Gelder, C van Veldhoven, I van Rooij, L Ramos, and *N Roeleveld (Department of Epidemiology, Biostatistics and HTA, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands)

During the last decades, the prevalence of male reproductive disorders, including poor sperm quality, increased rapidly. It has been hypothesized that prenatal and adult exposure to exogenous substances, especially endocrine disrupting chemicals (EDCs), are likely causes. To study the effects of a wide range of potential risk factors on the risk of poor sperm quality, we performed a case-referent study. Cases were men of reproductive age with sperm concentrations $< 20 \times 10^6$ per ml who visited the fertility clinic at the Radboud University Nijmegen Medical Centre in 2002-2007. Referents were randomly selected fathers of children born in the same hospital in 1997-2007. A total of 147 cases and 319 controls and their mothers were included. We used self-administered questionnaires and maternal interviews to determine exposure and calculated adjusted odds ratios (ORs) with 95% confidence intervals (CIs) using multivariable logistic regression. Poor sperm quality was associated with a family history of reproductive disorders, some health-related factors, periconceptional oral contraceptive use (OR = 2.9, 95%CI 1.5-5.7), use of iron supplements during pregnancy (OR = 2.1, 95%CI 1.3-3.5), current use of cosmetics (OR = 5.3, 95%CI 1.6-17.8), and occupational exposure to anaesthetics (OR = 4.2, 95%CI 1.3-13.6). Being breast-fed (OR = 0.6, 95%CI 0.3-1.0) and consumption of fish and sea food (OR = 0.5, 95%CI 0.3-0.8) seemed to decrease the risk of poor sperm quality. The associations found support the hypothesis that prenatal and adult exposure to exogenous substances, including EDCs are involved in the etiology of poor sperm quality.

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MATERNAL PRENATAL AND PARENTAL POSTNATAL STRESS IN A COHORT OF DEPRESSED WOMEN AND THEIR PARTNERS. *F Karam, O Sheehy, A Bérard, and the OTIS Collaborative Research Group. (Université de Montréal, Montreal, QC, Canada.)

Studies have shown that perinatal stress is associated with unfavourable outcomes. Our objective was to evaluate parental stress in a cohort of pregnant depressed women who continue or discontinue antidepressant (AD) treatment, and their partners. The OTIS Antidepressants in Pregnancy Study cohort was used. Women were recruited through North American Teratogen Information Services and at the outpatient clinic of CHU Ste Justine (Montreal, QC). To be included, women had to be ≥ 18 years old, < 15 weeks pregnant, using AD (exposed group) or any non-teratogenic drugs (non-exposed group). Women were excluded if they were using a known teratogen or other psychotropic drugs (except for benzodiazepines) or taking AD in the year prior to pregnancy (for the non-exposed group). Parental stress was assessed by telephone interview using the validated 4-items perceived stress scale during the 1st trimester of pregnancy (TP) for mothers and at 2 months postpartum for both parents. To compare stress levels between groups, statistical analyses were conducted using t-tests and ANOVA with posthoc tests. Overall, 249 women and 138 men were recruited for this study. During the 1st TP, women exposed to AD, and especially those who discontinued taking their AD, had a higher level of stress than women in the non-exposed group ($p < 0.001$). After pregnancy, exposed women as well as their partners also had a higher level of stress than parents in the non-exposed group ($p < .05$). These results indicate that depressed women taking AD while pregnant as well as their partners have higher levels of stress during and after pregnancy than those not taking AD.

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THE BUILT ENVIRONMENT AND WOMEN'S PSYCHOSOCIAL HEALTH. *P Maxson, L Messer & M L Miranda (Duke University, Durham, NC 27708)

The built environment (BE) to which women are exposed during pregnancy has been associated with adverse maternal and reproductive health. Limited research has identified maternal psychosocial status as a mechanism through which the BE influences health. We assess this relationship using directly observed neighborhood characteristics and psychosocial attributes from an ongoing pregnancy cohort study. Durham city tax parcels ($n = 17,239$) were assessed, and observed BE variables were summed into five domains: housing damage, property disorder, nuisances, territoriality and vacancy. These analyses include 595 non-Hispanic black and 178 white or Hispanic participants living in the study area. Generalized linear latent and mixed models were run with binomial family and multinomial links. Outcomes—including perceived stress, partner support and active coping—were constructed as defined in the literature. Living in areas with more property disorder or higher proportions of rental or vacant housing was associated with more active coping and perceived stress as well as less positive partner support. For example, living in areas with more housing damage was associated with 50% higher odds of women reporting moderate perceived stress, compared to women with low perceived stress (odds ratio (OR) = 1.5; 95% confidence interval (95% CI): 1.1, 2.1). Following adjustment for covariates, the relationship was attenuated, but still significant (OR = 1.4; 95% CI: 1.0, 2.1). Since we may be explaining a portion of the BE effect we are trying to observe, the unadjusted models may be a more accurate depiction of the 'built environment effect.' The BE, an important aspect of a woman's mental and physical health, is modifiable and thus an important target for interventions designed to improve public health.

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MID-PREGNANCY URINARY COTININE CONCENTRATIONS AND GESTATIONAL DIABETES. *J D Peck, C Robledo, J Ricci Goodman, J Stoner, E Knudtson, A Elimian (University of Oklahoma Health Sciences Center, Oklahoma City, OK 73104)

Tobacco use during pregnancy may increase risk of gestational diabetes. Inconsistencies in previous studies are attributed to methodological limitations such as self-reported smoking and inadequate control for confounders. We conducted a case-control study of gestational diabetes using a biochemical marker of tobacco exposure. Pregnant women undergoing 1 hour 50 gram glucose challenge tests at the University of Oklahoma Medical Center between August 2009 and May 2010 were recruited during the subsequent clinic visit (mean = 29 weeks, sd = 3.7). Cases ($n = 65$) were defined as women with 1) a screening value ≥ 135 mg/dl who went on to have a 3 hour 100 gram oral glucose tolerance test with ≥ 2 values above standard diagnostic thresholds, or 2) a screening value ≥ 200 mg/dl. Controls ($n = 244$) were selected (approximately 4:1) from those completing screening without a diagnosis of gestational diabetes. Self-reported tobacco use was collected by questionnaire. Urine samples were collected at enrollment and analyzed for cotinine concentrations. A multivariate logistic regression model controlling for age, race/ethnicity, body mass index and gestational age indicated diagnosis of gestational diabetes was not associated with an increased odds of cotinine exposure (referent: nondetectable urinary concentrations; 3.4 to 15 ng/ml, OR = 1.6 (0.7-3.7), and > 15 ng/ml, OR = 0.6; 95% CI 0.2-1.5.) An observed interaction with body mass index (BMI ≥ 30) suggests the association between tobacco exposure and gestational diabetes may differ for obese and non-obese women (interaction $p = 0.002$). The stratified estimates, however, lacked precision (e.g., OR = 2.9; 95% CI 0.8-10.2 for obese/smokers compared to non-obese/non-smokers.)

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PASSIVE SMOKING IN EARLY LIFE AND ADULTHOOD AND TIME-TO-PREGNANCY. *R G Radin, L A Wise, K J Rothman, E Mikkelsen, H T Sørensen, A H Riis, E E Hatch (Boston University School of Public Health, Boston, MA USA)

Background: Female passive smoking has been associated with reduced fecundability in the few studies that have examined this relation. Epidemiologic studies of the association between in utero smoke exposure and fertility have generated mixed findings. Methods: We examined time-to-pregnancy (TTP) in relation to in utero smoke exposure, passive smoking in childhood (age 0-10 years), and passive smoking in adulthood among 2,149 Danish women with no history of active smoking. In this prospective cohort study, participants reported their smoking history at baseline and contributed cycles at risk until the occurrence of pregnancy, fertility treatment, loss to follow-up, or the end of follow-up (12 months), whichever came first. We estimated fecundability ratios (FR) and 95% confidence intervals (CI) for each category of the exposure relative to no passive smoking across the lifespan, using discrete-time Cox regression models adjusted for potential confounders. Results: Relative to no passive smoke exposure at any life stage, the FR for in utero smoke exposure was 1.03 (95% CI: 0.89, 1.20), the FR for passive smoke exposure in childhood was 1.02 (95% CI: 0.90, 1.17), and the FR for passive smoke exposure in adulthood was 0.95 (95% CI: 0.73, 1.24). Conclusions: Among women with no history of active smoking, there was little evidence of reduced fecundability among women exposed to passive smoke either in early life or in adulthood.

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INVESTIGATING THE RELATIONSHIP BETWEEN GESTATIONAL AGE, BIRTHWEIGHT AND CHILDHOOD SLEEP APNOEA, USING LONGITUDINALLY LINKED DATA. C H Raynes-Greenow, R M Hadfield, P Cistulli, J Bowen, C L Roberts (University of Sydney, Australia)

Background: There is an increasing interest in the role of obstructive sleep apnoea in children and subsequent health outcomes. There is some evidence relating preterm birth and childhood sleep apnoea. Aim: To investigate the relationship between perinatal risk factors and sleep apnoea in childhood using population health longitudinally linked data from NSW. Methods: All live births recorded in NSW between 2000 and 2004 were extracted from the Midwives data collection, and followed up to the age of 6 years for all NSW hospitalisations recorded in the Australian Patient Data Collection. Exclusions included those births identified with major congenital anomalies, any births with birth weight outliers, and any deaths in the first year of life. Birth weights were adjusted for sex and gestational age using national centile charts. Sleep apnoea was identified using the (International Classification of Diseases) ICD-10 code G47.3 and the procedure codes for polysomnography and adenotonsillectomy. Results: We identified 4145 (1.0%) children with sleep apnoea diagnosed > 1 year old, mean follow-up was 5.03 years. Mean age at first diagnosis was 3.6 years, 86% had adeno/tonsillectomy and 36% had polysomnography. After adjusting for gestational age, year of birth, baby's sex, maternal age, smoking during pregnancy, mode of delivery, number of previous pregnancies, we found an increased risk for children to be diagnosed with sleep apnoea if they were born at < 32 weeks [Odds ratio (OR) 2.50; 95% CI 2.0, 3.2], or those born to mothers with any pregnancy hypertension [OR 1.19; 95% CI 1.1, 1.3], or those born by caesarean section [OR 1.19; 95% CI 1.1, 1.3]. There was no significant association between birthweight, adjusted for gestational age, and sleep apnoea. Conclusion: These results suggest that some perinatal factors are related to an increase in the risk of childhood sleep apnoea. Obstructive sleep apnoea in adults has been related to hypertension, coronary artery disease, diabetes and depression.

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HIGHER ENVIRONMENTAL TEMPERATURE DURING PREGNANCY CAUSES LOW BIRTHWEIGHT (LBW). A Gupta, *J S Teji, and K Eldeirawi (Pediatrics, University of Chicago, Chicago, IL)

LBW is a major cause of infant morbidity and mortality in the world. Animal and human studies have shown that intrauterine growth retardation was inversely related to environmental temperature. The purpose of this study is to assess the associations of higher temperature with lower birth weights in the United States infant born between 1995 and 2002. CDC Linked Death and Infant Birth data were analyzed only term babies and from MaxMind and National Oceanic and Atmospheric Administration (NOAA) website; The variables were maternal age, race, and Hispanic origin of the parents, birth weight, period of gestation, plurality, prenatal care usage, maternal education, live birth order, marital status, and maternal smoking and alcohol usage. Logistical regression was performed with LBW as the dependent variable with all the other dichotomized variables as confounding and where independent variables latitude and/or temperature with respect to race using STATA. About 25 million records from over 32 million births were used for analysis. It was noted average annual temperature > 55 F and lower latitude had a higher probability of LBW; Odds ratio (OR) 1.23, P < 0.0005; 95% CL-1.22-1.23). Greatest impact of LBW was for NHW and lowest for H, OR 1.22 vs 1.003 irrespective of other variables of LBW when directly related to temperature during pregnancy. Conclusions: LBW at birth is directly related to higher environmental temperature during pregnancy. LBW at birth is associated with diseases common to adults.

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ARSENIC EXPOSURE, PREGNANCY OUTCOMES, AND INFANT HEALTH IN BANGLADESH. *M Argos, F Parvez, and H Ahsan (The University of Chicago, Chicago, IL 60637)

Background: Chronic arsenic exposure through drinking water is a growing public health issue affecting millions of people worldwide, including 35 to 57 million in Bangladesh. Objectives: The aim of the present analysis was to evaluate whether individual-level arsenic exposure in females in the Bangladesh Vitamin E and Selenium Trial (BEST) is associated with pregnancy outcomes and infant health characteristics. Design: BEST consists of population-based participants from the Araihaaz and Matlab regions of Bangladesh, recruited between April 2006 and August 2009, and followed-up bi-weekly for clinical events including pregnancy. Study participants, aged 25-65 years at enrollment, have been chronically exposed to arsenic at various doses through the consumption of groundwater. Individual-level maternal arsenic exposure was measured by urinary total arsenic concentration in a spot urine sample at enrollment. Self-reported pregnancy outcome and infant characteristics were collected by interview and physician examination. Logistic regression models were used to estimate odds ratios and their 95% confidence intervals for pregnancy outcomes, as well as infant health characteristics including growth and morbidity, with respect to maternal arsenic exposure. Results: Associations between pregnancy outcomes, as well as infant growth and morbidity, with arsenic exposure will be presented. Conclusion: Our findings demonstrate the importance of maternal arsenic exposure for pregnancy outcomes and infant health in a Bangladeshi population.

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CHILDREN'S CIGARETTE SMOKING ASSOCIATED WITH LIFE STRESS, RULE-BREAKING BEHAVIOR, PARENTING STYLE AND ACADEMIC ACHIEVEMENT *Y L Liu, C C Chen, Y Y Yen, C H Lee and H L Huang (Kaohsiung Medical University, Kaohsiung, Taiwan 807)

Early initiation of smoking increases the likelihood of adult smoking dependence; still, most smokers start smoking in their early teens. Most schoolchildren start their smoking habit in the fifth or sixth grades. The current study was to understand children's life stress, rule-breaking behavior, parenting style and academic achievement associated with their cigarette smoking. Multistage cluster sampling was used to obtain a representative sample ($n = 5,353$) among 3rd to 6th graders from 65 elementary schools, in southern Taiwan in 2008-2009. A series of regression models was used to examine the influence variables had on smoking status of elementary school students. After adjusting for gender and grade, the risk of first cigarette smoking behavior was significantly associated with life stress, rule-breaking behavior, parenting style, and academic achievement. Compared to never smokers, the smokers were found to be more likely to have high level of stress (adjusted odds ratio (aOR) = 1.84, 95%CI:1.42-2.39), use swear words (aOR?2.13, 95%CI:1.67-2.71), have the authoritarian parenting style (aOR?1.28, 95%CI:1.01-1.63), and they were more likely to have low academic achievement in mandarin (aOR?1.45, 95%CI:1.03-2.02) and mathematics (aOR?1.41, 95%CI:1.03-1.93). The findings suggested that interventions aimed at reducing smoking initiation in children need to target on those who suffer high level of stress, have rule-breaking behavior and low academic performance, and to enhance their child-parent relationships as well as improve support system at school for children.

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DOES THE IMPACT OF SMOKING DIFFER BY SOCIOECONOMIC STATUS? *R Charafeddine, H Van Oyen, S Demarest (Scientific Institute of Public Health, Belgium)

The joint influence of smoking and socioeconomic status (SES) on health and mortality has received little attention in the literature; and the few published studies reported inconsistent findings and supported contradictory hypothesis. Some studies suggest that the effect of tobacco on health is higher among individuals with a lower socioeconomic status, others purport that the effect of tobacco is higher among individuals with a higher socioeconomic status, finally some suggest that the effect of tobacco is similar across all social groups. In this study, we examine whether educational level modifies the association between smoking and mortality. We used the Belgian Health Interview Surveys of 1997 and 2001 for information on tobacco consumption by age, gender, and educational level. The mortality follow up of the survey respondents was reported until December 2008. We used a Poisson regression to estimate the hazard ratio (HR) of mortality by smoking status controlling for age and other confounders. Our results show that men with the lowest educational level had the lowest relative risk of mortality (HR = 1.79 95% CI (1.10-2.89)) while intermediate (HR = 3.69 95% CI (2.59-5.26)) and high educated (HR = 3.51 95% CI (1.83-6.73)) men had comparably high relative risks. The variation in the effect of smoking observed among men is borderline significant as indicated by the log likelihood test. For women, the hazard ratios were only significant for the low and intermediate educated while there was no significant effect of tobacco on mortality among the highly educated. Variations among women were not statistically significant. This study provides evidence that the effect of smoking on mortality is conditional upon educational level, especially for men.

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A MULTILEVEL STUDY OF CHILDREN'S CIGARETTE SMOKING IN RELATION TO INDIVIDUAL- AND SCHOOL-LEVEL CHARACTERISTICS IN ELEMENTARY SCHOOLS. *C C Chen, Y Y Yen, C H Lee, Ted Chen and H L Huang (Kaohsiung Medical University, Kaohsiung, Taiwan 807)

The main aim is to examine the relationship between the individual- and school-level characteristics and cigarette smoking behavior of schoolchildren. We conducted a multilevel-based study to assess two-level effects for smoking among 5357 grades 3-6 students in 65 randomly selected elementary schools in southern Taiwan in 2008-2009. A series of multilevel models was analyzed. A significant random variation between schools was identified [$\sigma^2_{\mu_0} = 1.11(0.23)$, $P < 0.05$]. Between schools differences accounted for approximately 26.7% of the residual variance in smoking, indicating that the school cluster is very important. The presence and status of a school general tobacco policy, smoking restrictions or attending health promoting school programs appeared to be unrelated to student smoking behavior. However, the risk of smoking was significantly associated with those schools with a high perceived smoking rate, as compared to those with a low perceived smoking rate [adjusted odds ratio (aOR) = 1.67, 95% CI:1.17-2.51]. The specific school students attended had a positive significant effect on the risk of being smokers. Other individual-level characteristics having a significant relationship to student smoking were positive attitude toward smoking (aOR = 1.16) and immediate social environmental factors in which best friends always smoked in front of me (aOR = 6.32), and family always smoked in front of me (aOR = 1.57) as well as drinking alcohol (aOR = 2.56) and chewing betel nuts (aOR = 4.11). In addition to social models for smoking as predictors, the broader school environment with a higher student perception of smoking prevalence is associated with children's smoking behavior.

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NEIGHBORHOOD SOCIODEMOGRAPHIC, PHYSICAL, SERVICE-RELATED, AND SOCIAL-INTERACTIONAL CHARACTERISTICS AND BMI OR WAIST CIRCUMFERENCE IN THE RECORD STUDY: EVALUATION OF THE SEPARABILITY OF ASSOCIATIONS WITH A NEIGHBORHOOD CHARACTERISTIC-MATCHING TECHNIQUE *C Leal, K Bean, B Chaix (Inserm U707 and IPC Center, Paris, France)

We investigated whether correlated neighborhood characteristics related to the sociodemographic, physical, service-related, and social-interactional environments measured within ego-centered areas were associated with BMI and waist circumference, and assessed whether or not these associations could be disentangled using an original neighborhood characteristic-matching technique (analysis of each environmental effect within pairs of individuals similarly exposed to another environmental variable). We conducted cross-sectional analyses of 7230 adults from the RECORD Cohort Study (Paris region, France). After adjustment for individual/neighborhood socioeconomic variables, both outcomes were negatively associated with characteristics of the physical/service environments reflecting higher densities (e.g., built surface area, street network connectivity, and densities of fruit/vegetables selling shops, fast-food restaurants, and healthcare resources). Multiple adjustment models were unable to disentangle the effects of these correlated densities. Analyses by pairs of participants similarly exposed to another environmental variable only identified a few associations, primarily with the density of fruit/vegetables selling shops. Overall, beyond influences of the socioeconomic environment, certain characteristics of the physical/service environments may be associated with weight status, but it may be difficult to disentangle the effects of various environmental dimensions because of the strong correlation between the variables (even if they imply different causal mechanisms and interventions).

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ORGANIZATIONAL JUSTICE AND MENTAL HEALTH: A SYSTEMATIC REVIEW OF PROSPECTIVE STUDIES. *R NDJABOUE, C BRISSON and M VEZINA. (Population Health Research Center, Chemin Sainte-Foy. Quebec, Canada G1S 4L8)

The Demand-Control-Support model (DCS) and the Effort-Reward Imbalance model (ERI) are the models most commonly used to study the effects of psychosocial work factors on workers' health. An emerging body of research has identified *organizational justice* as another model that can help to explain deleterious health effects. This review aimed 1) to review prospective studies of the associations between organizational justice and mental health in industrialized countries from 1990 to 2010, 2) to evaluate the extent to which organizational justice is an independent predictor of mental health in prospective studies, 3) to discuss theoretical and empirical overlap and differences with previous models. The studies were collected from the Medline and PsychINFO databases, from references listed in major articles, and from experts in the field. The studies had to: present associations between organizational justice and a mental health issue; be prospective; and be available entirely in English or in French. Of the 363 selected studies, ten prospective studies were selected for this review. Prospective studies provide evidence showing that procedural justice and relational justice are associated with mental health. These associations remained significant after controlling for the DCS and ERI models. We also observed that there is a lack of prospective studies on distributive and informational justice and mental health. In conclusion, the organizational justice model can be considered a different and complementary model to the DCS and ERI models. Future studies should evaluate the cumulative effects of the exposure to organizational justice on employees' mental health over time.

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ASSOCIATIONS BETWEEN THE DENSITY OF ALCOHOL OUTLETS AND NON-VIOLENT CRIME IN URBAN NEIGHBORHOODS. *K Lenk, T Toomey, D Erickson, H Quick, E Harwood, B Carlin (University of Minnesota, Minneapolis MN 55454)

A growing body of literature has found statistically significant positive associations between the density of alcohol outlets (e.g., bars, liquor stores) and the incidence of crime in small geographic areas such as census blocks or neighborhoods; however, most studies have focused on effects of alcohol outlet density on violent crime. In contrast, we examine associations between alcohol outlet density and five types of non-violent crime: vandalism, nuisance crime, public consumption of alcohol, driving under the influence, and alcohol consumption by minors. Data come from the city of Minneapolis, Minnesota in 2009 and were aggregated and analyzed at the neighborhood level ($n = 84$ neighborhoods). Alcohol outlet density was measured as the number of outlets per roadway mile and crime outcomes were modeled as counts (Poisson distribution). A Bayesian approach was used for model estimation accounting for spatial auto-correlation and controlling for relevant neighborhood demographics. Models were estimated for total alcohol outlet density and then separately for off-premise outlets (e.g., liquor and convenience stores) and on-premise outlets (e.g., bars, restaurants). We found a significant positive association between total alcohol outlet density and each crime outcome. The estimated percent increase in crime related to an additional alcohol outlet in a neighborhood ranged from 2.7% to 8.1% across crime outcomes with the strongest associations for public consumption. Similar results were seen for on- and off-premise outlets although the strength of the associations were lower for off-premise density. Geospatial maps of outlets and crime outcomes will be presented as will implications of results.

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SOCIAL CONTACTS AND DEPRESSION IN MIDDLE AND ADVANCED ADULTHOOD: FINDINGS FROM A NATIONAL SURVEY. *R N Polur, L P McKenzie, C G Wesley, J D Allen, R E McKeown, J Zhang (Jiann-Ping Hsu College of Public Health, Georgia Southern University, Statesboro, GA 30460)

To assess how social contacts are associated with depression, we analyzed the data of adults aged 40 years or older, who completed a depression screening as part of the National Health and Nutrition Examination Survey, 2005-2008. Depression was ascertained using the Patient Health Questionnaire (PHQ), a 9-item screening instrument. The prevalence of depression was 5.5% (SE: 0.64) in men ($N = 2,836$) and 8.5% (SE: 0.71) in women ($N = 2,845$). After adjustment for covariates, significant associations between social contacts and depression were identified, and they were more salient among men than women. Compared to those who attended church weekly, the odds ratio (OR) was 2.57 (95% confidence interval (CI): 1.47-4.20), 2.43 (95% CI: 1.36-4.33), and 2.16 (95% CI: 0.88-5.31) among men who never attended church, attended occasionally, and more than weekly, respectively. The corresponding ORs for women were 1.81 (95% CI: 1.11-2.94), 1.71 (95% CI: 1.05-2.78), 0.99 (95% CI: 0.53-1.85). Compared with the respondents having 10 or more friends, the ORs of depression were 3.72 (95% CI: 1.77-7.83) for men and 1.88 (95% CI: 0.90-3.71) for women who had no close friends. Compared to married individuals, being previously married was significantly associated with depression in both men with OR of 2.15 (95% CI: 1.46-3.15) and women with OR of 1.62 (95% CI: 1.06-2.48). The current study provides evidence to support increasing social contacts to prevent depression, particularly among men. The inherent limitation of cross-sectional design, however, prevented the authors from investigating causality.

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NEIGHBORHOOD SOCIOECONOMIC STATUS AND SECURITY AND INDIVIDUAL HAZARDOUS ALCOHOL DRINKING IN CHILE: A MULTILEVEL ANALYSIS. *A Castillo-Carniglia and E Ansoleaga (Doctoral Program in Public Health, University of Chile, Independencia 939, Santiago, Chile)

It has been hypothesized that social environmental conditions, such as neighborhood security and socioeconomic status, act as stressors at the individual level and may increase alcohol consumption. However, there is little evidence of this, particularly in developing countries. We investigated the association between hazardous alcohol consumption, and neighborhood socioeconomic status and security, in a sample of adults in Chile. We analyzed a sample of 12,896 persons of both sexes between 18 and 65 years of age, who were included in the 8th General Population Survey of the National Council for Narcotics Control of Chile. Hazardous alcohol consumption was based in the Alcohol Use Disorders Identification Test (AUDIT). All analyses were performed with mixed-effect logistic models with two levels. There was no association between neighborhood socioeconomic status (in quartiles) and hazardous alcohol consumption when we adjusted for income and education at the individual level. In the case of neighborhood security (1st quartile [Q1] higher security of the neighborhood, the 4th quartile [Q4] lower security), there is a significant association in all models, even after controlling for individual perceptions of neighborhood security, except for Q4. In the fully adjusted model, the odds ratio and 95% confidence interval (OR, 95%) for Q2, Q3 and Q4 (vs Q1) were 1.24, 1.03-1.49; 1.22, 1.02-1.46; and 1.11, 0.92-1.34, respectively. The neighborhood security is thus independently associated with individual hazardous alcohol consumption in Chilean adults.

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INDIVIDUAL SOCIAL CAPITAL IN THE WORKPLACE AND WORK-RELATED INJURY IN CANADA: A CROSS-SECTIONAL ANALYSIS. V L Kristman; *A Vafaei, (Department of Community Health & Epidemiology, Queen's University, Kingston, ON, Canada)

Background: Work-related injuries result from complex interactions between multiple risk factors. Individual-level social capital in the workplace has been implicated as a risk factor for workers' health. Objectives: To determine associations between individual worker social capital and work-related repetitive and most serious injury. Methods: Canadian Community Health Survey data were used. Injury outcomes included repetitive strain and most serious injuries at work. Two comparison groups of non-work-related injured and non-injured were used. Individual worker social capital was determined by questions about workplace conflict, supervisor helpfulness, and co-worker helpfulness. Regression analyses were performed to quantify associations, adjusting for true confounders. Results: Females reporting high social capital had significantly decreased odds of repetitive strain injury compared to those reporting low social capital (Odds Ratio [OR] = 0.36; 95% CI: 0.15-0.86) using the injured comparison group. Compared to the non-injured group, both males and females reporting high social capital were less likely to report repetitive strain injuries (female OR = 0.45; 95% CI: 0.32-0.63; male OR = 0.64; 95% CI: 0.43-0.96). Individual worker social capital was not associated with the most serious injury using either control groups. Conclusions: We found an association between individual worker social capital and repetitive strain injury at work. Future studies need to examine this association prospectively to establish the causality.

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THE HEALTHY IMMIGRANT EFFECT IN SPAIN: HEALTH STATUS OF ROMANIANS-BULGARIANS, ECUADORIANS AND MOROCCANS LIVING IN SPAIN. *D La Parra (University of Alicante, Alicante, Spain, 03080)

To investigate the healthy immigrant hypothesis in Spain for the three main immigrants groups, we used data from two surveys: a) The European Health Survey in Spain (2009) and b) The Survey on Disability, Impairment and Handicap (2008). We compared health status indicators of foreigners born in Morocco, Romania-Bulgaria and Ecuador with Spanish native-born population. Several indicators were chosen to compare general health status: self-perceived health, activity limitation, chronic diseases, obesity, impairments, disability and handicaps. We have also analysed the access to an official certificate of handicap. Crude and adjusted odds ratios (95% confidence intervals) were calculated using logistic regression analysis stratified by sex and adjusted by age and education. Before adjusting by age, foreign born populations, as they are much younger, has in general a better health status. After adjusting for age, according to most indicators their health is similar than that of native-born population with some gender differences. A clear health advantage is observed in terms of functional health. Foreign born populations are more likely free of activity limitation than Spanish native born population: for instance, for men: Romanians and Bulgarians 2.44 (1.67-3.57), Ecuadorians 2.70 (1.75-4.15) and Moroccans 2.53 (1.82-3.51). And the difference is very large in terms of access to an official certificate of handicap: Romanians and Bulgarians 9.13 (4.12-20.3), Ecuadorians 3.54 (2.05-6.09) and Moroccans 4.56 (2.82-7.37). We conclude that there is enough support for the healthy immigrant hypothesis in Spain, especially when functional health (being able to work) is considered. A healthy worker effect may explain these results.

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THE RELATIONSHIP BETWEEN QUALITY OF LIFE OF FEMALE STUDENTS AND THEIR PARENTS' EDUCATION IN TEHRAN. A Amanollahi, *M-R Sohrabi, Ali Montazeri (Shahid Beheshti University of Medical Sciences, Tehran, Iran)

This study aimed to assess the relationship between the quality of life in female students and their parents' education in Tehran, the capital of Iran. This cross sectional survey was conducted on a sample of 1040 girls aged 9-12 years. Among 22 districts of Tehran, five regions selected randomly. These 5 regions were representative of different socioeconomic status of North, South, East, West and Central regions of Tehran. Then according to the list in the Department of Education 4 schools were selected randomly from each region. Thereafter 52 girls randomly selected using school's office list in each school. The validated Iranian version of pediatric quality of life inventory (PedsQL 4.0) was used to measure health related quality of life (HRQoL). Information on educational level of each student's parents also was recorded. One-way analysis of variance was performed for data analysis. The mean age of 1040 participants was 10.6 (SD = 0.71) years. In general the findings indicated that there was significant association between parents' educational status and quality of life ($p < 0.001$); as a better quality of life was seen among students with higher parental education from illiterate to bachelor academic degrees. However, an exception was inverse association for those whose parents were highly educated in master degree and higher. The results suggest that more educated parents increase the quality of children's life but higher educated parents might put their children at risk of sub-optimal quality of life due to their busy schedules. Key words: Quality of life, Child, Educational status, Parents, PedsQL

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SOCIOECONOMIC PREDICTORS OF MULTIPLE SEXUAL PARTNERSHIPS AMONG PERSONS TESTED FOR HIV IN NAMIBIA. *S Blank, B Nichols, S Sturgeon, P Pekow, K Reeves (University of Massachusetts, Amherst, MA 01003.)

Multiple sexual partnerships are associated with greater risk of human immunodeficiency virus (HIV), sexually transmitted infections (STIs) and intimate partner violence. Namibia has an 18% HIV prevalence and up to 40% of men in parts of the country have reported multiple sexual partnerships; yet no studies have evaluated characteristics associated with this behavior. We assessed the relationship between education, occupation and migration and multiple sexual partnerships among 275 men and 295 women tested for HIV in Lüderitz, Namibia using data from a cross-sectional study at a Voluntary Counseling and Testing Center in 2009. Preliminary results in a logistic regression model adjusted for age, gender and marital status show that employment in professional, administrative or healthcare positions (vs. no employment) was associated with multiple sexual partners over the lifetime (Odds Ratio (OR) = 2.1, 95% Confidence Interval (CI) 1.1-4.1) as was being away from home for over a month in the past year (OR = 1.7, 95% CI 1.1-2.6). Employment as a soldier, policeman or security guard (vs. no employment) was negatively associated with multiple sexual partners in the past year (OR = 0.2, 95% CI 0.1-0.9). Analyses were repeated stratified on gender and adjusted for age and marital status. For men, being away from home for over a month in the past year remained associated with multiple sexual partners over the lifetime (OR = 2.0, 95% CI 1.1-3.5). For women, employment in professional, administrative or healthcare positions was associated with multiple sexual partners over the lifetime (OR = 3.1, 95% CI 1.2-7.8). Findings can help target behavioral interventions among Namibians in a resource-limited setting.

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THE BUILT ENVIRONMENT AS A MEDIATOR IN THE ASSOCIATION BETWEEN RACIAL ISOLATION AND BIRTH OUTCOMES IN DURHAM, NORTH CAROLINA. *Rebecca Anthopolos, Lynne Messer, and Marie Lynn Miranda (Duke University, Durham, NC 27708)

Research has shown that racial residential segregation of blacks in the US is associated with poor birth outcomes among blacks and whites; however, the mediating pathways through which segregation affects maternal and fetal health remain understudied. One of the main pathways through which segregation is hypothesized to act is the built environment, including neighborhood characteristics such as the quality of housing and access to healthy food stores. We tested whether the built environment played a mediating role in the relationship between neighborhood level racial isolation of blacks and birth outcomes among non-Hispanic blacks and non-Hispanic whites in Durham, North Carolina. Previously constructed indices of black isolation and characteristics of the built environment, including housing damage, property disorder, vacant housing, tenure, nuisances, and security, were linked to 2000 to 2008 birth data in the North Carolina Detailed Birth Record. Outcomes included birthweight, low birthweight, preterm birth, small for gestational age, and birthweight percentiles. In race stratified multilevel models that controlled for maternal level characteristics, property disorder and tenure were especially important full or partial mediators in the association between black isolation and continuous birthweight, low birthweight, and preterm birth among blacks. In contrast, among whites, housing damage, property damage, nuisances, tenure and vacancy acted as mediators in models for continuous birthweight and birthweight percentiles. Identifying mediating pathways will help guide public resources for reducing the racial disparity in birth outcomes between US blacks and whites.

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WORKPLACE SOCIAL CAPITAL AND ALL-CAUSE MORTALITY: A PROSPECTIVE COHORT STUDY OF 28,043 PUBLIC SECTOR EMPLOYEES, 2000-2009. *T Oksanen, M Kivimäki, I Kawachi, S V Subramanian, S Takao, E Suzuki, A Kouvonen, J Pentti, P Salo, M Virtanen, J Vahtera (Harvard School of Public Health, Boston, MA 02115)

To examine the association between workplace social capital (i.e. social cohesion, trust and reciprocity in the workplace) and all-cause mortality, we examined data on 28,043 public sector employees in Finland (82% female, aged 20-66 years) who responded to surveys in 2000-2002 and 2004. All participants were successfully linked to national mortality registers through 2009. We used repeated measurements of self-assessed and co-workers' assessment of workplace social capital in the same work unit. To estimate the association between workplace social capital and all-cause mortality, we used Cox proportional hazard models and fixed effects conditional logistic regression. During the 5-year follow-up period 196 employees died. A one unit increase in the mean of repeat measurements of self-assessed workplace social capital (range 1-5) was associated with a 19% decrease in the risk of all-cause mortality [age- and sex-adjusted hazard ratio (HR) was 0.81; 95% CI 0.66-0.99]. The corresponding point estimate for the mean of co-workers' assessed social capital was similar, although the association was more imprecisely estimated [age- and sex-adjusted HR = 0.77; 95% CI 0.50-1.20]. In fixed-effects analysis, a one unit increase in self-assessed social capital across the two time points was associated with a lower mortality risk (OR = 0.81, 95% CI 0.55-1.19). These findings suggest that workplace social capital is associated with decreased risk of mortality in the working-age population. Further research is needed to provide insight into the pathways underlying this association.

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POPULATION FACTORS AND SEXUAL RISK BEHAVIOR AMONG PEOPLE ON PROBATION AND PAROLE. *T C Green, E R Pouget, M Harrington, A G Rhodes, D O'Connell, S S Martin, M Prendergast, P D Friedmann (Brown University Medical School, Providence, RI 02903)

Background: Racial/ethnic disparities in prevalence of HIV and other sexually transmitted infections (STIs) reflect disparities in incarceration, and may be related to population factors that can modify opportunities for sexual partnerships. Objectives: We explored associations of selected population factors (including sex ratios and incarceration rates) with indicators of sexual risk behavior of participants while under community supervision. Methods: Longitudinal data from 1287 drug-involved persons on probation and parole as part of the Criminal Justice Drug Abuse Treatment Studies were matched by county of residence with population factors, and stratified by race/ethnicity and gender for analysis. Adjusted generalized estimating equation models assessed associations with having unprotected sex with a partner who had HIV risk factors, and having more than one sex partner in the past month. Results: Low sex ratios or high incarceration rates were associated with greater odds of having unprotected sex with a risky partner among all racial/ethnic groups. Among women, low sex ratios were associated with having more than one sex partner. Generally, effects of population factors were stronger among non-Hispanic Black participants than among non-Hispanic White or Hispanic participants. Conclusions: Sex ratios and incarceration rates may act as social determinants to influence individual sexual risk behavior before and during probation and parole. Research investigating possible causal mechanisms of these associations is needed. HIV- and STI-prevention programs may be improved by addressing structural barriers to safer sexual behavior, particularly for non-Hispanic Blacks.

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SOCIOECONOMIC FACTORS AND TUBERCULOSIS INCIDENCE IN WASHINGTON STATE. *E Oren, J Mayer (University of Washington, Seattle WA 98195)

Traditional individual level studies and ecological studies are unable to simultaneously examine the role of individual and group level factors in disease risk. Few studies have used a multilevel approach to assess the role of area-based socioeconomic status on tuberculosis (TB) incidence. This analysis examined neighborhood-level influences on TB incidence in a multilevel population-based sample as well as modifying effect of living in an urban area. All incident TB cases in Washington state (n = 2,161) reported between January 1, 2000 and December 31, 2008 were identified using a retrospective cohort design. Multivariate Poisson analysis was used at zip-code tabulation area (ZCTA) level, which allowed for further exploration of area-specific influences on TB incidence. A significant association was found between indices of socioeconomic position (SEP) and TB incidence in Washington State, with a clear gradient of higher rates observed among lower ZCTA socioeconomic quartiles (Incidence rate ratio of lowest to highest SEP index quartile: 2.17, 95% CI: 1.93, 2.45; P-trend < 0.001). In multivariate analyses, addition of individual- and area-level covariates significantly attenuated this association, although statistical significance was preserved. No interaction between urbanity and socioeconomic status was observed for any SEP quartiles. This study found significant socioeconomic differences in risk of TB incidence across ZCTAs in Washington even after adjusting for individual age and sex and area-based race, ethnicity, origin and urbanity. Results emphasize importance of neighborhood context and the need to target prevention efforts to low SEP neighborhoods regardless of urban or rural status.

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WITHDRAWN

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MENTAL HEALTH EFFECTS OF A HOUSING MOBILITY PROGRAM BY VULNERABLE SUBGROUPS: WHO BENEFITS FROM MOVES TO LOW-POVERTY NEIGHBORHOODS? *T L Osypuk, M M Glymour, E Tchetgen Tchetgen, A Lincoln, D Acevedo-Garcia, F Earls. (Northeastern University, Boston MA)

Section 8 housing choice vouchers are a primary US housing policy serving 2.1 million families. Vouchers can facilitate moves to higher quality neighborhoods, yet little is known about differential health effects of Section 8 moves for children from vulnerable families. We therefore tested for subgroup treatment effect differences on psychological distress (Kessler K6 measure, $\alpha = .80$) in the Moving to Opportunity program, a social experiment randomizing volunteer low-income families to receive a Section 8 voucher to move to lower-poverty neighborhoods, compared to controls in public housing. We tested effect modification (additive scale) of treatment on distress among adolescents age 12-19 by baseline health vulnerability defined by health/developmental problems. We modeled standard intent to treat (ITT) analysis; since not all families offered vouchers opted to move, we also used instrumental variable (IV) analysis for families who used the voucher. The distress outcome was self-reported 4-7 years after random assignment. There were significantly opposite treatment effects by gender on distress: using a Section 8 voucher to move was beneficial for girls & harmful for boys. Moreover, treatment benefited (reduced distress) girls with no health vulnerability, but not for vulnerable girls (null effects). Treatment had no effect on boys without vulnerability but it harmed vulnerable boys. Overall, health vulnerability predicted 0.17 point worse treatment (higher distress) for both genders [95% CI: 0.03,0.32](ITT models). IV results yielded effect size twice as large. Results may inform housing mobility programmatic changes to offset health vulnerabilities.

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IS SMOKING PERCEIVED AS RISKY AMONG CAMBODIAN AMERICAN ADULTS? *R Friis, C Garrido-Ortega, A Safer, C Wankie, J Pallasigui, M Forouzesh, K Trefflich, K Kuoch (California State University, Long Beach, CA)

Cambodian Americans, especially men, have a high prevalence of cigarette smoking. Our previous research with focus groups suggested that they may not regard smoking as a major risk factor for adverse health outcomes. Using a community survey, we examined the degree to which Cambodian Americans perceived cigarette smoking as risky according to harm to one's overall health, chance for developing problems with heart, lungs, and fertility, chance of developing cancer, and harm from secondhand cigarette smoke. A cross-sectional survey was administered to a stratified, random sample of adult respondents ($n = 1,414$; females = 60.1%; mean age = 50.5 years) in census tracts with high concentrations of Cambodian Americans in Long Beach, California. Respondents responded to a five-point Likert scale (strongly disagree to strongly agree) to indicate perceived risks of smoking. Logistic regression analyses were employed to predict covariates that prompted respondents to perceive smoking as risky. Significant predictors were marital status, educational status, and smoking status. The odds of perceiving cigarette smoking as risky were 2.0 times (95% CI = 1.5 - 2.5) higher among married persons than among unmarried persons. The odds of perceiving cigarette smoking as risky were 1.8 times (95% CI = 1.1 - 2.8) higher among persons who had a college education than among persons who had no formal schooling. The odds of perceiving cigarette smoking as risky were 2.2 times (95% CI = 1.5 - 3.2) higher among former and never smokers than among current smokers. We concluded that persons who perceived cigarette smoking as risky tended to be former or never smokers, married, and have a college education.

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PRE-DRINKING AND IMPAIRED DRIVING AMONG YOUNG-ADULT MALE POST-SECONDARY STUDENTS IN LONDON ONTARIO. *T Pirie, S Wells (University of Western Ontario, London, ON, Canada N6A 3K7)

Recent studies suggest that heavy-episodic drinking (HED i.e. ≥ 5 drinks) is significantly associated with impaired driving. Pre-drinking, the consumption of alcohol in a private setting before going out to a social event, may increase the likelihood of impaired driving. In the present study, we investigated the nature of pre-drinking and its association with impaired driving in a sample of young-male post-secondary students. Using a cross-sectional study design, male students were randomly sampled from the University of Western Ontario and Fanshawe College and asked to complete an online questionnaire ($N = 1356$) which included questions regarding their drinking behavior and drinking consequences. Multiple logistic regression models were used to examine the relationship between heavy-episodic pre-drinking (HEPD i.e. ≥ 5 drinks on a pre-drinking occasion) and impaired driving, adjusting for HED, age, race, program of study, and living arrangement. About 89% of males reported pre-drinking, with a mean of 5.67 drinks consumed during a typical pre-drinking occasion. Approximately 62% of pre-drinkers engaged in HEPD. Those most likely to engage in HEPD were white students; students living off campus without family; 19-20 year old students; and students enrolled in a science, social science, or technology program. HEPDs were 3.47 (95% Confidence Interval 2.2-5.4) times more likely than non-HEPDs to drive impaired. Overall, HEPD appears to be highly prevalent among young male post-secondary students and an important correlate of impaired driving. These results highlight the importance of developing and improving prevention strategies and policies aimed at reducing harmful patterns of drinking among post-secondary students.

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CONFLICT AND CONFLUENCE IN NORMS ACROSS SOCIAL ENVIRONMENTS SHAPES SMOKING. *J Ahern, S Lippman, S Galea (University of California, Berkeley, CA 94720)

Social norms strongly shape health behavior. Ethnographic research suggests that across social environments, either conflict in norms or confluence of negative norms generates vulnerability among young adults, however how this affects health behaviors has yet to be examined. We used data from young adult participants (ages 18-24) in the New York Social Environment Study (n = 4000, 59 neighborhoods, conducted in 2005) to examine the relation between smoking norm conflict and confluence and individual smoking behavior. Smoking norms in the friend/family and neighborhood environments were categorized as confluent (both anti-smoking, both pro-smoking, both equivocal), mildly conflicting, or strongly conflicting. We used generalized estimating equation logistic regression models to examine relations of smoking norm conflict and confluence with current smoking, adjusting for confounders including history of smoking prior to residence in the current neighborhood and socio-demographic characteristics. Smoking prevalence was highest when norms were confluent and pro-smoking across environments (odds ratio = 9.4, p = 0.02) and lowest when norms were consistently anti-smoking across environments (reference group). When norms in only one environment were pro-smoking, smoking was also significantly elevated. The one exception was that anti-smoking norms in the neighborhood counteracted pro-smoking norms among friends/family such that smoking was not elevated. While confluent healthy norms may be ideal, this analysis found that norms in the neighborhood environment can overcome those among friends/family, suggesting that targeting the neighborhood environment may be most fruitful for intervention with young people.

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ASSOCIATION OF PERCEIVED NEIGHBOURHOOD SAFETY, OBJECTIVE CRIME AND PERCEIVED NEIGHBOURHOOD SOCIAL COHESION ON CHILDREN'S BODY MASS INDEX. *R Caleyachetty, E M van Sluijs, S J Griffin (MRC Epidemiology Unit, Cambridge, UK)

Research on the influence of the social neighbourhood environment has received little attention and linked few aspects of the social environment, particularly safety and social cohesion to child adiposity. We examined the association between parent's perception of neighbourhood safety, objective crime and perception of neighbourhood social cohesion on children's BMI (BMI, kg/m²). Data came from a population-based cross-sectional sample of 1,721 children aged 9-10 years in Norfolk, England. Parents reported demographics, perception of neighbourhood safety and social cohesion by standardized questionnaire. Geocoded crime rate data came from the Norfolk Constabulary. Height and weight was measured, and BMI transformed to z-scores based on gender- and age-specific reference values. Adjusted regression coefficients (B) and 95% confidence intervals (95% CI) were obtained from multiple linear regression. After adjustment for parent's education, socio-economic position, urban/rural location and child's ethnicity, children whose parents perceived their neighbourhoods as having a high crime rate had higher BMI z-scores on average than children whose parents perceived their neighbourhoods as having a low crime rate (B = 0.24, 95% CI: 0.07, 0.40). Objective crime and perceived neighbourhood social cohesion were not significantly associated with children's BMI z-score. Future research should seek to explore the association between perceived neighbourhood crime rate and children's BMI z-score longitudinally and confirm whether this association is causal and, if so, to what extent it is mediated by health behaviours and chronic stress.

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ANTI-DEPRESSANT USE AMONG WORKING AGE CANADIANS: EXPLORING INTERACTIONS BETWEEN GENDER, WORK AND FAMILY ROLES, AND SOCIOECONOMIC POSITION. I Kelly, B Lavery, B Janzen (University of Saskatchewan, Canada)

Use of antidepressants in the general population has been found, on average, to be greater among women than men, among the divorced compared to the partnered, and among those from lower income groups. However, research examining the sociodemographic patterning of antidepressant use has focused on main effects rather than on potential interactions between gender, indicators of social position (education and income) and work and family role occupancies. The purpose of this study, then, was to examine the socio-demographic and economic patterning of antidepressant use in a representative sample of working age Canadians. We used data from cycle 1.2 of Statistics Canada's Canadian Community Health Survey (2002). To address our research goals, the sample was restricted to 20,450 Canadians between the ages of 20 and 59 years. Self-reported use of antidepressant medication in the last year was the dependent variable. The primary independent variables considered were gender, age, education, income adequacy and work/family role occupancies. Logit log-linear models, using backward elimination, were applied to examine if these demographic and economic variables interacted in their association with the dependent variable. All analyses were conducted using the sampling weights provided by Statistics Canada. Among women, use of antidepressants was greatest among the following groups: low income, divorced, non-parents (27.8%); never married, parents with a post-secondary degree (23.8%); and never married, non-parents with a less than high school education (23.7%). Among men, use of antidepressants was greatest among the following groups: low income, divorced, non-parents (16.8%); low income, non-employed, with a less than high school education (15.8%); and never-married, non-parents with a less than high school education (11.7%). Limitations of the study are discussed and future research implications.

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WITHDRAWN

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TEMPORAL AND GEOGRAPHIC SHIFTS IN URBAN AND NON-URBAN COCAINE-RELATED FATAL OVERDOSES IN A CANADIAN SETTING. B D L Marshall, M-J Milloy, E Wood, S Galea, and T Kerr (BC Centre for Excellence in HIV/AIDS, Vancouver, BC, Canada V6Z 1Y6)

Background: Illicit drug overdose is a leading cause of premature mortality and no longer a predominately urban phenomenon. We sought to examine geographic distributions and temporal trends in cocaine-related fatal overdoses in British Columbia, Canada. Methods: All coroner case files in which an illicit drug overdose was identified as the cause of death between January 1, 2001 and December 31, 2005 were reviewed and geocoded. We compared the characteristics of cocaine and non-cocaine related overdoses and used multi-level mixed effects models to determine the individual and area-level risk factors for cocaine-related death. A spatial analysis was conducted to identify clusters of these cases. Results: In total, 904 illicit drug overdoses were recorded, including 535 (59.2%) in non-urban areas and 532 (58.9%) related to cocaine consumption. Over the study period, the proportion of cocaine-related overdoses remained constant in urban centres ($p = 0.526$), but increased significantly in non-urban settings ($p < 0.001$). In a multi-level mixed effects model, we observed a significant interaction ($p = 0.010$) between population density and year of observation, indicating a differential increase in the proportion of cocaine-related deaths in less populated areas of the province. Spatial analyses confirmed a statistically significant cluster of cocaine-related overdoses in a rural southeast region of the province. Conclusions: Increasing levels of cocaine-related overdoses in non-urban areas should be a public health concern. Evidence-based interventions to reduce the risks associated with cocaine consumption and reach drug users in non-urban settings are needed.

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SPATIAL HETEROGENEITY OF $PM_{2.5}$ CHEMICAL CONSTITUENT LEVELS. *K Ebisu, R D Pen, M L Bell (Yale University, New Haven, CT 06511)

Studies of the health impacts of airborne particulates' chemical constituents typically assume spatial homogeneity and estimate exposure from ambient monitors. In another words, the estimated exposure for a given community is equal to the spatially averaged ambient pollutant level. However, factors such as local sources may cause spatially heterogeneous pollution levels, which could affect results of epidemiological analysis. This work examines the degree to which constituent levels vary within communities and whether exposure misclassification is introduced by spatial homogeneity assumptions. Analysis considered $PM_{2.5}$ elemental carbon (EC), organic carbon matter, ammonium, sulfate, nitrate, silicon, and sodium-ion (Na^+) for the U.S., 1999-2007. Pearson correlations and coefficients of divergence were calculated and compared to distances among monitors. Linear modeling related correlations to distance between monitors. Spatial heterogeneity was present for all constituents, yet lower for ammonium and sulfate. Lower correlations were associated with higher distance between monitors, especially for nitrate and sulfate. Analysis of co-located monitors revealed measurement error for all constituents, especially EC and Na^+ . Exposure misclassification may be introduced into epidemiological studies of $PM_{2.5}$ constituents due to spatial variability. The reliance on the monitoring networks is likely to continue given concerns of data availability, cost, and the relative ease of use. To avoid exposure misclassification, denser monitoring networks would be ideal, but may not be practical due to cost. When assessing health effects of PM constituents, new statistical methods are needed for estimating exposure and accounting for exposure error induced by spatial variability.

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DETERMINANTS OF HIV/TB MORTALITY ADJUSTING FOR GEOSPATIAL CONFOUNDERS IN RURAL SOUTH AFRICAN CHILDREN. *Eustasius Musenge, Penelope Vounatsou, Mark Collinson and Stephen Tollman, Kathleen Kahn (School of Public Health, University of the Witwatersrand, Johannesburg, South Africa)

Background: South Africa alone has more than 20% (5.5 million) of global HIV infections, a TB incidence of 21 per 1,000 person years and has the highest TB/HIV co-infection rate, making her the nation with the greatest burden of HIV/TB infections globally. The aim of the study was to determine the spatially adjusted household and individual-level risk factors of childhood HIV/TB mortality in Agincourt which is located in rural north-east of South Africa. Methods: This was a retrospective cohort study done in 2004. Data were collected between January and December of the same year. A multilevel random effects model was done using a spatial Bayesian semi-parametric Cox survival model, catering for individual as well as household random effects. Results: Fifty one out of 6,527 children under 5 years from 4,211 households died of HIV/TB. Maternal death had the greatest impact on child HIV/TB mortality (HR = 3.33, 95%CI[1.01 - 12.28]). Other risk factors were multiple household deaths and being a former Mozambican refugee. A protective effect on child HIV/TB mortality was found with households that were male headed, were least poor and had many inhabitants. Conclusion: Maternal survival is protective of death and increases childhood longevity. Our findings can be used to inform policy and implementation strategies on exact geographical locations where most deaths occur, with the aim of reducing childhood and maternal deaths due to HIV/TB. This method of analyses which adjusts for spatial confounding and produces mortality risk maps is useful for policy makers, interventions and future studies.

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THE GROCERY GAP: ACCESS TO HEALTHY FOOD IN THE BOSTON AREA COMMUNITY HEALTH (BACH) STUDY. *R S Piccolo (New England Research Institutes, Watertown, MA 02472)

Numerous studies have shown that access to healthy foods is a challenge for many Americans, particularly those living in disadvantaged neighborhoods. However, it is unclear whether social disparities in access to healthy foods are linked to the development of downstream health outcomes such as diabetes, hypertension (HTN), cardiovascular disease (CVD), and obesity. To investigate the relationship between availability of healthy food and health outcomes (diabetes, HTN, CVD, and obesity), we used the population-based random-sample BACH I cohort (2002-05) of 5,503 participants between the age of 30-79 y and their geo-coded residential addresses. We surveyed 4,415 of these subjects for BACH II (2007-10) for disease incidence. Geo-spatial analyses showed racial/ethnic trends in the location of supermarkets (3.5 supermarkets per 100,000 population in predominantly black census tracts, 4.6 in racial mixed and 5.5 in predominantly white census tracts) and socioeconomic trends in the location of fast food restaurants with the lowest income census tracts having twice as many fast food restaurants per 100,000 population (3.4) than the highest income census tracts (1.7). However, proximity to supermarkets, grocery stores, convenience stores and/or fast food restaurants did not have an appreciable risk on incident diabetes, HTN, CVD, or obesity. These results confirm social disparities in access to healthy food in the Boston metro area, but suggest that such disparities do not manifest themselves in adverse health outcomes over a 5-y period. Future analyses of the BACH cohort including analyses of individual-level dietary patterns and physical activity may offer information on pathways by which the local food environment can affect health and well-being. Supported by Award Number U01DK056842 from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (NIH). Content is solely the responsibility of the authors and does not necessarily represent the official views of NIDDK or NIH.

ASSOCIATION BETWEEN THE REGIONAL PREVALENCE OF CHRONIC JOINT SYMPTOMS AND TEMPERATURE AMONG U.S. ADULTS: FINDINGS FROM THE BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM. *C A Okoro, A Z Fan, Y Zhong, X Qi, C Li, L S Balluz (Centers for Disease Control and Prevention, Atlanta, GA 30333)

To assess variations in the regional prevalence of chronic joint symptoms (CJS) and the impact of temperature. Data for the 48 contiguous states (N = 379,883) who participated in the 2007 Behavioral Risk Factor Surveillance System were merged with monthly temperature data from the National Oceanic and Atmospheric Administration. CJS other than back and neck pain were self-reported. Temperature data were categorized by quintile. Binomial logistic regression analyses were performed to estimate prevalence ratios (PR) and 95% confidence intervals (CI). The unadjusted prevalence of CJS was estimated to be 33.1% (standard error [SE], 0.16%) and ranged from 31.9% (SE, 0.47%) in the West to 34.7% (SE, 0.29%) in the Midwest. After adjustment for age, sex, race/ethnicity, education, marital status, and body mass index, adults in the Northeast had a significantly lower prevalence of CJS than those living in the Midwest (PR 1.06; 95% CI, 1.04–1.09), South (PR 1.05; 95% CI, 1.02–1.07), or West (PR 1.06; 95% CI, 1.03–1.10). While cooler temperatures were significantly associated with an increased prevalence of CJS (p-value for trend: < 0.01), further adjustment for temperature did not affect these findings. Significant differences in prevalence of CJS may exist between adults in different regions of the United States. Temperature variation may not account for regional differences in the prevalence of CJS. Further research is needed to examine the association between joint symptoms and climate.

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SPATIAL AND SPATIO-TEMPORAL RISK MAPPING FOR RARE DISEASE USING HIDDEN MARKOV MODELS. *L AZIZI, F Forbes, D Abrial et M Charras-garrido (INRA Clermont-Ferrand, France/INRIA Rhone-Alpes, France)

The goal of disease mapping is to identify homogeneous regions in terms of risk and to gain better insights into the mechanisms underlying the spread of the disease. Traditionally, the region under study is partitioned into a number of areas on which the observed cases of a given disease are counted and compared to the population size in this area. It has also become clear that spatial dependencies between counts had to be taken into account when analyzing such location dependent data. Traditional approaches to disease mapping have some deficiencies and disadvantages in presenting the geographical distribution. Following the idea of using a discrete Hidden Markov random field (HMRF) model, we propose to replace the continuous risk field in the traditional approaches by a partition model involving the introduction of a finite number of risk levels and allocations variables to assign each area under study to one of these levels. Spatial dependencies are then taken into account by modelling the allocation variables as a discrete state-space Markov field, namely a spatial Potts model. One advantage of this model is that the clustering risk task is a part of our procedure and not performed in a post-processing step as in traditional approaches. We propose to use for inference, as an alternative to simulation based techniques, an Expectation Maximization (EM) framework. The algorithm used is the EM mean-field algorithm. This algorithm is suffering from its high dependence to the starting values. To overcome this drawback, we present a novel strategy of initialization. The proposed model and strategy are illustrated using both simulated data and real data: the Bovine Spongiform Encephalopathy disease in France. To pursue our study we extend this spatial model to a spatio-temporal one in order to get comparable maps in space and time which can give valuable information not only about the present geographically localized disease problems but also on the evolution of these problems.

VARIATION IN SPATIAL RISK OF LEPTOSPIRAL INFECTION IN URBAN SLUMS. *M S Carvalho; R D M Felzemburgh; G S Ribeiro; W S Tassinari; R B Reis; M G Reis, AL Ko (Oswaldo Cruz Foundation, Rio de Janeiro, Brazil)

Leptospirosis, a zoonotic disease, has emerged as an important health problem in developing countries. Flooding, inadequate sanitation and drainage systems and accumulated refuse are widespread features of slum environments which favor rat-borne transmission. We mapped the spatial distribution for the risk for leptospiral infection of urban slum residents. Furthermore we developed models to evaluate whether specific environmental covariates explained the spatial variation of risk. Between 2004 and 2007, we performed four annual serosurveys of a cohort of 1264 subjects selected from an urban slum community, composed by four valleys, in the city of Salvador, Brazil. A Geographical Information System database organized all environment data. We fitted a generalized additive model which incorporated a bivariate smooth-spline term for each of the four valleys in order to map the spatial distribution of infection risk. We compared models which incorporated individual and environmental covariates to evaluate their effect on the spatial risk pattern. Among subjects, 81 (6.4%) had serologic evidence of one leptospiral infection and 10 of two infections. Significantly higher odds ratios were encountered at the bottom of valleys, where flooding occurs most often. Among the environmental covariates only the altitude of the subject's household was a significant risk factor. After including individual covariates and altitude, the spatial term lost statistical significance in three of the four valleys. Spatial risk for leptospirosis varies within slum regions possibly in relation to an interaction of poverty, geography and climate. However low altitude, a proxy for flooding, was the single important environmental factor which explained the spatial variation in risk. Therefore effective prevention of leptospirosis requires construction of proper drainage systems in marginalized urban communities.

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SEASONALITY OF INFLUENZA IN THE UNITED STATES. *B Malcolm and S S Morse. (Columbia University, New York, NY 10032)

Seasonality has a major effect on the spatiotemporal dynamics of natural systems and their populations. It is also a driving force behind the transmission of influenza in temperate regions. Although the seasonality of influenza in temperate countries is widely recognized, inter-regional spread of influenza in the United States have not been well characterized. Here, the authors will study the seasonality of influenza throughout the United States by using influenza-related mortality and laboratory surveillance data to model between-region movement of seasonal influenza in the United States between 1968 and 2010. Ordinary least squares will be used in order to develop linear trend surfaces for each influenza season and to depict the main trend in the spatial progression of each influenza season. Spatial autocorrelation will be used to detect the dominant spreading process of seasonal influenza in the U.S. (e.g. contagious, hierarchical, or mixed process). In addition, the average time seasonal influenza takes to spread across the United States and the average time between regional peak and national peak by dominant influenza subtype and season will be determined. Identifying spatiotemporal patterns could improve epidemic prediction and prevention. The authors intend for this research to determine the spatial and temporal characteristics of seasonal influenza in the U.S. and show if these characteristics differ by dominant influenza sub-type.

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SPATIAL ANALYSIS OF AUTISM SPECTRUM DISORDERS IN CENTRAL NORTH CAROLINA USING GENERALIZED ADDITIVE MODELS. *K Hoffman, A E Kalkbrenner, and J L Daniels (Department of Epidemiology, University of North Carolina, Chapel Hill, NC 27599)

Environmental exposures are increasingly suspected to contribute to autism spectrum disorders (ASD) risk, but data remain limited. Regional services and social factors can also contribute to ASD diagnosis. We evaluated the geographic variability in the odds of ASD in central North Carolina to identify social and environmental exposure hypotheses that warrant future epidemiologic investigation. Children meeting a standardized case definition for ASD at 8 years of age were identified through active records-based surveillance for 11 counties in 2002, 2004, 2006, and 2008 (n = 750). Vital records were used to represent the underlying cohort (15% random sample of children born in the same years as cases, n = 15,057), and to obtain birth addresses for cases and the birth cohort. We used generalized additive models (GAMs) to predict the odds of ASD by smoothing over latitude and longitude. Unlike previous investigations of geographic variability in ASD, the use of GAMs allowed adjustment for known ASD risk factors (e.g. maternal age). Using permutation tests, we evaluated the overall importance of residential location at birth and identified regions with significantly increased and decreased odds of ASD recognized by surveillance. Maps revealed statistically significant variation in surveillance-recognized ASDs. Adjusting for potential spatial confounding by maternal age made little difference in the odds of ASD. In some regions the odds of ASD were 1.5 times higher than those in the study area as a whole. Considering differences in the physical and social environments in this area may generate environmental hypotheses for future epidemiologic study of ASD.

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PREVALENCE AND OVERLAP OF CHILDHOOD AND ADULT PHYSICAL, SEXUAL, AND EMOTIONAL ABUSE: A DESCRIPTIVE ANALYSIS OF RESULTS FROM THE BOSTON AREA COMMUNITY HEALTH (BACH) SURVEY. *G R Chiu, K E Lutfey, H J Litman, C L Link, S A Hall, J B McKinlay (New England Research Institutes, Watertown, MA 02472)

Abuse is associated with a wide variety of health problems, yet comprehensive population-based data are scant. Existing literature on abuse tends to focus on a single type of abuse (e.g., sexual), abused population (e.g., women), or lifestage (e.g., childhood). Our objectives are to document the prevalence of physical, emotional, and sexual abuse by lifestage and gender; assess variation in abuse by gender and socio-demographics; establish overlap of abuses; and examine demographic and childhood abuse relationships with abuse in adulthood. Analysis of 2002-5 data from the Boston Area Community Health Survey, a racially/ethnically diverse community-based sample, ages 30-79 (N = 5,503). The results show that prevalence of abuse ranges from 15% to 27% dependent on type, gender, and lifestage; women are more likely to report emotional abuse in adulthood and sexual abuse in either lifestage than men, while men report similar prevalences of emotional abuse in childhood and physical abuse to women in either lifestage; there are often differences in reports of abuse by race/ethnicity and poverty status, particularly in women; there is substantial overlap between all types of abuse in both genders and lifestages; and a history of any childhood abuse is associated with a greater risk (odds ratios ≥ 4.95 ; p-values < 0.001) of reporting every type of abuse as an adult. The high prevalence of abuse needs to be taken seriously as a risk factor for a wide range of health outcomes. Types of abuse often overlap and victims of any abuse during childhood are at a greater risk for abuse in adulthood. Supported by Award Number U01DK056842 from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (NIH). Content is solely the responsibility of the authors and does not necessarily represent the official views of NIDDK or NIH.

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HOW DO U.S. CHINESE OLDER ADULTS VIEW ELDER MISTREATMENT? FINDINGS FROM A COMMUNITY-BASED PARTICIPATORY RESEARCH STUDY. E-Shien Chang,; Esther Wong, Bernarda Wong, Melissa Simon, (Rush Institute for Health Aging, Chicago, IL)

Objectives: This study examines the perception, knowledge, and help-seeking tendency toward elder mistreatment among Chinese older adults. Methods: A community-based participatory research approach was implemented to partner with the Chicago's Chinese community. A total of 39 Chinese older adults (age 60+) participated in focus group interviews. Data analysis is based on grounded theory framework of socio-cultural context recommended by the National Research Council. Results: A total of 39 Chinese older adults participated in four focus groups; 18 were men and 22 were women. The mean age was 74.7 years old. The majority of the participants emigrated from Mainland China, with a small portion from Hong Kong and Taiwan. Participants' average length of residence in the U.S. was 20 years. Chinese older adults mostly characterized elder mistreatment in terms of caregiver neglect, and identified psychological mistreatment as the most serious form of mistreatment. Other forms included financial exploitation, physical mistreatment, and abandonment. Chinese older adults have limited knowledge of help-seeking resources other than seeking assistance from local community service centers. Conclusion: This study has important practical implications for health care professionals, social service agencies, and concerned family members. Understanding how Chinese older adults define and perceive EM is crucial, especially when challenges in Chinese immigrant families are likely to increase the vulnerability of older adults. Our results further underscore the urgent need for educational initiatives and awareness programs that highlight the pervasive global public health and human rights issue of EM. Our results underscore the need for research and educational initiatives as well as community awareness programs that highlight the pervasive public health issue of elder mistreatment.

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COMPLETED SUICIDE IN ELDERLY POPULATION IN BRAZILIAN CITIES, 1996-2007. *L W Pinto, S G Assis, M C S Minayo, T P Oliveira, C M F P Silva (Oswaldo Cruz Foundation, Rio de Janeiro, Brazil 21040-361)

Although suicide rates of Brazilian population are low (below 10/100,000 inhabitants), they are substantially higher when only the elderly population (over 60 years old) is considered. In some cases these rates are similar to the highest ones found in European and Asiatic cities. This work aims to determine the age-gender distribution of suicide mortality in elderly population in Brazil, investigating cities with high incidences. Suicide mortality data (ICD-10, X60-X84) of the population over 60 years old in 5,565 cities for the period of 1996 to 2007 was extracted from the Brazilian Mortality Information System database. These data were grouped into four study periods: 1996-98, 1999-2001, 2002-04, 2005-07. Then, age-gender rates were computed. The results showed that 297 cities (5.4%) had rates above 10/100,000 inhabitants in the four periods analyzed. Most of these cities are in the South (52.5%) and Southeast (23.3%) regions of Brazil, the more developed and industrialized ones. The median mortality rates ranged from 43.12 to 46.51/100,000 inhabitants in the elderly population in general, from 76.80 to 87.13/ 100,000 in older males and from 0.00 to 8.98/ 100,000 in elderly women. The median ratio of suicide mortality among gender (male/female) ranged from 2.5 to 3.1. However, for 25% of the cities that rate was above 5.0, reaching 22.0 in some cases. It was also observed that the methods most often used by both men and women were hanging, firearms and poisoning. Brazilian suicide rates, although low for the general population, are very high for elderly population, mainly older men.

POPULATION-BASED ASSOCIATIONS OF SEXUAL IDENTITY OR SAME-SEX BEHAVIORS WITH HISTORY OF EARLY LIFE SEXUAL ABUSE. Seth L Welles, Thersa Sweet, (Drexel University School of Public Health, Philadelphia, PA 19145)

Associations of early life (< 18 years) sexual abuse (ELSA) with sexual orientation, and same-sex behaviors and attractions were evaluated in a nationally representative sample of adults. Data from the 2004-2005 Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions were analyzed, including rates of ELSA for five groups defined by sexual orientation (gay/lesbian, bisexual) and same-sex behaviors and attractions (heterosexuals with same-sex partners, same-sex attractions, and without same-sex partners or attractions). Among 33,902 persons included for analysis, rates of ELSA ranged from 24.6% among bisexual women to 6.7% among heterosexual women and ranged from 15.2% among bisexual men to 1.4% among heterosexual men. After adjustment for confounding, bisexual men, gay men, and heterosexual men reporting with some same-sex partners had 11.2-fold [Odds Ratio(OR) 11.16 (95% confidence interval): 7.46,16.68], 8.4-fold [OR 8.43 (6.81,10.45)], and 7.1-fold [OR 7.12 (5.94,8.55)], risk, respectively, for ELSA occurring frequently/sometimes (vs. almost never/never) compared with heterosexuals not having same-sex partners or attractions. For women, bisexuals, lesbians, and heterosexuals with same-sex partners, similar elevations of risk for ELSA were seen (4.3-fold [OR 4.29 (3.42,5.39)], 3.2-fold [OR 3.19 (2.73,3.73)], and 2.4-fold [OR 2.84 (2.40,3.36)], respectively). High rates of ELSA were observed for sexual minority men and women in this national survey. To address this disparity among sexual minorities, our findings underscore the need for additional research to identify determinants of being targeted for ELSA and potential psychosocial mediators as intervention targets.

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ELDERLY HEALTH STATUS: RURAL THAILAND. *T Apideckjul (Mae Fah Luang University, Thailand)

These participatory action research aimed to study the life styles, health status, and self-health care among elderly people who live in the semi-urban area in Chiang Rai Province, northern Thailand. The study population were a people of 60 years old and above selected by a simple random sampling technique. Totally 212 persons were recruited in to the study. The instruments of the study were questionnaires; general questionnaire, WHOQOL (WHO quality of life), NRI (Nutrition Risk Index), and MHSE (Mental Health Status Examination), and had been tested for validity and reliability. Other instruments included a physical examination and blood screening profiles. Of 54.23% were female, 25.47% were 70-74 years, 39.6% had history of medical conditions, and 32.07% had had surgical operation. Everyone used the hospitals or public health centers for their illnesses. 86.32% lived within 2 km. of a hospital 98.15% used the state social welfare insurance. 56.13% of cares were their own relatives. 91.985 had average of income 500 baht/month, 48.58% were illiterate. 12.73% smoked , 59.25% had 41-50 years of smoking. 16.98 often drank alcohol, and 42.10% ate uncook food. Biochemistry results showed that 17.55% had Cholesterol \geq 251mg/dl, 26.75% had Triglyceride \geq 171 mg/dl, 11.45% had Glucose \geq 121mg/dl, and 19.08% had Uric acid \geq 7.1 mg/dl. The determinants to develop the model of elderly health care in the rural area should consideration the risk behaviors? environmental management, health screening, and human resources management.

RACIAL DISPARITY OF THE RELATIONSHIP BETWEEN COTININE AND AGE. *J E Lee, J H Sung, W B Ward, J Perkins, (Jackson State University, Jackson, MS)

PURPOSE: Aging produces many physiological changes in the body. Thereby, effect of smoking on the body may vary with age, but not necessarily in a straight line. Previous studies assuming linearity identified a non-significant relationship between cotinine concentration and age. This study is aimed at determining whether there is a nonlinear association of serum cotinine concentration with age and whether there is any racial disparity in the association. METHODS: A Generalized Additive Model (GAM) was used to examine graphically possible nonlinear associations. The analyses utilized a valid sample of 2170 smokers aged \geq 20 years from the National Health and Nutrition Examination Survey 2005-2008. RESULTS: The GAM demonstrated that the cotinine concentration went up steadily until age 67 at which cotinine was the highest and then dropped quickly ($p > 0.0001$). Nonlinear pattern persisted even after controlling the daily cigarettes consumed ($p = 0.0088$). The pattern differed little among racial groups. While it was peaked at the age of 51 among non-Hispanic whites, it was at 44 and 62 among non-Hispanic blacks. The initial and peak values of cotinine concentration were higher in African-Americans. The multivariate regression model suggested that nonlinear model fit the data better than a linear model did. CONCLUSIONS: A significant nonlinear relationship existed between cotinine concentration and age. The finding suggested that the effect of smoking on the human body may be greater among those aged 50-67 and African-Americans than their counterparts. This finding may be a partial explanation for the association of lung cancer mortality with age and race.

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EYE DISEASE AND DEPRESSION IN OLDER ADULTS. *E E Freeman, M L Popescu, H Schmaltz, M J Kergoat, J Rousseau, S Moghadaszadeh, F Djafari, H Boisjoly (Centre de Recherche, Hôpital Maisonneuve-Rosemont, Montréal, QC, Canada)

Purpose: To examine whether patients with age-related eye diseases like age-related macular degeneration (AMD), Fuchs corneal dystrophy, or glaucoma are more likely to be depressed compared to a control group of older adults with good vision. Methods: We recruited 253 patients aged 65 years and older (61 with AMD, 45 with Fuchs, 79 with glaucoma, and 68 controls with normal vision) from the ophthalmology clinics of Maisonneuve-Rosemont Hospital (Montreal, Canada) from September 2009 until November 2010. Depressive symptoms were assessed using the Geriatric Depression Scale Short Form with a threshold of 5 suggesting depression, as prior research has validated. Cognition was examined using the Mini-Mental State Exam-Blind Version. Comorbidities were assessed by self-report of a physician diagnosis. Poisson regression with robust variance estimation was used to control for potential confounders. Results: There were 62 people who had symptoms suggesting depression (25%). AMD (Prevalence Rate Ratio (PRR) = 3.3, 95% Confidence interval (CI) 1.3, 8.0), Fuchs corneal dystrophy PRR = 3.0, 95% CI 1.2, 7.3), and glaucoma (PRR = 2.4, 95% CI 1.0, 5.8) were all associated with depression after adjustment for age, gender, education, obesity, cognitive score, and limitations in activities of daily living. Conclusions: Visually limiting eye disease is associated with depression in older adults. Greater attention to the mental health needs of patients with eye disease is needed.

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STUDY OF NUTRITIONAL STATUS AND FOOD CONSUMPTION PATTERNS IN THE ELDERLY POPULATION ARAK CITY AND DEMOGRAPHIC, ECONOMICAL AND SOCIAL FACTORS WITH THEIR AT 2009. M Taheri, *A Amani, R Zahiri, M Mohammadi (Arak University of Medical sciences, Iran)

By use of civil and rural families list and under random method, the main clusters were determined. The first family was questioned on the right side and this was continued until preparation the questionnaires for 10 studied elderly persons. Consumption evaluation of food stuff was registered through direct visiting them at their homes' fronts in non- holidays and by use of 24-hours food remembering method for three continuous days and the results were registered via a food recalling (remembering) album. Results: In studying weight of the elderly, the average weight of civil elderly (both men and women) is 5.70 Kg more than the elderly people living in rural regions. Also, in studying the height of the elderly, it was found that the height average of the civil elderly (men and women) is 161.53 centimeters and this is 158.12 for the rural elderly people, respectively. Thirty six point four percent of the men elderly people living in the city have the BMI between 25-30 but this rate is 27.5% for the rural men. Also, 41.3% of the civil women elderly have the BMI higher 30. The same difference was observed among the civil and rural men and women elderly people. But, in the case of BMI, between 25-30 (appropriate weight) the condition of the rural elderly people is more ideal in comparison to the civil people. Eight one point five percent of the civil women elderly people and 74.7% of the rural women elderly people are receiving energy less than 90% of RDA per day. In the case of elderly people, the main received energy is result of consuming carbohydrate (71%) and the proportion of fat consumption is lower. Thirty one point three percent of the men elderly under 70 years old are receiving protein less than 90% of RDA but this rate is 49.1% in the same women group and this difference is evident in the rural men and women elderly people.

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ALCOHOL INTAKE IS ASSOCIATED WITH INCIDENT GOUT IN ARIC. *M DeMarco, J Maynard, J Coresh (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205)

Studies suggest that alcohol increases gout risk in white men. We quantified the association of alcohol intake and incident gout in a bi-racial population-based cohort. ARIC is a prospective cohort study of 15,792 individuals from 4 US communities, consisting of 4 visits administered 3 years apart. At visit 4, participants reported their gout status. We excluded those who did not attend visit 4 or had gout prior to visit 1. The % daily calories from alcohol intake was categorized into none, and quintiles of % alcohol intake (≤ 1.5 , 1.5-3.1, 3.1-5.3, 5.3-9.8, > 9.8). We tested the association (HR) of categorical alcohol intake and incident gout using a Cox Proportional Hazards model with age as the time scale (adjusted for sex, race, BMI, diuretics, eGFR, hypertension and intake of dietary factors). We adjusted for serum urate and tested for sex and race interactions. The study contains 10,799 participants; 6,495 (60%) abstained from alcohol and 275 developed gout. The study population was 57% female and 22% African American. The adjusted HR and 95% CI for alcohol intake were no intake (reference), quintile 1: 1.00 (0.60, 1.70); quintile 2: 0.93 (0.54, 1.63); quintile 3: 0.92 (0.53, 1.61); quintile 4: 2.26 (1.54, 2.29); quintile 5: 2.31 (1.57, 3.40), (p-value for trend < 0.001). Serum urate did not substantially attenuate the HR for alcohol intake, suggesting an independent association of alcohol intake and gout. There was no interaction of alcohol intake with sex (p-value = 0.8) or race (p-value = 0.2). Participants in the 2 highest quintiles of alcohol intake had more than a 2-fold risk of gout, independent of confounders and serum urate. Gout is one of the many consequences of alcohol intake.

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THE EFFECT OF OLDER EDUCATION ON KNOWLEDGE ABOUT HEALTHY LIFESTYLES. A RANDOMIZED CONTROLLED TRIAL. *M Taheri, A Amani, R Zahiri, M Mohammadi (Arak University of Medical Sciences, Iran)

This pre-post quasi-experimental study was performed in ten randomly selected villages (Intervention: n = 5; Control: n = 5) in rural Arak. The analyses include 408 participants (Intervention: n = 212; Control: n = 196) who participated in both baseline and post-intervention surveys. The healthy lifestyles were assessed using a multi-dimensional instrument designed for elderly persons. A self-designed questionnaire on the basis of the goals of the study, whose content reliability had been approved by a number of efficient academic members was used. The mentioned questionnaires were filled out before educational intervention, and three month later after data collection in the first stage, action was taken with regard to educational intervention and then in the second stage (after the intervention), data was collected again. Results: Out of 408 elderly people in the sample 221 (54.16%) were men and 187 women (45.83%). Almost were in the 60-65 age group (31.8%). The mean age of participants was 71.34 with SD = 9.86. The majority of respondents were illiterate (43.9%). Results showed that the mean score of all parts of healthy lifestyles in experimental group after educational intervention compared to before intervention was increased significantly. The older people' mean knowledge grade increased from 28.6 ± 7.4 to 35.9 ± 6.8 ($P < 0.001$) after education. Based on results of present study, before intervention 37.3% of the elderly had weak knowledge, 54.1% had average knowledge, and 8.6% of them had good knowledge; but after intervention these percentages changed to 13.2% (weak), 37.4% (average), and 49.4% (good) respectively. There was a significant difference between the level of knowledge pre- and post-education, statistically ($P < 0/000$).

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ELDERLY MENTAL HEALTH IN A LOW SOCIOECONOMIC STATUS (SES) URBAN POPULATION. *F Islam, J Manson, & H Tamim; (York University, Toronto, ON Canada M3J 1P3)

The objective of this study was to determine the correlates of mental health in community-dwelling individuals aged 65+ living in an immigrant-dense, low SES urban area in Toronto, Canada. A total of 63 participants (14 male; 49 female) were recruited. The mental health outcome measures used were the Medical Outcomes Study Short Form (36) Health Survey (SF-36) emotional health, Perceived Stress Scale (PSS), and Subjective Happiness Scale (SHS). Sociodemographic (age, sex, marital status, ethnicity, education, and income), behavior (overall physical activity and alcohol drinking), and health (SF-36 general health and SF-36 role of limitations due to physical health) variables acted as potential correlates. At the bivariate level, older age significantly predicted poorer emotional health. Being female, having better general health, and fewer limitations due to physical activity was significantly correlated with less perceived stress. Being in better general health and having fewer limitations due to physical health was significantly correlated with higher levels of happiness. According to the step-wise multivariate linear regression analysis, older elderly individuals experienced significantly poorer levels of emotional health. Elderly individuals with better general health perceived significantly less stress in their life. Not being married and having better general health was significantly associated with greater levels of happiness. Physical health is linked to emotional health: elderly individuals in better general health report higher levels of emotional well-being.

SLEEP PREDICTS THE DEVELOPMENT OF UROLOGIC SYMPTOMS IN A LONGITUDINAL STUDY. *A B Araujo, R S Piccolo, J B McKinlay (New England Research Institutes, Inc., Watertown, MA 02472)

It is assumed that urologic symptoms and sleep are linked uni-directionally, i.e., that urologic symptoms lead to sleep disturbance. We tested the biologically plausible opposite—that sleep disturbance leads to development of urologic symptoms—in a 5-year longitudinal study. Analyses of 1610 men and 2535 women who completed baseline and follow-up phases of the population-based random sample Boston Area Community Health (BACH) survey. Short sleep duration (men only) defined as sleeping < 5 hours/night and sleep quality defined as having restless sleep in the past week. Lower urinary tract symptoms (LUTS), urinary incontinence (UI) and nocturia were measured with validated questionnaires. Logistic regression models of incidence among those without baseline symptoms yielded odds ratios (OR) and 95% confidence intervals (CI) adjusted for age, race/ethnicity, diabetes, heart disease, alcohol use, physical activity and anti-depressant use. Further adjustments were made for body mass index (BMI) and C-reactive protein (CRP) to test for mediation. Mean age was 48 years. Prevalence of short sleep duration was 18% (men) and restless sleep was 34% (men) and 42% (women). Incident LUTS was related to short sleep duration among men (OR = 1.97, 95% CI = 1.02-3.78) and restless sleep among men (OR = 2.03, 95% CI = 1.26-3.28) and women (OR = 1.66, 95% CI = 1.10-2.49). Incident UI (OR = 1.78, 95% = 1.06-2.96) and nocturia (OR = 1.90, 95% CI = 1.26-2.88) were associated with restless sleep among women. Findings persisted with adjustment for BMI and CRP; ORs were altered with adjustment for CRP. This study identified sleep as a novel and modifiable risk factor that precedes urologic symptoms, perhaps operating through inflammatory and other pathways. This study was supported by award number U01DK056842 from the National Institute of Diabetes and Digestive and Kidney Disorders. The content is solely the responsibility of the authors and does not necessarily represent the official views of NIDDK or NIH.

ASSOCIATION OF C-REACTIVE PROTEIN WITH INCIDENCE OF LOWER URINARY TRACT SYMPTOMS. LONGITUDINAL RESULTS FROM THE BOSTON AREA COMMUNITY HEALTH (BACH) SURVEY. *V Kupelian, C Roehrborn, R C Rosen, C L Link, J B McKinlay (New England Research Institutes, Watertown, MA 02472)

There is increasing evidence suggesting a role of inflammation in the etiology and natural history of lower urinary tract symptoms (LUTS). The objective of the present study was to determine whether serum C-reactive protein (CRP) levels are associated with the development of LUTS. BACH is a prospective cohort study of 4145 men and women age 30-79 at baseline. LUTS was defined as a score ≥ 8 on the American Urological Association symptom index (AUASI). Analyses were conducted among 1093 men and 1130 women without LUTS at baseline. CRP levels were categorized into three groups: < 1 mg/L (referent), 1-3 mg/L, > 3 mg/L. Association of baseline CRP levels and LUTS at follow-up were assessed using logistic regression to estimate odds ratios (OR) and 95% confidence intervals (95%CI) and adjust for age, race/ethnicity and BMI. About 8% of men and 12% of women developed LUTS over the follow-up period. Adjusted ORs (95%CI) of the CRP and LUTS association in men were 1.28 (0.66-2.52) for CRP levels 1-3 mg/L and 1.95 (1.07-3.54) for CRP levels with a trend-test p-value = 0.03. A similar trend was not observed in women with ORs of 1.03 (0.25-2.37) for CRP levels 1-3 mg/L and 0.54 (0.25-1.18) for CRP levels > 3 mg/L and a trend test p-value = 0.12. The increased risk of incident LUTS with elevated CRP levels support the hypothesis of a role of inflammation in the etiology of LUTS among men but not in women. This in turn may lead to the speculation that the portion of male LUTS attributable to the prostate is influenced by inflammation rather the component attributable to the bladder. The project described was supported by Award Number U01DK056842 from the National Institute of Diabetes and Digestive and Kidney Disease. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Diabetes and Digestive and Kidney Diseases or the National Institutes of Health.

LOWER URINARY TRACT SYMPTOMS AND INCIDENT DIABETES AND CARDIOVASCULAR DISEASE. LONGITUDINAL RESULTS FROM THE BOSTON AREA COMMUNITY HEALTH (BACH) SURVEY. *V Kupelian, G Miyasato, M Fitzgerald, C L Link, J B McKinlay (New England Research Institutes, Watertown, MA 02472)

The objective of this study was to determine whether lower urinary tract symptoms (LUTS) are associated with the development of diabetes and CVD in a population-based sample of men and women. BACH is a cohort study of 4145 men and women age 30-79 at baseline, with a median follow-up time of 4.8 years between baseline and follow-up. CVD and diabetes were assessed by self-report. CVD was defined as self-report of myocardial infarction, angina, congestive heart failure, coronary artery bypass, or angioplasty stent. LUTS was defined as a score of 8 or above on the American Urological Association symptom index (AUASI). Analyses were conducted on 2,774 participants without diabetes or CVD at baseline. Logistic regression was used to estimate odds ratios (OR) and 95% confidence intervals (95%CI) and adjust for potential confounders. A higher proportion of participants developed diabetes among those reporting LUTS (6%) compared to those without LUTS (3%) at baseline. A similar trend was observed for CVD, however the observed difference between those with and without LUTS was smaller (3.4% vs. 2.8%). After adjusting for age, gender, race/ethnicity, and BMI, we observed a two-fold increase in the risk of incident diabetes with LUTS at baseline (adjusted OR = 1.96, 95%CI:1.37-2.79). The magnitude of the association of baseline LUTS and incident CVD was more modest but remained statistically significant (adjusted OR = 1.47, 95%CI:1.03-2.11). The increased risk of incident diabetes and CVD associated with LUTS at baseline suggests that LUTS may be a marker of impending or preclinical disease. The project described was supported by Award Number U01DK056842 from the National Institute of Diabetes and Digestive and Kidney Diseases. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Diabetes and Digestive and Kidney Diseases or the National Institutes of Health.

WITHDRAWN

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GERIATRIC SYNDROMES AND INCIDENT DISABILITY IN OLDER WOMEN. *A L Rosso, C B Eaton, R Wallace, R Gold, J D Curb, M L Stefanick, J K Ockene, Y L Michael (Drexel University, Department of Epidemiology, Philadelphia, PA)

Comorbid conditions are important risk factors for incident disability in older women; however, often chronic diseases and not geriatric syndromes (GS) are considered in assessment of comorbid conditions. Data from the Women's Health Initiative observational study were used to determine burden of geriatric syndromes and risk of incident disability over three years. 29,291 women age 65 and older who were cancer free and had no baseline disability were included in the analyses. Geriatric syndromes (syncope, sleep problems, depression, falls, osteoporosis, dizziness, urinary incontinence, visual or hearing impairment, and polypharmacy), number of chronic diseases based on a modified Charlson index, and disability measured as any limitation in activities of daily living (ADLs) were assessed at baseline. ADLs were assessed again at 3 years and relative risk (RR) of incident disability was estimated by log binomial regression after adjustment for age, smoking and income. At baseline, 21,759 (76%) women had at least one geriatric syndrome. After three years, 742 (2.5%) women developed disability. Geriatric syndromes increased risk of disability compared to women with no geriatric syndromes (1-2 GS: RR (95% confidence interval (CI)) = 1.4 (0.9, 2.0); 3-4 GS: RR(CI) = 3.9 (2.7, 5.8); 5+ GS: RR(CI) = 6.6 (4.1, 10.6); test for trend, $p < 0.0001$). Associations were only somewhat attenuated after adjustment for chronic diseases. Burden of geriatric syndromes are predictive of incident disability over 3 years in older women, independent of chronic disease burden.

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THE EFFECTS OF PHYSICAL AND MENTAL HEALTH STATUS ON TRANSITIONS IN LIVING ARRANGEMENTS: A LONGITUDINAL INVESTIGATION OF COMMUNITY-DWELLING MIDDLE-AGED AND OLDER CANADIANS. *C L Angus, S A Kirkland, and Y Asada (Dalhousie University, Halifax NS, Canada B3M 1X1)

As in many other countries, Canada's population is aging, and lifespans are expanding. Supporting quality of life during our aging population's extended years is a high priority in social and health policy, and understanding living arrangements and their determinants plays a critical role in such policy. To date, the literature focuses on the oldest old, is mostly limited to cross-sectional assessment, and rarely addresses the collective impacts of physical and mental health status. This research investigates, in a sample of middle-aged and older community-dwelling Canadians, how transitions in living arrangements vary by sex and age group, and how physical and mental health status influence living arrangements over time. This study uses data from 3 waves (Baseline, Year 5 and Year 10) of the Canadian Multicentre Osteoporosis Study (CaMos), a population-based prospective cohort study conducted at 9 sites across Canada beginning in 1995. The CaMos sample used in this study includes individuals aged 45+ at baseline, for a total of 8,513 participants (6,044 women and 2,469 men). We examine the effects of physical and mental health status (measured by SF-36) on living arrangements (living independently or not) longitudinally, after adjustment for sociodemographics, medical history, BMI, physical activity, and other factors, using multivariate generalized estimating equations (GEE) logistic regression models, and present sex-specific age-adjusted associations. The findings of this study provide population-based longitudinal evidence to inform social and health policy development to support 'aging in place' in Canada and elsewhere.

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25-HYDROXYVITAMIN D (25(OH)D) AND PERIODONTAL DISEASE IN POSTMENOPAUSAL WOMEN. *A E Millen, M Swanson, K M Hovey, M J LaMonte, C A Andrews, R J Genco, J Wactawski-Wende. (University at Buffalo, Buffalo, NY 14214)

Background: Minimal research has investigated associations between periodontal disease (PD) and 25(OH)D status, which has anti-inflammatory properties. No study has reported on this association using multiple measures of PD inclusive of alveolar crestal height (ACH). Purpose: We investigated cross-sectional associations between plasma 25(OH)D concentrations and three different measures of prevalent PD among 885 postmenopausal women in an ancillary study (1997-2000) of the Women's Health Initiative. Methods: Three measures were used to define presence of PD: 1) an ACH-based definition determined from standardized intraoral radiographs (660 cases), 2) a clinical case definition based on measures of clinical attachment loss (CAL) and probing depth (683 cases), and 3) whole mouth mean gingival index (GI) as the % of sites with gingival bleeding (233 had $GI \geq 50\%$). Logistic regression was used to estimate odds ratios (ORs) and 95% confidence intervals (CIs) for PD by quintiles (Q) of 25(OH)D in models adjusted for age and season. P-trend was estimated using 25(OH)D as a continuous variable. Results: No association was observed between 25(OH)D and PD using either the ACH-based or the clinical case definition (OR (95% CI) for Q5 vs. Q1 = 0.90 (0.56-1.47); p-trend = 0.59 and 0.76 (0.46-1.24; p-trend = 0.14, respectively). The OR (CI) for a more severe GI ($\geq 50\%$) was decreased among women in Q5 vs. Q1 (0.61 (0.38-0.99), p-trend = 0.002). Conclusion: In this sample of postmenopausal women, there was no association between 25(OH)D and chronic PD based on ACH or CAL and probing depth. However, an inverse association existed between 25(OH)D and GI (a marker of acute PD and oral inflammation).

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PERCEPTION OF HEALTH STATUS IN DISADVANTAGED URBAN MOTHERS AND CUSTODIAL GRANDMOTHERS, *P Ryder (Butler University College of Pharmacy & Health Sciences, Indianapolis, IN)

To do the work of epidemiology it is necessary to think consciously about the meanings of 'health' and to understand its conceptualization in populations under study. Perceptions of health vary within and between populations and change over the lifecourse. This investigation considers perceptions of health in deprived urban mothers and grandmothers in Baltimore, Maryland. Caregiver clients (82 mothers and 68 grandmothers) of two programs for families at risk for child neglect were assessed using the Short Form-36 (SF-36); demographics, resources, depressive symptoms, everyday stressors, and family function were measured. Total and subscale SF-36 scores were compared. Logistic regression models were constructed to predict higher self-rated health (SRH) for generations collectively and separately. Participants were overwhelmingly poor African-American with low education. Mothers had lower annual incomes and more depressive symptoms. SF-36 scores did not vary by generation; however for mother, subscales for physical function were significantly higher and emotional well-being lower. For mothers, depressive symptoms were best single predictor of SRH; for grandmothers, energy level. Physical function (Odds ratio (OR) = 1.02, 95% Confidence Interval (CI) 1.01, 1.04), and pain (OR 1.02, 95%CI 1.001, 1.03) were significantly associated with higher SRH overall; for mothers depression, function, and pain were significant, for grandmothers, energy level, function and resources, controlling for depression, public assistance, and generation. Factors associated with perception of health in this vulnerable population differed for older and younger caregivers. Interventions should target different domains for older and younger caregivers.

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LIVING ALONE, HEALTH-RELATED QUALITY OF LIFE, LIFE SATISFACTION, SOCIAL SUPPORT, AND DEPRESSED MOOD: A POPULATION BASED STUDY AMONG THE RURAL AND URBAN OLDER ADULTS IN CHINA.

*H Wang, K Chen, B Zhou (Department of Epidemiology and Health Statistics, School of Public Health, Zhejiang University, Hangzhou 310058, China)

Facing population aging which is one of the serious non-traditional security challenges among the world in the 21st century, we focus on the social determinants and health status among older adults. A cross-sectional study was conducted basing on a multistage cluster sample of 4995 older adults, aged 60 years and over, 2441 in rural area and 2554 in urban area of Zhejiang Province in China. SF-36 was used to assess health-related quality of life in eight dimensions physical functioning (PF), role limitations due to physical problems (RH), bodily pain (BP), general health perceptions (GP), vitality (VT), mental health (MH), role limitations due to emotional problems (RP) and social functioning (SF) and physical component summary (PCS) and mental component summary (MCS). And a self-developed structured questionnaire was combined to investigate correlation of living arrangement and quality of life satisfaction, social support and depressed mood. Results suggested that these factor, including advanced age, female gender, rural residence, positive physical activity and low social support were the predictors of living alone status among the elderly. Comparing to older adults living with others, the living alone had significantly low quality ($P < 0.05$) in dimensions PF, MH and PCS, MCS after adjusting social support and other socio-demographic variables. Our study also reported a significant relationship between living arrangements, depressed mood, physical assistance, emotional support and life satisfaction ($P < 0.0001$). Older adults living alone accompanied by the characteristics of female gender (OR, 95%CI: 1.52, 1.07-2.18), life dissatisfaction (OR, 95%CI: 3.75, 2.59-5.45; 24.71, 10.53-57.97) and low emotional support (OR, 95%CI: 2.00, 1.06-3.76; 6.50, 2.17-19.51; 14.90, 2.17-102.16) had significantly depressed mood after adjustment. Living arrangement as one of the social determinant like social support partly explains the variance in health-related quality of life. There is existing significant association between living arrangement and life satisfaction, depressed mood and emotional support.

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FACTORS ASSOCIATED WITH SELF-REPORTED ORAL HEALTH IN BRAZILIAN ELDERS. FB de Andrade, M L Lebrão, J L F Santos, Y A O Duarte, D S Teixeira (University of São Paulo/Public Health Faculty, São Paulo, Brazil 01246-904)

The aim of this study was to investigate the relationship between self-reported oral health and socioeconomic, general health and clinical oral health measurements in a sample of free living elderly people from São Paulo, Brazil. This was a cross-sectional study with a sample of 871, aged 65 and older, representing 606,071.25 people, enrolled in the Health, Well-being and Aging cohort study (SABE). Self-reported oral health was measured by a five-point-response-scale and categorized as: poor, regular and good. Participants underwent a clinical oral health examination, answered a questionnaire regarding socioeconomic and general health factors and completed the Geriatric Oral Health Assessment Index (GOHAI). Multinomial logistic regression analysis was used, estimating values for odds ratio (OR), considering a 5% significance level. A design effect correction was made using the Stata survey command to analyze data coming from complex samples. Mean age was 72.6, 61.1% were females, 42.98% had ≤ 3 years of schooling. Overall, 49.19% were edentulous, 41.64% needed prostheses, 20.42% self-rated oral health as regular and 5.22% as poor. Regular self-reported oral health was related with poor general health perception (OR 2.23; $p = 0.012$), having no teeth (OR 2.04; $p = 0.008$) and GOHAI score (OR 0.89; $p = 0.000$). Poor self-reported oral health was associated with dental prosthesis necessity (OR 3.50; $p = 0.013$), having no teeth (OR 5.03; 0.004), GOHAI score (OR 0.83; $p = 0.000$) and dental attendance for treatment (OR 0.11; $p = 0.000$) or prevention (OR 0.13; $p = 0.004$). Clinical and subjective oral health measurements were the best predictors of self-reported oral health among elderly people.

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LIFESTYLE AND BEHAVIOUR CHANGES TO IMPROVE HEALTH AMONG ELDERLY CANADIANS. *J Wang, V Maddalena, and P P Wang (Memorial University of Newfoundland, St. John's, NL, Canada A1B 3V6)

Background and Objectives: In contrast to the wealth of studies on health status and the factors associated with it, there is a lack of research in lifestyle/behaviour changes towards improving health in general. Even less is known with respect to how and what elderly do to improve their health and what factors are associated with promoting and impeding healthy behaviour changes. This study aims to describe the changes of behaviors to improve health among elderly Canadians and to examine the factors that either enhance or impede healthy lifestyle changes. Methods: The 2007 Canadian Community Health Survey (CCHS) data were used. In total, 40,677 individuals aged 65 or older were included in this study. CCHS has a list of behaviour changes questions, such as "increased exercise", "lost weight", "improved eating habits", and "quitted smoking". Participants were asked if they had made any behaviour changes to improve their health in the past 12 months. Those who reported "Yes" were asked to indicate the most important change they have made. Participants were also asked to report the barriers they believed preventing them from making changes. Descriptive statistics were performed to estimate the frequency of various health behavior changes. Analyses were weighted to represent the target population. Results: 47.86% of elderly people reported that they have made behaviour changes to improve their health. 44.94% reported there were barriers in making the improvement. The behavior changes to improve health between male and female participants were also examined to be different. Conclusion: The findings showed low rates of elderly people (both male and female) made behaviour changes to improve health. Increasing exercises, changing eating habits, and receiving medical treatments were the main factors enhancing the changes, whereas lack of will power, disability or health problem, and physical condition were the leading barriers of the improvement. Further efforts should be made to help elderly people in Canada to change their behaviours and relieve the barriers.

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SUPPLEMENTAL VITAMINS AND VISUAL ACUITY IN THE PRESENCE OF EARLY AGE-RELATED OCULAR LESIONS.

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Antioxidants are thought to be of value in preventing cataract and age-related maculopathy (ARM). Studies have also suggested that treatment with multivitamin combinations preserves or improves vision when early-stage eye disease is present. How much of which vitamins might be effective is unknown, however. We evaluated associations between supplement use and visual acuity in eyes that had been assessed using the Lens Opacities Classification System III and the Wisconsin ARM Grading System. Nurses' Health Study participants residing in Massachusetts underwent eye examinations in 1993. The women had completed multiple food frequency questionnaires asking about supplement use since 1980. Two-thirds of the women had used multivitamins, and single-vitamin supplementation was also common. Analyses involved 915 eyes of 468 women who did not have diabetes, cataract, or late ARM. A multivariate-adjusted 1.1-point difference ($P = 0.006$) in Baily-Lovie score (overall mean = 55.6) associated with multivitamin use versus non-use actually reflected a difference restricted to eyes with high nuclear opacity grades ($n = 189$; mean = 2.7; 95% CI = 1.1-4.5) or ARM lesions ($n = 179$; mean = 3.5, 95% CI = 1.8-5.1). Better visual acuity in eyes with nuclear opacities was associated with vitamin A intakes $\geq 10,000$ IU/d and vitamin C intakes ≥ 200 mg/d, independently of intakes of other vitamins. Among eyes with ARM-related drusen, better visual acuity was associated with vitamin E intakes that far exceeded the RDA, but high intakes of other vitamins or merely meeting versus not meeting the RDA for vitamin E was not associated with benefits.

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MORTALITY AFTER PRENATAL EXPOSURE TO THE DUTCH FAMINE OF 1944-45. *L H Lumey, P Ekamper, Aryeh D Stein, F van Poppel (Columbia University, New York, NY)

Several studies have examined immediate and later health effects of famine exposure during pregnancy on the offspring. Little is known however about the role of maternal or fetal nutrition on adult survival. We selected men with prenatal exposure to the Dutch famine of 1944-1945 from military examinations records ($n = 408,015$) for births 1944-1946 in the Netherlands. Selection was by date and place of birth to define famine exposure in relation to stage of pregnancy and weekly food rations distributed among the population. We included men exposed in the immediate post-natal period ($n = 8,225$) and in the third ($n = 8,197$), the second ($n = 6,809$), and the first trimester of pregnancy ($n = 4,666$). We also selected men exposed around conception ($n = 7,727$). Additional men born before or after the famine without famine exposure in pregnancy were selected as time controls and men born outside the famine area as place controls. We first linked 82% of the selected sample population ($n = 45,000$) to national population records from the Netherlands Statistical Office for 2004-2009. These provide current vital status and cause of death where applicable. Successful linking was unrelated to famine exposure status or to indicators of social class. At this stage, men classified as unfit or obese at military examination were somewhat more difficult to link to current records. The remainder of the sample is now being traced at the Netherlands Central Bureau of Genealogy for deaths that took place prior to 2004. To date, 89 % of the study population has been traced in either of these registries, covering deaths from 1967 to 2009. Among those traced, mortality until 2009 was 9 %. In 24 %, cardiovascular disease was the primary cause of death, in 50 % cancers, and in 26 % other causes. Our findings show that long term tracing of vital status and cause of death is possible in this environment.

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AN ASSESSMENT OF SUBDOMAINS OF FRAILTY IN COMMUNITY-DWELLING OLDER PERSONS

*S Karunanathan, N Ahmadzai, H Payette, C Wolfson, N Sourial, B Zhu, F Beland and H Bergman (McGill University, Montreal, QC, Canada H3A 1A2)

Frailty is a syndrome of increased vulnerability to adverse outcomes due to impairments in multiple physiological systems. Recently, there has been an interest in identifying subdomains of frailty by examining associations among its criteria. These subdomains may provide insight into hypothesised etiologies and pathways. Objective: To examine associations among seven candidate criteria for frailty: nutrition, mobility, strength, physical activity, energy, cognition and mood. Methods: This study was based on the analysis of 1,733 community-dwelling persons aged 68-82 years from the Quebec longitudinal study on Nutrition and Successful Aging (NuAge). Associations among frailty criteria were examined using exploratory factor analysis. Results: Weak correlations were found between all frailty criteria except energy and mood. The measure of nutrition did not correlate with any other criterion and was therefore excluded from the factor analysis. The principal factor analysis based on six frailty criteria revealed two factors with eigenvalues greater than 1.0, accounting for 51% of the variance. The first factor included energy and mood, with a high positive loading of 0.85 on energy and an inverse loading of -0.83 on mood, whereas the second factor included the four other criteria, with high loadings on strength (0.70), mobility (0.66), physical activity (0.50) and cognition (0.45). Conclusion: Overall, our results indicate that among healthy older persons frailty criteria are weakly associated, forming two subdomains: one for psychological criteria and the other for physical and mental criteria. Further research is needed to determine whether these results hold true in more frail populations.

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GENDER DIFFERENCES IN MOBILITY DISABILITY IN WEST AFRICAN YOUNG AND MIDDLE AGED ADULTS. *M Miszkurka, M V Zunzunegui, E E. Freeman, S Kounda, S Haddad (Universite de Montreal, Montreal, QC, Canada)

Objective: To assess the prevalence of mobility disability, the contribution of socio-demographic factors and chronic diseases and the extent to which these factors account for gender differences in mobility disability in three West African countries. Methods: Data were used from the World Health Survey done in 2002-2003 in adults 18 years and over from Burkina Faso ($n = 4,822$), Mali ($n = 4,230$) and Senegal ($n = 3,197$). Those reporting that they had mild, moderate, severe, or extreme difficulty or were unable to move around were defined as having mobility disability. Sex and setting (urban/rural) prevalence distributions were estimated correcting for the complex sampling design. Logistic regression was used to estimate associations between sociodemographic factors, symptoms of arthritis, back pain, cardiovascular disease asthma and mobility disability. Results: Mobility disability was frequent, starting at young ages. In the 35-44 years old group, mobility difficulty was reported by 15% of men and 20% of women in Burkina Faso, 16% of men and 22% of women in Mali and 22% of men and 35% of women in Senegal. Women had higher odds of mobility difficulty at every age group in the three countries. The age adjusted odds ratios of women compared with men were 1.34 (95%CI 1.06;1.70) in Burkina Faso; 2.33 (95%CI 1.84;2.71) in Mali and 1.82 (95%CI 1.41;2.36) in Senegal. The fully adjusted odds of mobility difficulty in women compared with men were 0.94 (95% IC 0.70; 1.25) in Burkina Faso, 2.19 (95% IC 1.61;2.96) in Mali and 1.90 (95% IC 1.27; 2.84) in Senegal. Conclusion: Adults' functioning is compromised because of mobility difficulties, particularly among women. The gender gap seems to be partly explained by the higher prevalence of chronic conditions in women. Better knowledge on the causes underlying these high rates of mobility disability is needed if mobility is to be preserved in adulthood and old age.

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PROGRESSION AND REMISSION OF UROLOGIC SYMPTOMS: RESULTS FROM THE BOSTON AREA COMMUNITY HEALTH (BACH) SURVEY. *C L Link and J B McKinlay (New England Research Institutes, Watertown, MA 02472)

The prevalence of urologic symptoms increases with age which may lead to the conclusion that symptoms only worsen as a person gets older. With the completion of the first follow-up of the Boston Area Community Health (BACH) survey we consider the progression and remission of urologic symptoms. BACH recruited 5502 Boston residents (2301 men and 3201 women; 1767 Black, 1876 Hispanic, 1859 White) aged 30-79 years at baseline (2002-5) and re-interviewed 4145 respondents (1610 men and 2535 women; 1327 Black, 1341 Hispanic, 1477 White) after a median follow-up time of 4.8 years (2006-10). Lower urinary tract symptoms (LUTS) were measured by the American Ur Urologic Association Symptom Index (range 0-35) which measures the frequency of seven symptoms; 0 = none, 1-7 = mild, 8-19 = moderate, 20+ = severe). Involuntary urine leakage (UI) over the last year was classified as none, less than once per week, or one or more times per week. Painful bladder syndrome (PBS) was defined as pain increasing as bladder fills and/or pain relieved by urination for at least 3 months. Overactive bladder (OAB) was defined as (urinary frequency and urgency) or urge leakage. The amount of progression/remission of urologic symptoms is similar to the prevalence of these symptoms at follow-up: (prevalence, progression, remission) LUTS (men: 27.3, 20.6, 15.8; women: 18.8, 19.7, 17.6), UI (men: 5.0, 15.3, 8.7; women: 10.9, 18.8, 17.4), PBS (men: 1.0, 3.5, 3.8; women: 2.4, 6.0, 5.2), OAB (men: 9.8, 24.2, 21.0; women: 20.8, 21.7, 25.7). There is considerable progression and remission of urologic symptoms. Those with more severe symptoms are more likely to remit and those with no or mild symptoms are more likely to progress. Supported by Award Numbers U01DK56842 from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (NIH). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIDDK or the NIH.

IS THE ASSOCIATION OF DEPRESSIVE SYMPTOMS AND UROLOGIC SYMPTOMS BI-DIRECTIONAL? RESULTS FROM THE BOSTON AREA COMMUNITY HEALTH (BACH) SURVEY. *C L Link and J B McKinlay (New England Research Institutes, Watertown, MA 02472)

We have previously shown that depressive symptoms are associated with urologic symptoms (European Urology, 2007, Vol. 52(2), page 407-15). With the completion of the first follow-up of the Boston Area Community Health (BACH) survey we consider the question of directionality of this association. BACH recruited 5502 Boston residents (2301 men and 3201 women; 1767 Black, 1876 Hispanic, 1859 White) aged 30-79 years at baseline (2002-5) and re-interviewed 4145 respondents (1610 men and 2535 women; 1327 Black, 1341 Hispanic, 1477 White) after a median follow-up time of 4.8 years (2006-10). Urologic symptoms were measured by the American Urologic Association Symptom Index (range 0-35) which measures the frequency of seven symptoms; 0 = none, 1-7 = mild, 8-19 = moderate, 20+ = severe). Depressive symptoms were measured by an abridged Center for Epidemiological Studies depression scale with eight yes/no questions. We find that progression of urologic symptoms (an increase of 3+ points) is associated with an odds ratio of 1.34 (no baseline urologic symptoms, $p < .0001$), 1.24 (mild, $p < .0001$), 1.24 (moderate, $p = .0120$), or 0.85 (severe, $p = .2024$) per baseline depressive symptom and 1.21 ($p < .0001$) per increase in depressive symptoms from baseline to follow-up when adjusting for gender, age decade, and baseline urologic symptoms. Remission of urologic symptoms (a decrease of 3+ points) is associated with an odds ratio of 0.86 (moderate urologic symptoms, $p = .0026$) per baseline depressive symptom. These results suggest that the association of urologic symptoms and depressive symptoms is bi-directional. Supported by Award Numbers U01DK56842 from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (NIH). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIDDK or the NIH.

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DISENTANGLING THE ASSOCIATION BETWEEN ADULT SEXUAL ORIENTATION AND CHILDHOOD MALTREATMENT: EVIDENCE FROM A NATURAL EXPERIMENT INDICATES CHILDHOOD MALTREATMENT AFFECTS SEXUAL ORIENTATION. *Andrea L Roberts, M Maria Glymour, Karestan C Koenen (Harvard School of Public Health, Boston, MA 02115)

Epidemiological studies find a strong association between childhood maltreatment and same-sex sexuality in adulthood, but conventional observational studies cannot disentangle the causal direction. Nascent same-sex orientation may increase risk of maltreatment; alternatively, maltreatment may shape sexual orientation. The present study uses instrumental variable (IV) models based on family characteristics that predict maltreatment but are not plausibly influenced by sexual orientation, e.g., having a step-parent, as natural experiments to test whether maltreatment increases likelihood of same-sex sexual attraction, partners, and identity. IV estimates were calculated using the nationally representative 2004-2005 National Epidemiologic Survey on Alcohol and Related Conditions ($n = 34,653$). IV effect estimates were very similar to conventional effect estimates. For example, history of sexual abuse predicted increased probability of same-sex attraction of 2.0 percentage points [pp] (95% confidence interval [CI] = 1.4, 2.5pp) in IV models and 1.6 pp (95% CI = 1.2, 2.0pp) in conventional models. Although IV estimates are based on strong assumptions, these findings suggest associations between maltreatment and sexual orientation are due to effects of maltreatment on sexuality, rather than the reverse. If IV estimates are causal, 9% of same-sex attraction, 21% of any lifetime same-sex sexual partnering, and 23% of homosexual or bisexual identity is due to childhood sexual abuse.

ASSOCIATIONS BETWEEN FISH CONSUMPTION AND SEVERITY OF DEPRESSIVE SYMPTOMS. *C A Hoffmire, R C Block, K Thevenet-Morrison, E van Wijngaarden (University of Rochester, Rochester, NY 14642)

Fish is the primary source of dietary omega-3 poly-unsaturated fatty acids (n-3 PUFAs), which have been reported to reduce the risk of depressed mood in recent clinical trials. However, data from observational studies are less conclusive. We assessed the association between fish consumption and depressive symptoms in a nationally representative sample of 10,480 adult subjects (> 20 years) from the 2005-2008 National Health and Nutrition Examination Survey. Depressive symptoms were classified by severity using the Patient Health Questionnaire (PHQ-9): no depression (0-4), mild depression (5-9), and moderate to severe depression (≥ 10). Four measures of fish meal consumption in the past 30 days were considered: all fish, non-breaded fish, breaded fish, and shellfish. Multivariable ordinal logistic regression controlled for age, gender, race, education, marital status, smoking status, health status, antidepressant use, and supplemental fish oil. After controlling for potential confounders, consumption of any fish (odds ratio (OR) = 1.05, 95% confidence interval (CI) = 0.93-1.19), any non-breaded fish (OR = 1.02, CI = 0.90-1.14), or any shellfish (OR = 0.97, CI = 0.85-1.10) was not associated with depressive symptom severity, while consumption of any breaded fish showed an increased risk (OR = 1.35, CI = 1.08-1.68). No clear dose-response patterns with categorical measures of fish consumption emerged. Findings for fish oil supplementation were similar, indicating a lack of association (OR = 0.98, CI = 0.73-1.33). Although exposure misclassification is of concern, these findings do not support those from recent clinical trials reporting a benefit of fish consumption or n-3 PUFAs on depressive symptoms.

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PREDICTORS OF SIX-YEAR TRAJECTORIES OF DEPRESSION IN A NATIONAL CANADIAN SAMPLE. *I Colman, K Naicker, Y Zeng, A Ataullahjan, A Senthilselvan, S B Patten (School of Public Health, University of Alberta, AB, Canada)

Depression is a prevalent and recurrent condition. The long-term prognosis of depression is highly variable; however, there is paucity of evidence on factors associated with a negative long-term course of depression. The aim of this study was to identify these factors. The sample included 585 adults from Statistics Canada's National Population Health Survey who experienced a major depressive episode in 2000/01. These individuals were followed up until 2006/07; the primary outcome was a trajectory of depression over four time points. Growth trajectory models were used to group individuals into similar depression trajectories. Over 20 demographic, mental health, physical health and stress factors were included in a multivariate logistic regression model comparing those with differing trajectories. Two trajectories of depression were identified: those who recover and remain well (45%) and those who suffer from repeated symptoms (55%). Smoking, low self-mastery and history of depression were significant predictors ($p < 0.05$) of a negative depression trajectory. Smoking was significantly predictive in those with a history of depression but not in first-episode subjects. There were few differences in predictors between those with mild symptoms versus those with severe symptoms; however, being an immigrant was protective against a negative depression trajectory in those with severe symptoms. Those individuals presenting with major depression who are current smokers or display low levels of self-mastery are at an increased risk for experiencing chronic depression. Clinical guidelines should closely consider the promotion of early treatment for individuals in these potentially high risk groups.

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ASSOCIATIONS BETWEEN ZINC INTAKE AND DEPRESSIVE SYMPTOMS IN A POPULATION-BASED STUDY OF MEN AND WOMEN. *N N Maserejian, S Hall, J B McKinlay (New England Research Institutes, Watertown, MA 02472)

Prior studies indicate that lower serum zinc levels are associated with depression, but epidemiological data examining dietary sources of zinc in association with depressive symptoms are lacking. We tested the hypothesis that low dietary zinc was associated with depressive symptoms using cross-sectional data from the random population-based Boston Area Community Health survey (2002-2005). Current depressive symptoms were assessed by the abridged Center for Epidemiologic Studies Depression (CES-D) scale. Dietary data were collected by food frequency questionnaire. Multivariate regression analyses were conducted among 1,122 men and 1,746 women with dietary data, adjusting for age, race/ethnicity, body mass index, physical activity, total energy intake, antidepressant/antipsychotic drug (AD/AP) use, and in women, menopausal status and polyunsaturated fat intake. Results showed an interaction ($P = 0.03$) between gender and dietary zinc. In men, there were no associations between zinc and depressive symptoms. Among women, low intake of dietary and supplemental zinc were strongly associated with depressive symptoms (e.g., dietary zinc quartile 1 vs. 4, odds ratio = 1.96, 95% confidence interval: 1.36-2.82, P -trend = 0.003; supplemental zinc P -trend = 0.02). Among the 381 women with depressive symptoms, a positive association between zinc and CES-D score was apparent only among non-users of AD/AP drugs ($B = 0.49 \pm 0.19$, $P = 0.01$; P -interaction = 0.06). These findings importantly add to evidence from animal and clinical studies on serum zinc and zinc supplementation among clinically depressed patients, by indicating that inadequate dietary zinc intake may contribute to depressive symptoms in the general population of women. This work was supported by the National Institute of Diabetes and Digestive and Kidney Diseases (grants R21DK081844 and DK56842). The content of this work is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Diabetes and Digestive and Kidney Diseases or the National Institutes of Health.

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SEX, STRESSFUL LIFE EVENTS, AND ADULT ONSET DEPRESSION AND ALCOHOL DEPENDENCE: ARE MEN AND WOMEN EQUALLY VULNERABLE? *N Slopen, D R Williams, G Fitzmaurice, and S E Gilman (Harvard School of Public Health, Boston, MA 02115)

Higher rates of major depression (MD) among females, and of alcohol dependence (AD) among males, are among the most routinely reported findings in psychiatric epidemiology. One of the most often pursued explanations for sex differences in both disorders emerges from stress-diathesis theory: that males and females have a differential vulnerability to stressors, which is manifested in sex-specific ways (MD for females, AD for males). However, existing evidence in support of this explanation is mixed. In the present study, we investigated sex differences in the association between stressful life events and MD and AD in a large national sample ($n = 32,744$) using a prospective design. Logistic regression was used to estimate associations between stressful life events and both MD and AD; the stress-diathesis hypothesis was evaluated by testing interaction terms between sex and stressors in the prediction of both outcomes. The number of stressful life events was predictive of first onset MD (OR = 1.14, 95% CI: 1.10, 1.20) and AD (OR = 1.12, 95% CI: 1.06, 1.18). This was true for both males and females, and sex-by-stress interaction terms were not consistent with a stress-diathesis model for higher rates of MD among females and higher rates of AD in males. Our results do not support the hypothesis that sex-specific responses to stressful life events lead to sex differences in first onset of MD and AD among adults; new directions of research that bring together physiological and social aspects of vulnerability in the development of gender differences in MD and AD may be useful.

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SIMILARITIES IN THE EPIDEMIOLOGY OF AUTISM AND OF SCHIZOPHRENIA. *M J Dealberto (Queen's University, Kingston, ON, Canada K7L3N6)

Introduction: Several authors hypothesize that both schizophrenia and autism are associated with a maternal vitamin D deficit. Aim: To examine the epidemiology of autism and that of schizophrenia in regards to the maternal vitamin D hypothesis. Methodology: Review of the literature on prevalence and incidence rates of autism and schizophrenia, and on factors associated with these rates. Results: The epidemiology of autism and that of schizophrenia share many traits, especially a relationship to maternal immigrant status and ethnic origin (1, 2). Other associated factors, such as increasing rates with higher latitudes and excess of winter births, are possibly related to a maternal vitamin D deficit. They are also associated with prenatal and perinatal complications and with maternal stress. Discussion: The epidemiology of autism and that of schizophrenia differ mainly in the association with socio-economic status (SES). Early studies found that autism was associated with higher SES, but later studies did not confirm this. The association between schizophrenia and lower SES is partly due to the consequences of this condition, as its strength is much decreased when considering the parents' SES. Conclusion: As autism and schizophrenia have different susceptibility genes, the marked similarities between the epidemiology of autism and that of schizophrenia point to similar environmental factors. Maternal vitamin D deficiency and maternal stress are possible candidates. References: 1. Dealberto MJ. Prevalence of autism according to maternal immigrant status and ethnic origin. *Acta Psychiatr Scand*, in press; 2. Dealberto MJ. Ethnic origin and increased risk for schizophrenia in immigrants to countries of recent and longstanding immigration. *Acta Psychiatr Scand* 2010;121:325-39

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MIGRATION FROM MEXICO TO THE US AND CONDUCT DISORDER: A CROSS-NATIONAL STUDY. *J Breslau, G Borges, N Saito, D Tancredi, C Benjet, L Hinton, K Kendler, R Kravitz, W Vega, S Auilar-Gaxiola, M Medina-Mora (University of California, Davis, CA)

Twin studies suggest that Conduct Disorder (CD) is under substantial genetic influence, which may be stronger for aggressive than for non-aggressive symptoms. Studies of migrating populations offer an alternative strategy for separating environmental and genetic influences on psychopathology. We examine variation in the prevalence of CD associated with migration from Mexico to the US and whether this variation is similar for aggressive and non-aggressive CD symptoms and symptom profiles. Data come from population surveys of adults conducted in both countries using the same diagnostic instrument. Compared with families of origin of migrants, risk of CD is lower in the general population of Mexico (AOR = 0.54, 95% CI 0.19-1.51), higher in children of Mexican-born immigrants who are raised in the US (AOR = 4.12, 95% CI 1.47-11.52) and higher still in Mexican-American children of US-born parents (AOR = 7.64, 95% CI 3.20-18.27). The association with migration is markedly weaker for aggressive than for non-aggressive symptoms. These data suggest that the prevalence of CD increases dramatically across generations of the Mexican-origin population following migration to the US. This increase is of larger magnitude for non-aggressive than for aggressive symptoms, supporting the suggestion that non-aggressive symptoms are more strongly influenced by environmental factors than aggressive symptoms.

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COGNITIVE IMPAIRMENT AT AGE 7 AMONG SIBLINGS OF INDIVIDUALS WITH LATER PSYCHOTIC DISORDERS. *J Agnew-Blais, S Cherkerzian, J Goldstein, M T Tsuang, L J Seidman, S L Buka. (Dept of Epidemiology Harvard School of Public Health, Boston, MA)

Deficits in cognition among family members of individuals with schizophrenia (Scz) have led researchers to hypothesize an endophenotype characterizing individuals with the disorder and their relatives. However, it is unclear if these deficits are present in 1st degree relatives of individuals with other forms of psychosis, such as affective (Aff) psychoses. We compared cognitive functioning among controls (N = 108), cases with future psychoses (N = 99) and their non-psychotic siblings (N = 74) at age 7, as well as between siblings of individuals with later Scz (N = 41) and later Aff psychoses (N = 33). Full scale IQ was assessed, as well as domains of cognition (verbal ability, academic achievement, working memory/attention and perceptual motor functioning). Non-psychotic siblings (IQ = 96.9) were significantly cognitively impaired compared to controls (IQ = 106.8); in fact, siblings were equally impaired compared to future cases (IQ = 97.0, p value = 0.7). Siblings of those with later Scz (IQ = 95.7) were more impaired than siblings of later Aff psychoses cases (IQ = 99.2), although these differences did not reach statistical significance. That siblings were as impaired as cases was in contrast with other studies, which have found milder deficits among siblings. Siblings of those with later Scz showed more impairment than siblings of cases of Aff psychosis, suggesting that an endophenotype characterized by cognitive impairment may be more relevant for Scz than for psychotic disorders as a whole.

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PREVALENCE OF K2 USE AMONG COLLEGE STUDENTS. X Hu, B A Primack, T Barnett, and *R L Cook (University of Florida, Gainesville, FL, 32603)

Smoking K2 (also known as "spice") is increasingly becoming a popular legal substitution for smoking marijuana and has been linked to adverse health events. However, the actual prevalence of K2 use is not known, and it is not clear whether this product is only being used by other drug users. The primary objectives of this study are (1) to describe the prevalence of K2 use among college students and characteristics of persons who use K2; and (2) to assess associations between K2 and other drug use. Using an online data collection system, we obtained anonymous surveys from students enrolled at the University of Florida in September 2010 (36% response rate). The questionnaire assessed demographic characteristics, smoking history/behavior, marijuana use and K2 use. The average age of the 852 participants was 21 years (SD = 5) and 36% were female. Overall, 35% of participants reported ever smoking marijuana. Eight percent of respondents reported having ever smoked K2, and marijuana use was ubiquitous (91%) among these K2 users. In multivariable logistic regression analyses, greater use of K2 was significantly associated with status as a first-year student (vs. 3rd year or above, Odds Ratio (OR) = 3.7, 95% Confidence Interval (CI) = 1.6-8.5), ever marijuana use (vs. no previous marijuana use, OR = 9.9, 95% CI = 3.4-28.4) and ever hookah use (vs. no prior hookah use, OR = 3.7, 95% CI = 1.6-8.6). Greater K2 use was not significantly associated with gender, race or cigarette smoking. K2 use was common among this sample of college students, especially those just entering college. Most K2 users also smoked other substances. Longitudinal data are needed to determine which smoking product was used first in this younger population.

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DISPARITIES IN THE PREVALENCE OF PSYCHOLOGICAL DISTRESS BY REGION OF BIRTH: RESULTS FROM THE 2000-2008 NATIONAL HEALTH INTERVIEW SURVEY. *F J Dallo, T Snell (Oakland University, Rochester, MI)

Serious psychological distress (SPD) affects 11.3% of the United States population. The purpose of this study is to: 1) Estimate the age and sex-adjusted prevalence of SPD among individuals (> 18 years of age) by region of birth and 2) Examine the association between SPD and region of birth. We use data from 2000-2008 from the National Health Interview Survey (NHIS). The main outcome measure is SPD measured using Kessler and colleagues' K6 scale. The K6 asks how often the participant felt: sad; nervous; restless; hopeless; that everything was an effort; or worthless during the past 30 DAYS. Participants were instructed to choose from the following 5-point Likert scale: 1) ALL of the time; 2) MOST of the time; 3) SOME of the time; 4) A LITTLE of the time; and 5) NONE of the time. Item scores are summed to generate a total symptoms score ranging from 0 to 24. A cut-off > 13 is considered having SPD and can identify DSM-IV disorders. The main independent variable is region of birth. The unweighted sample size was 259,799. The overall prevalence of SPD is 3.0% (\pm 0.05). Immigrants from the Middle East report the highest estimate [5.3% (\pm 1.1)]. The Indian Subcontinent and Asia report the lowest estimates [\sim 1.0% (\pm 0.02)]. In the unadjusted regression model, and compared to non-Hispanic whites, individuals from the Middle East were 1.7 times (95% CI = 1.12, 2.64) more likely to report having SPD. All other immigrant groups were less likely (odds ratio < 1) to report having SPD. When controlling for confounders, the odds ratios were attenuated, but still statistically significant. This is the first study to examine the prevalence of SPD among immigrants. Future studies should include more variables related to acculturation and use of health services. However, the current information is pivotal in understanding the necessity of education and allocation of mental health services for immigrants.

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TREATMENT DELAY AND FIVE YEAR OUTCOMES IN PSYCHOTIC DISORDERS. *R Norman, R Manchanda, D Windell, R Harricharan, S Northcott (University of Western Ontario, London, ON, Canada)

Psychotic disorders are among the most costly forms of mental illness in terms of personal suffering and social and economic costs. There has been much interest the possible benefits of earlier intervention in improving treatment outcomes for such disorders. Past research on the relationship between treatment delay and outcomes for first episode psychosis have primarily focussed on the role of duration of untreated psychotic symptoms (DUP) in predicting symptomatic outcomes up to two years. In the current study we examine the influence of both DUP and the duration of any untreated psychiatric (duration of untreated illness or DUI) on symptoms and functioning at five year follow-up while controlling for other characteristics of early illness. One hundred and thirty-two patients with first episode psychosis and treated in an early intervention program were prospectively followed up for five years. Outcomes assessed included positive and negative symptoms, overall functioning, weeks on disability pension and weeks of full-time competitive employment. While DUP showed a significant correlation with level of positive symptoms at follow-up, this was not independent of premonitory social adjustment. DUI emerged as a more robust independent predictor of negative symptoms, social and occupational functioning and use of a disability pension. Delay between onset of non-specific symptoms and treatment may be a more important influence on long term functioning for first episode patients than DUP. This suggests the possible value of treating such signs and symptoms as early as possible regardless of the effectiveness of such interventions on likelihood or severity of psychotic symptoms.

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COMPARISON OF MULTIPLE ESTIMATES OF DEPRESSION PREVALENCE USING THE PATIENT HEALTH QUESTIONNAIRE-9 AND REPORTED REASON FOR USE OF ANTIDEPRESSANTS: NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY: 2005-2008. *L A Pratt, D J Brody, Q Gu (National Center for Health Statistics/CDC, Hyattsville, MD 20782)

Hypertension is often defined as a high measured blood pressure or use of anti-hypertensive medication. Depression is defined using various instruments, but does not include use of anti-depressant medication. This is because the drug data is not collected, and/or because antidepressants can be used for other illnesses besides depression. The 2005-2008 National Health and Nutrition Examination Survey (NHANES) used the Patient Health Questionnaire-9 (PHQ-9) to measure depression. NHANES collects data on medications used and verbatim reason for use. We examined four possible measures of depression prevalence using reported reason for use of antidepressants: PHQ-9 depression, PHQ-9 depression plus use of antidepressants for depression, plus use for any psychiatric reason, and plus any use of antidepressants. Socio-demographic characteristics of persons with depression by each definition were examined. The prevalence of depression measured by the PHQ-9 alone was 6.8% in persons 18 years and older. The prevalence of depression when use of antidepressants for depression was included was 12.3%, 14.4% when use of antidepressants for any psychiatric reason was included, and 16.3% when use for any reason was included. The prevalence of depression was significantly higher when persons taking antidepressants for depression were included. Prevalence estimates based on using antidepressants for any reason were significantly higher than estimates using antidepressants for depression only. Considering reason for use of antidepressants makes a significant difference when calculating depression prevalence estimates.

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ARE FRENCH AND ENGLISH VERSIONS OF THE PHQ-9 COMPARABLE? AN ASSESSMENT OF DIFFERENTIAL ITEM FUNCTIONING. *E Arthurs, M Hudson, M Barron, B Thombs (McGill University and Jewish General Hospital, Montreal, QC, Canada H3T 1E4)

The Patient Health Questionnaire-9 (PHQ-9) is a commonly used measure of depressive symptoms. It has been translated into 25 languages, including English and French. To combine English and French scores in analyses or compare PHQ-9 scores between English and French respondents, the equivalency of scores across English and French versions of the PHQ-9 must be demonstrated. This is typically done by testing for Differential Item Functioning (DIF), or whether English and French PHQ-9 respondents with similar levels of depressive symptoms respond similarly to PHQ-9 items. Objective: To determine whether PHQ-9 items exhibit DIF versus having equivalent measurement properties among English and French-speaking Canadians with scleroderma. Methods: Patients from the Canadian Scleroderma Research Group Registry completed the PHQ-9. MIMIC models in Mplus were used to identify items displaying possible DIF. Results: A one-factor model fit the PHQ-9 data well (Number of English respondents = 635; Number of French respondents = 204; Comparative Fit Index = 0.98, Tucker Lewis Index = 0.99, Root Mean Square Error of Approximation = 0.07). Statistically significant DIF was identified in one item (anhedonia; $p < 0.001$). However, the magnitude was small, and English-French differences in the latent depression factor were minimal and not statistically significant with adjustment for DIF (English - French = 0.02, 0.18 standard deviation (SD)) or without (English - French = 0.06, 0.18 SD). Conclusions: French and English PHQ-9 scores are on the same measurement scale and can be directly compared.

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DEPRESSIVE SYMPTOMS AND LIMITATIONS IN DAILY ACTIVITIES IN MIDLIFE WOMEN. *J T Bromberger and L L Schott (University of Pittsburgh, Pittsburgh, PA 15213)

Most studies have examined the association between depression and functional limitations among the elderly and in cross-sectional designs. The extent to which this relationship exists over time among midlife women, is independent of menopausal symptoms and is similar across multiple ethnic groups is unknown. Using data from the multi-site Study of Women's Health Across the Nation (SWAN), we examined the association of depressive symptoms and limitations in daily activities (LDA) every 2 years during 7 years of follow up in a community sample of 2423 White, African American, Chinese, and Japanese women aged 46-56. Demographic, health and psychosocial data were collected annually. Depressive symptoms were assessed with the Center for Epidemiologic Studies Depression (CESD) Scale; scores ≥ 16 defined high symptom levels. LDA were assessed with the 10-item subscale of the SF-36 questionnaire. The bottom 25% of the computed score identified significant LDA. Generalized Estimating Equations were used to determine the relationship between CESD ≥ 16 and LDA adjusting for age, ethnicity, education, menopausal status, psychotropic medication use, hot flashes/night sweats, and number of medical conditions. Results showed that a CES-D ≥ 16 was significantly associated with a higher odds of reporting LDA independent of confounders including number of self-reported medical conditions (Odds ratio (OR) = 1.74, 95%CI = 1.49, 2.03). Chinese Americans were more likely than Whites to report LDA, but no other ethnic differences emerged. The inclusion of an interaction between ethnicity and CESD was not significant. These results indicate there is a consistent relationship between depressive symptoms and LDA over time that does not vary by ethnicity.

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PERSISTENCE OF ADHD SYMPTOMS FROM CHILDHOOD THROUGH ADOLESCENCE IN A COMMUNITY SAMPLE OF BOYS AND GIRLS. *J R Holbrook, R E McKeown, S P Cuffe, M Bottai, B Cai (University of South Carolina, Arnold School of Public Health, Columbia, SC)

Attention-Deficit Hyperactivity Disorder (ADHD) is most common in childhood, but symptoms often persist into adolescence. This community-based study examined ADHD symptom persistence and factors associated with elevated symptom counts. Elementary school children in a SC school district were screened with the teacher report Vanderbilt ADHD scale. High scorers and a random sample of remaining children were invited for interviews. Data were collected on ADHD symptom presence via the Diagnostic Interview Schedule for Children. We interviewed 481 parents at baseline (children aged 5-13 years) and invited them to three waves of follow-up, with 352 parents (73%) seen at least once over the next 3-6 years. Descriptive statistics and models were fit using SUDAAN to account for statistical weights and sampling design. A majority of baseline participants had at least one inattentive or hyperactive/impulsive symptom. Inattentive and hyperactive/impulsive symptom counts ≥ 6 (part of ADHD criteria) were present in 10.4% (95% CI: 8.3-13.1) and 24.4% (95% CI: 20.4-28.9) of the sample, respectively. In two waves of follow-up data, mean inattentive symptom count did not change ($t = 0.66$, $p = 0.51$), while mean hyperactive/impulsive symptom count decreased through developmental stages ($t = 4.73$, $p < 0.001$). Impairment domains showed a similar pattern. Adding the third wave of follow-up data will allow marginal models to identify the rate of symptom count decline and changes in impairment domains while adjusting for significant symptom predictors. ADHD symptoms, especially inattentive symptoms, persisted into adolescence. Understanding the rate and pattern of decline in different groups is important for understanding the natural course of ADHD and for treatment planning.

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PARENT-CHILD RELATIONSHIPS IN THE PRESENCE OF BEHAVIORAL DISORDER. *J R Holbrook, L L James, R E McKeown, S P Cuffe, K A Fiegel, J M S Place, H L Ranhofer, R E Horne, K A Storck (University of South Carolina, Arnold School of Public Health, Columbia, SC)

Parents of children with behavioral disorders often find associated symptoms difficult to manage and experience distress. This study examines aspects of parenting related to Attention-Deficit Hyperactivity Disorder (ADHD) or Conduct Disorder/Oppositional Disorder (CD/ODD) and the comorbid condition in relation to parent-reported parental support, involvement, communication, and limit setting. Elementary school children in a SC school district were screened with the teacher report Vanderbilt ADHD scale. High scorers and a random sample of remaining children were invited for interview. Presence of behavioral disorders was determined via Diagnostic Interview Schedule for Children. The Parent Child Relationship Inventory (PCRI) provided scores on the four outcome domains. We interviewed 481 parents (children aged 5-13 years); 441 had complete data. Descriptive statistics and multiple linear regression models were fit using SUDAAN to account for statistical weights and sampling design. ADHD (prevalence 9.3%) and CD/ODD (10.6%) were highly comorbid (15.1% had at least one). Parents of children with behavioral disorder had lower (unfavorable) mean scores than controls in all PCRI domains. Comorbid ADHD and CD/ODD was negatively associated with all PCRI scores (all $\beta < -1.23$, all $p < 0.01$); CD/ODD alone with parental support ($\beta = -3.16$, $p < 0.01$), communication ($\beta = -1.63$, $p = 0.02$), and limit setting ($\beta = -4.60$, $p < 0.001$); and ADHD alone with parental support ($\beta = -1.74$, $p = 0.03$) and limit setting ($\beta = -3.06$, $p < 0.01$). Comorbid ADHD and CD/ODD is consistently associated with challenging parent-child relationships. Findings identify specific aspects that are problematic and may inform programs that target improved parent-child relationships.

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A SYSTEMATIC SEARCH OF ADHERENCE TO SELF-CARE TOOLS IN STUDIES OF SUPPORTED SELF-CARE FOR SYMPTOMS OF DEPRESSION OR ANXIETY. *R Simco J McCusker (McGill University, Montreal, QC, Canada)

There is some evidence for the effectiveness of supported self-care for symptoms of depression and anxiety,[1,2] which are proposed as part of stepped care models for the care of depression and anxiety. [3,4] Though these interventions include a small amount of support, they are considered self-administered, in that the patient is responsible to both read and put into practice the techniques provided in the tools. However, few studies report on adherence to the tools provided. This presentation will present a review of 23 articles that described the adherence to self-care tools for symptoms of depression or anxiety. A systematic search of the literature (EMBASE, MEDLINE, CINAHL, PSYCINFO) found less than half of supported self-care studies reported adherence; while reporting was not standardized, 19 studies reported self-reported or direct observation "percent completion", indicating the percent of participants who read or watched all of the tools offered, ranged from 20% to 93%. Only 7 studies attempted to measure patient characteristics predicting adherence. 1.Bower P, Richards D, Lovell K. The clinical and cost-effectiveness of self-help treatments for anxiety and depressive disorders in primary care: a systematic review. *British Journal of General Practice*. 2001; 51: 838-45. 2.McKendree-Smith NL, Floyd M, Scogin FR. Self-administered treatments for depression: A review. *Journal of Clinical Psychology*. 2003; 59 (3): 275-88. 3.Scogin FR, Hanson A, Welsh D. Self-administered treatment in stepped-care models of depression treatment. *Journal of Clinical Psychology*. 2003; 59(3): 341-9. 4.Cuijpers P, Schuurmans J. Self-help interventions for anxiety disorders: An overview. *Current Psychiatry Reports*. 2007; 9(4): 284-90.

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HOUSING FORECLOSURE ASSOCIATED WITH GREATER SYMPTOMS OF DEPRESSIVE, POST-TRAUMATIC STRESS, AND GENERALIZED ANXIETY DISORDERS IN A REPRESENTATIVE SAMPLE OF URBAN RESIDENTS DURING THE RECENT FINANCIAL CRISIS. *A Nandi, K M Keyes, K A McLaughlin, K C Koenen, M Uddin, A E Aiello, and S Galea (McGill University, Montreal, QC Canada H3J1A7)

Millions of US households have been foreclosed on during the recent economic crisis. Although foreclosures, like other stressful life events, are posited to adversely affect mental health, we are not aware of a single longitudinal study that has examined the relation between foreclosure and mental health problems. We used data from a representative sample of 1054 participants enrolled in the Detroit Neighborhood Health Study (DNHS), assessed at baseline in September 2008-April 2009 and followed-up one year later, to assess the relation between foreclosure and symptoms of depressive, post-traumatic stress, and generalized anxiety disorders. 25 (2.4%) respondents reported a foreclosure in their household between baseline and follow-up. At follow-up, the mean number of symptoms of depression [mean = 2.5, standard error (SE) = 2.5 for foreclosed; mean = 1.1, SE = 1.8 for non-foreclosed], post-traumatic stress disorder (PTSD) (mean = 39.7, SE = 21.6 for foreclosed; mean = 30.4, SE = 13.8 fore non-foreclosed), and generalized anxiety disorder (GAD) (mean = 6.2, SE = 6.0 for foreclosed; mean = 2.8, SE = 4.7 for non-foreclosed) were greater among the foreclosed relative to the non-foreclosed. In multivariable linear regression models, exposure to foreclosure was positively associated with the mean number of symptoms of depression [Beta = 1.2, 95% confidence interval = 0.1, 2.2] after accounting for socio-demographic characteristics (i.e., age, sex, marital status, race, education, income, employment status), past-year exposure to stressors, and lifetime history of psychiatric disorders. A foreclosure is a protracted process encompassing a chain of events, from delinquency to the loss of a home, that may be differentially associated with health. Further work should identify the characteristics of the foreclosure process that are adversely associated with mental health, as well as the mechanisms that link them.

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ALBERTA PHYSICAL ACTIVITY AND BREAST CANCER PREVENTION TRIAL: INFLAMMATORY MARKER CHANGES IN A YEAR-LONG EXERCISE INTERVENTION AMONG POSTMENOPAUSAL WOMEN. *C M Friedenreich, H K Neilson, C G Woolcott, Q Wang, F Z Stanczyk, A McTiernan, C A Jones, M L Irwin, Y Yasui, K S Courneya (Alberta Health Services, Calgary, AB, Canada T2N 4N2)

Chronic, low-grade inflammation is a hypothesized biologic mechanism that could explain how physical activity influences breast cancer risk. We conducted a two-centered, two-armed randomized controlled exercise intervention trial in 320 postmenopausal, inactive women living in Calgary or Edmonton, Canada. They were randomized to an exercise intervention (n = 160) or a control group (n = 160). The intervention group was prescribed 45-min aerobic exercise sessions 5x/wk for 12 months; the control group maintained their usual activity level. No change in diet was made for either group. Fasting blood samples were collected at baseline, 6- and 12-months. Direct chemiluminescent immunoassays were conducted to measure high sensitivity C-reactive protein (hsCRP) and enzyme-linked immunosorbent assays were used to measure interleukin-6 (IL-6) and tumour necrosis factor-alpha (TNF- α). Intention-to-treat analyses were done using linear mixed model methods. Statistically significant differences in hsCRP were observed between baseline and 12-months for exercisers vs controls (treatment effect ratio = 0.87, 95% Confidence Interval = 0.79-0.96, p-value = 0.005) but not for IL-6 or TNF- α . A statistically significant trend (p = 0.02) in hsCRP with increasing adherence to the exercise intervention and a greater effect on the intervention on women obese at baseline (body mass index (kg/m²) ≥ 30) (p = 0.06). This trial found that a moderate-to-vigorous intensity exercise can result in statistically significant decreases in some inflammatory markers hypothesized to be related to breast cancer risk.

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LIFECOURSE PREDICTORS OF ADULT BREAST TISSUE DENSITY: THE NEWCASTLE THOUSAND FAMILIES STUDY. *M S Pearce, P W G Tennant, T Pollard, L McLean, B Kaye, L Parker (Newcastle and Durham Universities, Newcastle, UK)

Dense breast tissue patterns are a strong predictor of breast cancer risk. A range of factors at different stages of life have been linked to breast cancer risk, although rarely studied simultaneously. We aimed to study whether birth weight and factors later in life were associated with breast tissue density (BTD) in the Newcastle Thousand Families cohort, which originally consisted of all 1142 babies born in May and June 1947 to mothers resident in Newcastle upon Tyne in Northern England. At age 50, 574 study members completed a questionnaire. 199 of the 307 surviving women who returned these returned a further questionnaire asking for details of routine mammographic screening and for details of their reproductive and contraceptive history. BTD patterns were coded into Wolfe categories (lowest, low, high and highest risks). This was analysed, by ordinal logistic regression, in relation to a range of variables at different stages of life. Increased standardised birth weight [adjusted odds ratio, aOR = 1.42 (95% CI: 1.08 to 1.87), $p = 0.01$] and not having entered menopause [aOR, compared to peri-menopausal women = 3.99 (95% CI: 1.78 to 8.97), $p = 0.001$] were both significant independent predictors of being in a higher BTD group. In contrast, increasing body mass index was independently predictive of being in a lower BTD group [aOR = 0.85 (95% CI 0.80 to 0.91), $p < 0.001$]. After adjustment for factors acting throughout life, we identified a significant association between increased birth weight, standardised for sex and gestational age, and increased BTD in adulthood. This is consistent with previous research suggesting that heavier babies have an increased risk of breast cancer in later life.

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ALCOHOL CONSUMPTION AND SURVIVAL AFTER BREAST CANCER. *P A Newcomb, E Kampman, A Trentham-Dietz, M N Passarelli, K M Egan, L Titus-Ernstoff, J M Hampton, W C Willett (University of Wisconsin Carbone Cancer Center, Madison, WI 53705)

Alcohol intake is consistently associated with increased risk of breast cancer (BC). In contrast, some studies have suggested improved BC survival in women who consumed moderate levels of alcohol prior to diagnosis. We assessed the association between pre- and post-diagnostic alcohol intake and BC survival in a prospective cohort of 19,967 women with incident invasive BC. These women, aged 20-79 years, were residents of Wisconsin, Massachusetts, or New Hampshire, and enrolled as cases in consecutive case-control studies from 1988-2006. All women reported on pre-diagnostic intake and a sub-sample of 5,669 reported on post-diagnostic intake. Women were followed-up for vital status through December 31, 2007. During an average 11.2 years of follow up, 2,992 deaths from BC occurred. Proportional hazards regression was used to estimate adjusted hazard ratios (HR) and 95% confidence intervals (CI). BC-specific survival was greater among women who consumed alcohol pre-diagnostically compared to non-users (HR (CI) = 0.85 (0.75-0.97) for 3-6 d/wk, 0.85 (0.72-1.00) for 7-9 d/wk and 0.87 (0.74-1.01) for ≥ 10 d/wk; P-trend = 0.01). Reductions varied somewhat by type of beverage. This inverse association was limited to women with ductal BC (P-trend = 0.003), and was not apparent among those diagnosed with lobular tumors. Adjusting for pre-diagnostic alcohol intake, post-diagnostic alcohol consumption was also associated with improved survival from BC (P-trend = 0.04), as well as death from any cause (P trend < 0.001). Although consumption of alcohol increases BC risk, use of alcohol before or after diagnosis was associated with reduced risk of death from BC in this population-based study.

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RELATIONSHIP OF PERI-LESIONAL MAMMOGRAPHIC DENSITY TO PATHOLOGIC DIAGNOSIS. *G Gierach, J Johnson, B Geller, P Vacek, D Weaver, R Chicoine, J Shepherd, J Wang, S Herschorn, L Brinton and M Sherman (National Cancer Institute, Bethesda, MD 20852)

Mammographic density (MD), which reflects the fibroglandular tissue content of the breast, is an established breast cancer risk factor. MD has typically been rated visually in broad categories or quantified as a percentage of the total breast area by computer-assisted technologies. These methods ignore spatial distribution of MD and breast thickness. We used a novel volumetric method to assess whether MD surrounding a suspicious lesion detected on mammography and/or sonography was related to pathologic diagnosis in a cross-sectional study of 465 women, ages 40-65, who were clinically referred during 2007-2010 for an image-guided breast biopsy at the University of Vermont Breast Cancer Surveillance Consortium site. Peri-lesional and overall volumetric MD were assessed in craniocaudal views of pre-biopsy digital mammograms using single x-ray absorptiometry. Preliminary analyses of 308 women demonstrated that mean peri-lesional MD was 5.6% (95% confidence interval: 4.2-7.1%) higher than overall MD. In multivariate analysis of covariance models adjusted for age and body mass index, which are strongly and inversely related to MD, we found that the mean difference between peri-lesional and overall MD was 8.5% (95% CI: 4.8-12.3%) among the 49 women with incident breast cancer versus 5.1% (95% CI: 3.4-6.7%; $p = 0.10$) among the 259 women with benign diagnoses. We suggest that large differences between peri-lesional and total volumetric MD may be associated with breast cancer. We are expanding the analysis to assess whether peri-lesional MD is a useful predictor of underlying pathology.

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CARDIOVASCULAR DISEASE SCREENING AMONG WOMEN WITH HISTORIES OF GESTATIONAL HYPERTENSION. *C R Robbins, P M Dietz, J Bombard, A L Valderrama (Centers for Disease Control and Prevention, Atlanta, GA 30341)

The association between hypertension during pregnancy (gestational-hypertension) and subsequent cardiovascular disease (CVD) is well established, but CVD screening practices among women with such histories is unknown. We used 2008 National Health Interview Survey data to estimate prevalence and adjusted odds ratios for recommended blood pressure screening within the past 2 years and cholesterol screening within the past 5 years by hypertension history among 11,970 women ≥ 20 years. We also examined health indicators (diabetes and CVD) and modifiable risk factors (smoking, obesity, physical inactivity) assessing differences in the distributions by hypertension history with Pearson chi square tests. Diabetes prevalence rates were patterned by hypertension history: 3% (95% confidence interval [CI] 3.0-4.0) with no hypertension, 13% (95% CI 8.6-17.8) with gestational-hypertension-only and 21% (95% CI 19.1-22.5) with other-hypertension ($p < .05$). Women with history of hypertension (gestational- or other-) had greater prevalence of obesity and physical inactivity than women with no hypertension ($p < .05$). Women with gestational-hypertension-only were no more likely to get recommended CVD screening than those with no hypertension, but women with history of other-hypertension had 2.5 greater odds of having their blood pressure checked (95% CI 1.8-3.4) and 2.4 greater odds of having their blood cholesterol checked (95% CI 2.0-3.0), controlling for potential confounders. Cholesterol screening rates in particular suggested missed opportunities: 72% of women with no hypertension (95% CI 70.4-73.2) and 75% (95% CI 68.5-81.1) with history of gestational-hypertension received recommended cholesterol screening, compared to 93% (95% CI 91.7-93.9) of women with history of other-hypertension ($p < .05$). CVD risk factors should be addressed with all women, but especially with those with history of any hypertension.

THE ASSOCIATION OF BLOOD PRESSURE AND MORTALITY DIFFERS BY FUNCTIONAL STATUS IN OLDER LATINOS. *M C Odden, J Neuhaus, K E Covinsky, M Haan, (University of California, San Francisco, CA 94143)

The relationship between blood pressure and mortality changes with age. We hypothesize that the association of blood pressure and mortality is modified by functional status in older adults. Study participants were 1,497/1,789 adults aged 60-101, from the Sacramento Area Latino Study on Aging. Functional status was measured by walking speed, and blood pressure was measured by automatic sphygmomanometer. There were 547 deaths from 1998 - 2009, and 46% were cardiovascular (CVD) (ICD10: I20-25, I50, I63, I64). Mean blood pressure levels varied across fast, medium, and slow-walkers: 136, 139, and, 140 mmHg (systolic), $p = 0.02$, and 75, 76, and 77 mmHg (diastolic), $p = 0.08$, respectively. After adjustment for potential confounders, higher systolic blood pressure was associated with increased mortality in fast walkers: hazard ratio (HR): 1.29 per 10 mmHg higher blood pressure (95% confidence interval: 1.07, 1.55), but not in medium: 1.00 (0.93, 1.08), or slow walkers: 0.94 (0.87, 1.01). We found similar results for CVD mortality; the adjusted HR was 1.31 (0.97, 1.76), 1.15 (1.02, 1.29), and 0.94 (0.84, 1.05) in fast, medium, and slow walkers, respectively. Higher diastolic blood pressure was associated with lower CVD mortality only in slow walkers; adjusted HR of 1.03 (0.51, 2.09), 1.03 (0.83, 1.28), and 0.75 (0.60, 0.93). The associations were similar when we excluded deaths in the first year of follow-up, and when we included antihypertensive use in the models. In high functioning older adults, elevated systolic blood pressure is a risk factor for CVD and all-cause mortality. In low-functioning adults, higher diastolic blood appears to be associated with lower mortality and may be a marker for physiologic vigor.

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THE ASSOCIATION OF SOCIAL STRAIN AND C-REACTIVE PROTEIN AMONG PREGNANT AFRICAN AMERICAN WOMEN. *D Johnson, R Peters, A Cassidy-Bushrow (Henry Ford Hospital, Detroit, MI 48202)

Background: Chronic stress may lead to a dysfunctional inflammatory response. Increased C-reactive protein (CRP), a marker of systemic inflammation, is associated with prematurity and psychosocial stress during pregnancy. Residents in disadvantaged neighborhoods with decreased socioeconomic status (SES) and higher social strain experience more chronic stress. African Americans (AA) have more inflammation than other racial groups. The relationship between social strain and inflammation in pregnant women is unknown. Our purpose was to determine the association between social strain and CRP among pregnant AA women. Methods: February 2009-June 2010, 203 AA women in the 2nd trimester of pregnancy enrolled. Social strain was measured using: MacArthur Scale of Subjective Social Status (SSS) (self-reported) and the Messer Index of Neighborhood Deprivation (ND) (census-level). CRP was measured using standard methods. Linear regression models were fit to estimate the association of social strain measures with log-transformed CRP. Results: Participants were young (26.2 ± 6.0 years), mostly high school graduates (84%), predominantly low-income (Median = \$31,781) and obese (mean pre-pregnancy body mass index (BMI) = $30.1 \pm SD$ kg/m²). Mean CRP was 4.4 ± 3.1 . ND scores ranged from -1.1 to 3.3, suggesting relatively deprived neighborhoods. The mean SSS score was 5.4 ± 2.0 suggesting equal social status to their community. Neither ND nor SSS was associated with CRP ($p = 0.686$ and $p = 0.778$) after adjusting for age, education, income, and pre-pregnancy BMI. Women with higher pre-pregnancy BMI were more likely to have higher CRP levels ($p < 0.0001$). Conclusions: In our sample we detected CRP levels consistent with moderate cardiovascular disease risk. As expected, BMI was associated with increased inflammation. We did not detect an association between social strain and inflammation however suggesting additional work needed examining other social status constructs and biomarkers of inflammation.

* = Presenter; S = The work was completed while the presenter was a student

FOOD GROUP AND NUTRIENT DIETARY INTAKES BY HISPANIC SUBGROUPS AMONG THE HCHS/SOL PARTICIPANTS. *A M Siega-Riz, D Sotres-Alvarez, G X Ayala, M Ginsberg, J H Himes, K Liu, C M Loria, Y Mossavar-Rahmani, C L Rock, B Rodriguez, G Shor-Posner, L Van Horn (University of North Carolina, Chapel Hill, NC 27599)

Hispanic HANES, conducted in the 1980s, yielded extensive data on the lifestyle behaviors of Hispanic subgroups and their association with health outcomes. The Hispanic Community Health Study/Study of Latinos (HCHS/SOL) currently underway is a cohort study recruiting participants 18-74 yrs of age from 4 cities (Miami, Bronx, Chicago, and San Diego) with a goal of 16,000 participants. In this study we estimate the distribution of usual intakes (both food groups and nutrients) using a recent advancement in statistical methodology for estimation that accounts for the correlation between probability of intake and quantity of intake. This analysis describes results from 2168 participants who have provided 2 24-hr dietary recalls and completed a food propensity questionnaire adapted specifically for this population. The analyses adjusted for age and gender. Overall, Cubans ($n = 225$) had higher intakes of total energy, macronutrients, folate and iron compared to the other subgroups. Dominicans ($n = 135$) had lower intakes of total energy, fat, and calcium. Puerto Ricans ($n = 432$) had lower intakes of carbohydrates, protein, folate, iron, vitamin A and fiber. Mexican Americans ($n = 952$) had higher intakes of fiber and vitamin C. Food group data reflect nutrient intake with Cubans having higher intakes of refined grains, vegetables, red meat, oils and fats and Dominicans having higher intakes of fruits and poultry while Puerto Ricans had lower intakes of fruits and vegetables. Central/South Americans ($n = 424$) are characterized by a higher intake of sweetened beverages compared to other subgroups. These variations in diet may help explain diet-related differences in health outcomes observed among Hispanics/Latinos.

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THE PARADOX OF HYPERTENSION CONTROL IN WOMEN AND MEN: FINDINGS FROM THE CANADIAN HEALTH MEASURES SURVEY. *K Wilkins (Statistics Canada, Health Analysis Division, Ottawa, ON, Canada)

Consistent with observations elsewhere, Canadian survey findings indicate that awareness of hypertension (HPT) is significantly more common in women (86%) than in men (80%), but pharmaceutical treatment of the condition is less successful in women. In a preliminary investigation of the difference in treatment outcomes between the sexes, patterns in anti-hypertensive use were analyzed for adults with HPT (measured systolic blood pressure (BP) ≥ 140 mm Hg or diastolic BP ≥ 90 mm Hg, or self-reported recent medication use for high BP). Data were from the 2007-2009 Canadian Health Measures Survey, which involved a household interview and physical measures. The data were weighted to be representative of the Canadian population, and analyzed using SAS and SUDAAN. Anti-hypertensives used were grouped into four therapeutic categories: thiazides, beta-blockers, angiotensin-converting enzyme (ACE) inhibitors, and calcium channel blockers. In persons using any anti-hypertensive drug, uncontrolled HPT was nearly twice as frequent in women (21%) as in men (11%). Thiazide use (alone or in combination with other medications) was significantly more common in women (42%) than in men (27%). Men were more likely to be taking beta-blockers (34%) than were women (23%). Differences in the use of calcium channel blockers or ACE inhibitors were not statistically significant. A higher percentage of males (50%) than females (44%) reported using more than one anti-hypertensive drug. In such persons, the percentage of uncontrolled BP was significantly higher in women (26%) than in men (11%). Differences observed between the sexes in therapeutic management of HPT should be further studied for their possible association with differences in clinical outcomes.

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PARENTAL OCCUPATIONAL EXPOSURE TO PESTICIDES AND CHILDHOOD BRAIN TUMOR RISK. *E van Wijngaarden, S Mlynarek, K Thevenet-Morrison, G R Bunin (University of Rochester, Rochester, NY 14642)

Epidemiologic studies have shown suggestive associations of childhood brain tumors in relation to parental farm residence, pesticide use, and contact with farm animals. We examined the risk of childhood brain cancer in relation to parental exposure to classes of pesticides among 318 children diagnosed with medulloblastoma/primitive neuroectodermal tumors (MB/PNET) before 6 years of age in the United States and Canada between 1991 and 1997. Controls were selected by random digit dialing and were individually matched to cases by race, age, and geographic area. 2,048 jobs in the fathers' work history and 463 jobs held by mothers during pregnancy were assigned a probability and intensity of exposure to insecticides, herbicides, and fungicides by two expert raters. In addition, jobs were assigned exposure (any vs. none) to animal manure, farm animals, pigs and hogs, poultry, pets, and raw meat. Finally, 16 specific job tasks (e.g., welding and painting) were identified based on participants' responses in job-specific modules. None of the specific pesticide classes were associated with elevated MB/PNET risk, with odds ratios (OR) around the null. ORs differed little between expert raters. Similarly, there were no excess risks in relation to exposures to animals or animal products. Finally, ORs were elevated for three job tasks (working with plastics and sandblasting among fathers, and working with X-rays for mothers) but they were based on very small numbers and not statistically significant. Overall, our data do not support a role of parental exposure to pesticides, animals or animal products, or specific job tasks in the etiology of childhood MB/PNET.

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ARE CHILDREN WITH BIRTH DEFECTS AT GREATER RISK OF DEVELOPING CHILDHOOD CANCERS? *S E Carozza, P H Langlois, and E A Miller (Oregon State University, Corvallis, OR 97331)

Background: Presence of birth defects may influence risk of childhood cancer development through shared genetic and/or environmental factors, through changes in organ structure or function, or through lifestyle adaptations related to the malformation. Methods: We conducted a retrospective cohort record-linkage study which included Texas children born between 1996 and 2005, with exposed subjects (i.e. with birth defects) identified through the Texas Birth Defects Registry and non-exposed subjects identified through birth certificate data linkage. Using probabilistic record linkage with Texas Cancer Registry data, we identified which children in the cohort developed cancer. Over 3 million records were included in the study; 115,686 subjects had one or more birth defects and 2,351 total cancer cases were identified. Incidence risk ratios (IRR) and 95% confidence intervals (CI) were calculated to evaluate risk. Results: Overall, children with a birth defect had a 3-fold increased risk of developing cancer during childhood (IRR = 3.05, 95% CI:2.65,3.50). By childhood cancer group, germ cell tumors (IRR = 5.19, 95% CI:2.67, 9.41), retinoblastomas (IRR = 2.34, 95% CI:1.21, 4.16) and soft-tissue sarcomas (IRR = 2.12, 95% CI:1.09, 3.79) had the highest risk estimates. All birth defect groups except for gastrointestinal and musculoskeletal had a 2- to 3-fold (or greater) increased cancer risk. Risk was also greater among infants under age 1 and for children with multiple birth defects. Conclusions: These results point to a strong relationship between birth defects and development of cancer in childhood. Untangling this relationship could lead to a better understanding of the genetic and environmental factors which affect both conditions.

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EARLY-LIFE EXPOSURE TO DIAGNOSTIC RADIATION AND ULTRASOUND SCANS AND RISK OF CHILDHOOD CANCER: A CASE-CONTROL STUDY. *P Rajaraman, J Simpson, G Neta, A Berrington de Gonzalez, P Ansell, E Ron, E Roman. (Division of Cancer Epidemiology and Genetics, National Cancer Institute, NIH, DHHS, Bethesda, MD)

Exposure to diagnostic radiographic examinations in utero has been associated with increased risk of childhood cancer, but the relationship is less clear for post-natal diagnostic radiation exposure. Results of existing studies are mostly based on data from parent interviews, which may be prone to misclassification. Using data abstracted from medical records, we examine childhood cancer risks associated with in utero and early infant (age 0-100 days) exposure to diagnostic radiation and ultrasound scans in 2,690 childhood cancer cases and 4,858 age-, sex- and region- matched controls from the United Kingdom Childhood Cancer Study (UKCCS). Results from logistic regression models conditioned on matching factors, and adjusting for maternal age and child birth weight indicated no evidence of increased risk of childhood cancer with exposure to in utero ultrasound scans. There was some indication of a slight elevated risk following in utero exposure to x-rays for all cancers (OR = 1.14, 95% CI: 0.90 to 1.45) and leukemia (OR = 1.36, 95% CI: 0.91 to 2.02), but this was not statistically significant. Exposure to diagnostic x-rays in early infancy (0-100 days) was associated with small, non-significant excess risks for all cancers and leukemia as well as a statistically significant increased risk of lymphoma (OR = 5.14, 95% CI: 1.27 to 20.78) based on small numbers.

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A SIBLING-AUGMENTED CASE-ONLY DESIGN FOR ASSESSING MULTIPLICATIVE GENE-ENVIRONMENT INTERACTION. *C R Weinberg, M Shi, D M Umbach (National Institute of Environmental Health Sciences, Research Triangle Park, NC)

Complex diseases arise through joint actions of environmental factors and genetic susceptibility variants. Family-based designs protect analyses of genetic effects from bias due to population stratification. Investigators have assumed that this robustness extends to assessments of interaction. Unfortunately, this assumption is not true for the common scenario where the genetic variant under study is related to risk through linkage with a causative allele. Lack of robustness also plagues other methods used for GxE interaction. When testing against a multiplicative joint effects model, the case-only design offers good power but is invalid if genotype and exposure are correlated in the source population. Four mechanisms can produce genotype-exposure dependence: 1. Subpopulations vary in both ancestry and cultural traditions; 2. Family history of disease causes people to avoid exposures perceived as risky; 3. Genotype influences propensity for exposure; or 4. Selective attrition produces correlation in older age strata. We propose a sibling-augmented case-only design, which is robust against the first two mechanisms and is therefore valid for study of a young-onset disease when genotype does not influence exposure. Our proposed design ascertains genotype and a dichotomous exposure on cases and exposure for one or more siblings selected randomly from the case's unaffected siblings. A logistic model permits testing of the exposure main effect and GxE interaction. We study likelihood-based testing and estimation for this design in comparison to competitors and we relate the approach to previously proposed robust analyses of interaction based on tetrads or on disease-discordant sib-pairs.

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TWO-PHASE SAMPLING FOR CORRELATED RESPONSES. *M McIsaac and R Cook (University of Waterloo, Waterloo, ON, Canada)

Studies involving two-phase sampling schemes have seen widespread use in epidemiology. Much of this work, however, has been restricted to the case of responses which are independently distributed given covariates. The purpose of this talk is to describe a biomarker study in rheumatology in which interest was in assessing the effect of biomarkers on the rate of progression of joint damage in psoriatic arthritis. The response of interest was joint damage score for each of three locations of the spine, making a clustered response. The damage status and auxiliary covariates were available at phase one of this study for patients in a clinic cohort. The biomarkers were expensive to assess but stored sera could be used for their evaluation. It is, therefore, beneficial to determine how to optimally select sera for biomarker assessment given the available phase-one data. Maximum likelihood and estimating function approaches are considered for analysis, and for each approach the optimal strategies for sampling were derived. The precision of the estimators resulting from these optimal two-phase sampling strategies are compared those resulting from simple random sampling and a balanced sampling design.

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METHODS FOR ANALYZING SPARSE DATA IN GENETIC EPIDEMIOLOGIC STUDIES: AGNOSTIC AND HIERARCHICAL MODELING. *J S Witte, T J Hoffmann, N Cardin (University of California, San Francisco, CA 94158)

Epidemiologic studies are increasingly incorporating genetic measures as potential risk factors. Such studies have rapidly expanded from focused candidate gene efforts to genome-wide association studies to sequencing projects. This growth has paralleled our burgeoning understanding of the human genome and the rapid development of new genomic technologies. These studies, however, can generate sparse data: genetic variants that are rarely observed. How to appropriately analyze these data remains unclear; this issue is similar to that faced by any epidemiologic study of uncommon exposures. One solution is to simply combine the genetic variants together based on existing information such as their functionality—and analyze them as a single group. But this requires one to make some assumptions about what to aggregate. Instead, we propose three approaches to most efficiently group rare variants. First, using multiple possible groupings based on existing information such as whether a variant changes a protein. Second, applying a hierarchical model where a prior distribution is placed on the genetic variants' potential associations to compromise between treating them singularly versus collapsing them together. The third is an agnostic step-up approach that determines an optimal grouping of rare variants analytically. We evaluated these approaches by simulation, and found that using prior information to group rare variants works well when there is reasonable existing information while the step-up approach works well across a broad range of plausible scenarios. These findings provide guidance for the legion of epidemiologists who are adding genetic information into their ongoing and new studies.

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GENE BY ENVIRONMENT INTERACTION: BEST STRATEGIES. *I Hertz-Picciotto (University of California, Davis, CA)

A persuasive argument for studying geneXenvironment interactions is an enhanced power to identify associations of a health outcome with both the gene and the environmental exposure, as compared with separate studies examining marginal effects for each factor separately. It is, however, widely assumed that pursuit of interactions should be limited to exposures and/or genes that show an overall (marginal) effect in a population. The wisdom in each of these contradictory perspectives hinges on the state of nature, namely, the degree to which underlying interactions actually occur even when marginal associations are unremarkable. While it is difficult to surmise the frequency of such situations, conditions that produce them can be defined. Key factors are: (i) prevalence of gene; (ii) prevalence of exposure; (iii) association between gene and exposure; (iv) independent effect of gene (absent the exposure); (v) independent effect of exposure (absent the high risk polymorphism); and (vi) magnitude of the synergistic effect from joint presence. This presentation demonstrates results of a simulation study demarcating the range of conditions most likely to lead to the scenario of small marginal effects, but substantial increased risk conferred by joint exposure. Several examples from autism research will provide context. A quantitative understanding of how these scenarios arise can be used to assess plausibility and hence best strategies. If these occurrences are rare, then an optimal approach could begin with separate searches for high-risk genes and environmental factors. If common, then GxE interactions would optimally be evaluated early on, for public health purposes, since modification of diet, lifestyle, and toxic exposures is likely to remain more feasible than modification of the genome for the foreseeable future.

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DOSE-RESPONSE ANALYSIS IN EPIDEMIOLOGY FOR COVARIATES WITH SPIKE AT ZERO. *H Becher, E Lorenz, P Royston, W Sauerbrei (University of Heidelberg, Heidelberg, Germany)

A common goal for a quantitative variable X is to assess the dose-response relationship. Often, these have a non-standard distribution. A common situation is that a proportion of individuals have exposure zero, and the others have some continuous distribution. We call this a "spike at zero". Typical examples include occupational exposures or tobacco consumption. A common procedure is to classify exposure into several groups with the unexposed as the baseline category. However, categorization results in biologically implausible step functions and raises the issue of the number of cutpoints and where to place them. Fractional polynomials (FP) have shown to be useful for assessing dose-response relationships. Recently, we have suggested a method based on FPs to deal with the above situation (Royston, Sauerbrei, Becher, 2010). A binary variable for the unexposed fraction is added to an FP model and a two-stage procedure is used to assess whether the binary variable or the FP part is required to fit the data. The FP procedure generally requires to add a constant c to X to ensure positivity of all observations in order to allow all transformations as required in the procedure, for example the log or the inverse function. Here, we modify the procedure such that adding an arbitrary constant is no longer required. We present the properties of this procedure theoretically and show that under realistic situations, the inclusion of a binary variable XE denoting the binary exposure status (yes-no) plus a specific function of the continuous part of the variable yields the correct dose-response curve. For example, if the continuous part is log-normal distributed, the log-transformed variable must be included into the model. Finally, we illustrate the procedure and with data from two case-control studies on lung and laryngeal cancer and compare the results both of the previously suggested and the new modified procedure.

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LUNG CANCER RISK IN PAINTERS: RESULTS FROM THE SYNERGY POOLED ANALYSIS. *N Guha, A Olsson, V Benhaim-Luzon, Kurt Straif on behalf of the SYNERGY study group(IARC, Lyon, France 69008)

The International Agency for Research on Cancer classified “occupational exposure as a painter” as carcinogenic to humans based on increased risks of cancers of the lung, bladder, and mesothelioma. Identifying the specific agent(s) contributing to the elevated risk of lung cancer has been difficult since painters are exposed to a mixture of known and suspected carcinogens, though these agents may be inferred through analyses by painter type. Data from the SYNERGY study, a pooled effort of 11 case-control studies in European countries and Canada, were used to evaluate the risk of lung cancer associated with ever working as a painter, duration of employment, and type of painter (classified according to ISCO and ISIC codes). Detailed individual data on smoking for 13389 lung cancer cases (462 painters) and 16384 age- and sex-matched controls (383 painters) were available. Multivariable logistic regression models were adjusted for age, gender, centre, tobacco pack-years, time since smoking cessation and lifetime occupational exposures to asbestos, crystalline silica, polycyclic aromatic hydrocarbons, chromium and nickel as assessed by a job-exposure matrix. An odds ratio of 1.18 (95% CI, 1.00-1.39) was associated with ever working as painter and the risk of lung cancer increased with increasing years of employment (p-value for trend = 0.02). Ever spray and repair painters experienced the highest lung cancer risk among all painters. Exposure-response trends were present for construction and repair painters. Results were similar by histological type and when restricted to never smokers. These results corroborate the evidence of an increased risk of lung cancer among painters and results by type of painter may help in identifying causative agents.

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MORTALITY EXPERIENCE OF WORKERS EMPLOYED AT A SPECIALTY-CHEMICALS RESEARCH FACILITY. *L L F Scott, J H Mandel, G Ramachandran, Y C Chen, B H Alexander (University of Minnesota School of Public Health, Division of Environmental Health Sciences, Minneapolis, MN)

To evaluate a potential excess of brain cancer in employees of a specialty-chemicals research and development facility, we conducted a retrospective mortality study on a cohort of 5,284 workers employed from 1963 to 2007. A nested case-control study was conducted to evaluate brain cancer risk associated with specific job and chemical exposures. Chemicals of interest were incorporated into the assessment on the basis of their ability to penetrate the blood-brain barrier, their carcinogenic capabilities, and/or their uniqueness to the facility. Five chemicals were ultimately selected including acrylates, bis(chloromethyl) ether, chloromethyl ether, isothiazolones, and nitrosoamines. Standardized mortality ratios (SMRs) and ninety-five percent confidence intervals (CIs) were estimated in reference to Pennsylvania rates. Conditional logistic regression models estimated risk with regard to each chemical exposure. A total of 486 deaths, including 14 brain cancer deaths were observed; all brain cancer cases were male. All-cause mortality was lower than expected (SMR = 0.51, 95% CI = 0.47-0.56); however, brain cancer mortality was elevated (SMR = 2.02, 95% CI = 1.11-3.40). With respect to work history and specific chemical exposures, there was no discernible pattern that could explain the brain cancer cases. Although an excess of brain cancer deaths among male employees of this facility was observed, no clear occupational etiology was identified.

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OCCUPATIONAL EXPOSURE TO ENDOCRINE DISRUPTING CHEMICALS AND THE RISK OF TESTICULAR CANCER. S de Wit, R Bretveld, L Wijers, C van Veldhoven, M van Tongeren, M van Gelder, and *N Roeleveld (Department of Epidemiology, Biostatistics and HTA, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands)

The worldwide incidence of testicular cancer (TC) doubled over the past 50 years and endocrine disrupting chemicals (EDCs) are thought to play a role in this increase. The objective of this case-referent study was to assess the effects of occupational exposure to EDCs on the development of testicular cancer (TC). TC cases were approached through the Comprehensive Cancer Centre East (IKO) in the Netherlands, while referents were men whose female partner delivered a child in the Radboud University Nijmegen Medical Centre. Cases and referents were asked to fill out a questionnaire to assess current and past exposure, including job history. A Job Exposure Matrix (JEM) was used to determine occupational exposure to ten different groups of EDCs. A total of 261 cases and 670 referents completed the questionnaire of which 63.2% experienced occupational exposure to EDCs. Adjusted odds ratios (ORs) with 95% confidence intervals (CIs) were increased for the JEM summary score (OR = 1.4, 95%CI 1.0-2.1) and for 7 of the 10 EDC groups: polycyclic aromatic hydrocarbons (OR = 1.5, 95%CI 0.8-2.6), polychlorinated organic compounds (OR = 3.3, 95%CI 1.3-8.3), pesticides (OR = 1.7, 95%CI 1.0-2.7), phthalates (OR = 1.5, 95%CI 1.0-2.4), organic solvents (OR = 1.4, 95%CI 0.8-2.5), alkylphenolic compounds (OR = 1.6, 95%CI 1.0-2.5), and metals (OR = 1.4, 95%CI 1.0-2.1). There seems to be an association between testicular cancer and occupational exposure to certain groups of endocrine disrupting chemicals, mainly occurring among farmers, carpenters, and electricians, but most risk estimates are small to moderate.

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RACISM AND ADVERSE BIRTH OUTCOMES AMONG ROMA IN THE WESTERN BALKANS: USING QUALITATIVE DATA TO DEVELOP A CONCEPTUAL FRAMEWORK OF CAUSATION. *T Janevic, P Sripad, E Bradley (Yale University, New Haven, CT 06520)

Roma are the largest minority group in Europe and experience widespread racism and health disadvantage. Using qualitative data from Serbia and Macedonia, we developed a conceptual framework hypothesizing how three levels of racism—institutional, personal, and internalized—are associated with adverse birth outcomes among Romani women. Eight focus groups of Romani women aged 18-39 (n = 71), as well as in-depth semi-structured interviews with gynecologists (n = 8), and key informants from NGOs (n = 8) were conducted on health knowledge and behaviors during pregnancy, living conditions and social environment, and experiences with the health care system. Transcripts were coded and emergent themes were used to construct hypotheses about the mechanisms by which racism increases the risk of adverse birth outcomes. Mechanisms by which institutional racism was hypothesized to affect adverse birth outcomes included: 1) social environment and resources, (segregation, social connections, patriarchal ideology, lack of social support), 2) health system accountability (lack of redress), 3) financial issues (lack of health insurance, informal payments, inability to buy medications), and 4) education (lack of health knowledge, illiteracy). Mechanisms by which personal-level racism affected adverse birth outcomes included: 5) perceptions and interactions with health providers and other non-Roma (perceived discrimination). Mechanisms by which internalized racism affected adverse birth outcomes included: 6) psychological factors (self-efficacy, fear). Biological mechanisms hypothesized from qualitative data were high rates of untreated vaginal infections, high rates of smoking, anemia, and physiological response to stress. The importance of qualitative data in designing global epidemiologic studies of racism and inequalities in adverse birth outcomes is discussed.

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RESIDENTIAL CONTEXT BUFFERS AGAINST PSYCHOSIS: MULTI-LEVEL INVESTIGATION OF ETHNIC MINORITY GROUPS LIVING IN ENGLAND. *J Das-Munshi, L Bécarea, J Boydell, M E Dewey, C Morgan, S A Stansfeld, M J Prince (Institute of Psychiatry, King's College London, UK)

Objectives: Using a nationally representative dataset from England, to: 1. Determine if people who live in areas of lower own-group ethnic density are more likely to report psychotic symptoms. 2. Assess whether the individual-level associations of discrimination, chronic strains, and social support with psychosis are modified by area-level ethnic density. Methods: Multi-level analysis of community-level data ($n = 4281$) examining associations of own group ethnic density with the reporting of psychotic symptoms, in five of the main ethnic minority groups living in England (Irish, Indian, Pakistani, Bangladeshi and Black Caribbean people), and a White British group. Results: Per 10% point reduction in own-group ethnic density, Indian people were 1.38 times more likely to report psychotic symptoms (95% CI: 1.02 to 1.86; $p = 0.03$ (trend)) and the total ethnic minority sample were 1.07 times more likely to report psychotic symptoms (95% CI: 1.01 to 1.14; $p = 0.03$ (trend)). Similar trends were noted in all other ethnic minority groups. People living in areas of lower own-group density reported greater discrimination, poorer social support and greater chronic strains; all of which were associated with an increased risk of psychosis. Residential ethnic density also modified associations with psychosis risk as people reporting good social support enjoyed a much reduced risk of psychosis from living in areas of higher own-group density. Conclusions: Ethnically dense neighbourhoods may 'buffer' ethnic minority residents from social risk factors. Both individual and contextual factors should be considered in the aetiology of psychosis.

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SELECTION BIAS IN HEALTH INEQUALITIES RESEARCH. *L D Howe, B Galobardes, K Tilling, D A Lawlor (University of Bristol, UK BS8 2BN)

Scandinavian studies exploiting record linkage have shown that although cohort members tend to be healthy and affluent compared to the whole population, exposure-outcome associations are not biased by this selection, at least for certain well established relationships. It is not known whether this is true when estimating socioeconomic inequalities in health. Individuals of lower socioeconomic position (SEP) may be less likely to consent to participation at the start of a cohort study and more likely to drop out over time. We assess whether socially-patterned drop-out from a cohort affects the estimation of health inequalities using data from the Avon Longitudinal Study of Parents and Children. In this UK cohort, children of higher SEP (measured by maternal education) are more likely to continue participating as they get older. We estimate SEP inequalities in maternal and early life outcomes for which we have data on almost the whole cohort (birth weight and length, breastfeeding, preterm birth, maternal obesity and smoking during pregnancy, $N=12000$). We then restrict analyses to individuals who participated in subsequent data collections when the child was aged 9 ($N=7000$) and aged 15 ($N=5000$). Drop-out was related to SEP and outcomes, so under missing data theory analysis may be biased. For each of the 10 outcomes, SEP inequality was greatest in the full sample; the more selected the sample became, the more the inequality was underestimated; eg mean birthweight difference between highest and lowest maternal education was 116g (95% confidence interval 78,153) in the full sample, but only 93g (95%CI 45,141) and 62g (95%CI 5,119) in those attending at ages 9 and 15 respectively. We conclude that selection bias in cohorts may result in underestimation of health inequalities.

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CUMULATIVE NEIGHBORHOOD RISK AND ALLOSTATIC LOAD IN ADOLESCENTS. *K P Theall, S Drury, R Scribner (Tulane University, School of Public Health and Tropical Medicine, New Orleans, LA)

The mechanisms by which life stress affects human biology and is translated into negative health outcomes is not well understood. Accumulating evidence suggests an important role of biologically-mediated pathways such as allostatic load (AL)—cumulative wear and tear on physiological systems and organs due to chronic stress. Differential exposure to adverse environments may play an important role in producing and maintaining health disparities, and the cumulative impact of these conditions may be more important than a singular exposure. The objective of this study was to examine the impact of cumulative neighborhood risk exposure on AL among adolescents, and to determine whether this association is modified by race/ethnicity or sex. We conducted multilevel analyses, weighted for sampling, among 9887 adolescents (age 12 to 20) in the georeferenced National Health and Nutrition Examination Survey, 1999-2006. Even after accounting for cumulative household risk, adolescents living in neighborhoods with greater cumulative risk based on social and physical indicators had significantly higher AL based on available markers, and cumulative neighborhood risk explained a substantial proportion of the variance in AL (intraclass correlation coefficient = 3.8%). We also identified significant effect modification by both sex and race/ethnicity, with a greater impact of cumulative risk on AL for boys ($\beta = 0.0759$, $p = 0.003$) than girls ($\beta = 0.0021$, $p = 0.7246$) and for non-Hispanic whites ($\beta = 0.0817$, $p = 0.0087$) than minority groups ($\beta = 0.01943$, $p = 0.2795$). Differences in AL among adolescents may be partially explained by cumulative neighborhood risk, and differentially for sex and race/ethnic groups. Findings are consistent with the hypothesis that neighborhood experiences may affect a range of biological systems, resulting in cumulative differences in risks that in turn may affect health outcomes.

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COMPARING OBSERVED VERSUS EXPECTED TUBERCULOSIS CASES. *C A Winston, T R Navin, and J E Becerra (Centers for Disease Control and Prevention [CDC], Atlanta, GA 30333)

From 2000–2008, the average annual decline in tuberculosis (TB) case rate in the United States was 3.8%. However, in 2009, the decline was 11.4%, the largest single-year decrease since national TB surveillance began in 1953. To investigate the 2009 decline, we analyzed TB cases reported from 2000–2009 to the CDC's National Tuberculosis Surveillance System. We tabulated observed TB case counts by patient and clinical characteristics. We log-transformed counts for 2000–2008, and performed linear regression to calculate expected cases and 95% prediction intervals (PI) for 2009. Observations outside 95% PI were considered statistically significant. We obtained denominators from the U.S. Census Bureau Current Population Survey and calculated expected TB case rates and 95% PI using Poisson regression. The overall decline in reported TB cases in 2009 was 7.9% greater than expected. Among foreign-born persons, declines were greatest among persons who had been in the United States less than 2 years; among U.S.-born persons, declines were greatest among homeless persons and substance users. According to Census data, the population of U.S.-born persons in the United States increased 1.1% in 2009 compared with 2008; in contrast, the population of foreign-born persons fell 1.6% during this time. The rate of TB in 2009 among U.S.-born persons was 1.7, compared with an expected 1.9, per 100,000 persons (95% PI, 1.8 to 1.9). Among foreign-born persons, the rate of TB in 2009 was 18.7, compared with an expected 19.3, per 100,000 persons (95% PI, 18.8 to 19.9). Calculating observed versus expected provided effective epidemiologic assessment of unexpected TB declines, accounting for trends and population changes.

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IMPACT OF TUBERCULOSIS ON MORTALITY AMONG HIV-INFECTED PATIENTS RECEIVING ANTIRETROVIRAL THERAPY. *R Chu, E Mills, J Beyene, C Bakanda, J Nachega, L Thabane (McMaster University, Hamilton, ON, Canada, L8N 3Z5)

To estimate the poorly understood effect of tuberculosis (TB) on all-cause mortality among HIV positive patients who received antiretroviral therapy (ART), we conducted a prospective cohort of 15,225 adult patients who initiated antiretroviral therapy between January 2004 and June 2009 at ten districts in Uganda. We estimated the relative risk (RR) and odds ratio (OR) of mortality relative to TB at the initiation of ART via four propensity score (PS) methods (including PS matching, PS stratification, PS as regression covariate, and PS weighting) to control for confounding bias. Conventional regression models were fit for sensitivity analysis. About 7.7% (1,177/15,225) patients were diagnosed having TB at ART initiation. TB patients were more likely to be male, suffer from AIDS, and have lower CD4 cell count and weaker immune system at baseline. The percentages of death were 10.8% (95% confidence interval [CI]: 9.0% – 12.5%) and 6.5% (95% CI: 6.1% – 7.0%) for those with and without TB, respectively. The adjusted RR for mortality comparing TB and no-TB patients on 1,173 propensity score matched pairs (RR = 1.38, 95% CI: 1.07 – 1.79) was clinically relevant and less marked relative to the crude estimate (RR = 1.65, 95% CI: 1.38 – 1.96). Other propensity score methods and the conventional regression models produced similar results. In conclusion, after controlling for important confounding variables, HIV patients who had TB at the initiation of ART had a marginally higher risk of overall mortality.

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PERTUSSIS IN ONTARIO, CANADA: A TRANSMISSION DYNAMIC MODEL. *A Tuite and D Fisman (University of Toronto, ON, Canada M5T 3M7)

Despite highly successful vaccination programs and high vaccine uptake, both endemic pertussis and periodic pertussis outbreaks continue to challenge medical and public health professionals. We constructed an age-structured compartmental model to describe the transmission of pertussis in the province of Ontario in both the pre- and post-vaccine era, with the aim of better understanding the transmission dynamics of pertussis in this population, in order to estimate the underlying burden of pertussis and to use as a tool for assessing the potential impact of different vaccination strategies. Natural history parameters were derived from epidemiologic studies and by model calibration. A time series of pertussis mortality in Ontario between 1880 and 1929 was used to derive estimates of pertussis incidence in the pre-vaccine era. For calibration in the post-vaccine era, we used data on laboratory-confirmed cases in Toronto, Ontario for the period between 1993 and 2004. Through model calibration to pre-vaccine pertussis incidence in children under 2 years of age, best-fit model estimates gave a basic reproductive number of 5.5, with a high degree of annual seasonal oscillation (range 4.2 to 6.7), and a duration of naturally-acquired immunity of 27 years. Model calibration to pertussis incidence in the presence of vaccination resulted in estimates of vaccine-induced immunity of approximately 6.5 years for individuals receiving all 5 recommended vaccine doses. This model reproduces observed pertussis epidemiology in children in the province of Ontario and represents a valuable tool for assessing the role of under-recognized pertussis infections in adolescents and older adults in sustaining pertussis transmission in a highly vaccinated population.

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ENVIRONMENTAL THREATS AND CHILDHOOD FEVER DURING THE RAINY SEASON IN DAKAR-SENEGAL: INTEREST IN USING HIERARCHICAL MODELS. *S Dos Santos, I Rautu, J-Y Le Hesran, M Diop, A Mourtala, A Ndonky, R. Lalou (Institut de Recherche pour le Developpement, Dakar, Senegal)

In African cities, a major cause of childhood fevers are water-related diseases, such as typhoid, or water-related vector, in particular mosquito-borne pathogens such as malaria, dengue and other arbovirus diseases. Apart from the individual and household characteristics, environmental factors can have an influence on those fevers especially during the rainy season. A household survey conducted in 2008 in Dakar, the capital-city of Senegal, was completed by a community questionnaire on environmental threats that could be factored into multilevel analyses. Using a data set of 7,300 children from 3,000 households dispatched within 50 neighborhoods, a three-level modeling process is presented. Recent fever incidence is modeled level by level according to individual factors (sex, age), to household factors (socio-economic variables) and to environmental factors at the neighborhood level (floods, shrub lands, water bodies, solid waste and wastewater management facilities, etc.). Rates of recent fever varied substantially from one neighborhood to another, ranging between 14 and 37%. The hierarchical organization of the data set in levels, fixed and random effects and cross-level interactions are considered. As expected, the findings indicate that the occurrence of fever is influenced by factors from all three hierarchical levels, with environmental factors playing a relatively lower role than the other two. Among the environmental threats, the effect of the neighborhood's salubrity is particularly significant.

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A NOVEL FRAMEWORK FOR MODELING THE GLOBAL IMPACT OF CLIMATE CHANGE ON INFECTIOUS DISEASES. *A G Hoen, M Keller, D L Buckeridge, and J S Brownstein (Children's Hospital Informatics Program, Children's Hospital Boston and Harvard Medical School, Boston, MA 02215)

The inevitability of global climate change has led to concerns about its effects on the incidence and distribution of infectious disease risk, but studies thus far have usually focused on one disease in a limited geographic region. Here we present the first results of a study aimed at broadly characterizing the global effects of climate on the risk and burden of a range of infectious diseases. Using dengue as an initial proof of concept, we developed subnational scale spatial risk models that predict established endemic areas and zones of ongoing emergence. We overcame limitations in the granularity of global surveillance information by coupling data from HealthMap, an automated surveillance system that collects event-based information at a global scale, with traditional dengue surveillance data. We estimated a surface of HealthMap dengue report density with a Gaussian mixture model and quantitatively compared this with established endemic zones to define and then cross-validate areas of expansion in Latin America, Sub-Saharan Africa and Southeast Asia. Future steps for this study include development of spatial models to characterize the effects of climate on dengue expansion and the application of long-term climate change scenarios for forecasting. The ultimate products of this study will be real-time, global risk assessments for a range of diseases useful for improving prevention and control efforts, resource allocation and arming clinicians and the public with enhanced epidemic intelligence.

LATE-LIFE SOCIAL ACTIVITY AND COGNITIVE DECLINE IN OLD AGE. *B D James, R S Wilson, L L Barnes, D A Bennett (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21201)

We examined the association of social activity with cognitive decline in 1,135 persons without dementia at baseline with a mean age of 79.6 (SD = 7.5) who were followed for up to 12 years (mean = 5.2, SD = 2.8). Using mixed models adjusted for age, sex, education, social network size, depression, chronic conditions, disability, neuroticism, extraversion, cognitive activity, and physical activity, more social activity was associated with less cognitive decline during an average follow up of 5.2 years (SD = 2.7). A one point increase in social activity score (range = 1-4.2, mean = 2.6, SD = 0.6) was associated with a 47% decrease in the rate of decline in global cognitive function ($p < 0.001$). The rate of global cognitive decline was reduced by an average of 70% in persons who were frequently socially active (score = 3.33, 90th percentile) compared to persons who were infrequently socially active (score = 1.83, 10th percentile). This association was similar across five domains of cognitive function. Sensitivity analyses revealed that individuals with the lowest levels of cognition or with mild cognitive impairment at baseline did not drive this relationship. These results confirm that more socially active older adults experience less cognitive decline in old age.

MEASURING WHAT PEOPLE DO DO INSTEAD OF WHAT THEY CAN DO: THE ENACTED FUNCTION PROFILE. *T A Glass, B D James, and B S Schwartz (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD)

Standard tools for the assessment of functional status focus on the hypothetical tense (capability or difficulty) and poorly represent the enacted tense (actual performance). This fails to capture heterogeneity that arises from the impact of environments that either enable or constrain the functioning of older adults in real-world settings. Standard questionnaires designed to measure activities of daily living have also been subject to little psychometric scrutiny. This paper reports on the psychometric properties of the Enacted Function Profile (EFP), a new 20-item tool to measure actual performance in the community. Baseline data from a population-based cohort of 1141 older adults were used to test a measurement model of enacted function using confirmatory factor analysis. Construct validity of the new scales was demonstrated by showing associations with variables hypothesized to be related to functional status. A four-factor model proved to fit the data well. Subscale scores for social engagement, self-care, home maintenance, and community involvement were estimated along with a global summary score Enacted function was associated with depressive symptoms and disability in instrumental activities of daily living in the anticipated direction. Substantial gender and race/ethnic differences in enacted function were observed. As hypothesized, associations between new enacted function measures and self-reported neighborhood problems as well as objective features of the neighborhood were generally twice as strong as standard measures of IADL disability. The EFP appears to capture different aspects of functioning than standard disability instruments and shows favorable measurement properties.

PSYCHOSOCIAL INFLUENCES IN ONSET AND PROGRESSION OF LATE LIFE DISABILITY: THEORETICAL AND ANALYTICAL CONSIDERATIONS. *C F Mendes de Leon, K B Rajan, D A Evans (University of Michigan, Ann Arbor, MI 48109)

Although psychosocial factors have been linked with disability in older age, the exact role of these factors in the chronic disability process remains poorly understood. This study investigates whether specific psychosocial risk factors are differentially associated with onset of disability and progression of disability. We used nine waves of yearly disability data from a population-based, longitudinal study of older adults (N=5,800). The disability measure was a count of limitations in six Activities in Daily Living (ADL), and psychosocial factors included measures of social networks, social engagement, and depressive symptoms. We developed a two-part regression model with a logistic link for onset of ADL disability and a negative binomial link for progression of ADL disability, each with its own random effect. The two-part regression models were fit simultaneously using maximum likelihood techniques. Larger social networks, more social engagement, and less depression were associated with significantly lower ADL disability severity levels at baseline (p 's $< .001$). Prospectively, larger social networks and more social engagement but not depression were associated with reduced risk of new onset of ADL disability ($p < .05$). Larger social networks, more social engagement and less depression were also significantly associated with more rapid progression of ADL disability (p 's $< .001$), gradually attenuating the large differences in ADL disability severity associated with these psychosocial risk factors at baseline. This new statistical approach to the analysis of late life disability data suggests that the protective effect of social networks and engagement is limited to onset of late life disability.

MEASUREMENT OF PHYSICAL FUNCTION IN POPULATION-BASED COHORTS OF AGING: THE QUEST FOR HARMONY. *S Karunanathan, *S Magalhaes, C Wolfson, I Fortier (McGill University, Montreal, QC, Canada H3A 1A2)

Throughout the world, more and more studies of aging are collecting measures of Physical Function, producing a wealth of data to advance our understanding of transitions in Physical Function through old age, as well as predictors and consequences thereof. While each study can make a unique contribution, the synthesis of information from multiple studies has the potential to provide additional unforeseen insights: study to study comparisons can support the robustness and/or generalizability of findings; and merging data from multiple studies increases sample size, thereby providing opportunities to examine hypotheses that may otherwise be statistically underpowered. Despite these advantages, cross-study comparisons and data pooling are complex and may lead to erroneous inferences if methodological differences between studies are not appropriately considered. Data harmonization refers to a formal process by which data comparability is assessed and appropriate calibration is applied prior to data pooling. The DataSHaPER (DataSchema and Harmonization Platform for Epidemiological Research) is an international project with the principal aim of developing a scientific approach for data harmonization. A DataSHaPER consists of two components: a DataSchema, which is a comprehensive inventory of variables related to a given field of research, and a Harmonization Platform, which is a set of predefined rules to determine whether a study contains adequate information to generate a variable of interest. This presentation describes how the scientific approach of the DataSHaPER is being applied to develop a tool that supports the study of Physical Function and aging through the harmonization of population-based cohorts.

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META-ANALYSIS FOR LINEAR AND NON-LINEAR DOSE-RESPONSE RELATIONSHIPS: EXAMPLES, AN EVALUATION OF APPROXIMATIONS, AND SOFTWARE. N Orsini, *D Spiegelman, R Li, A Wolk (Harvard University, School of Public Health, Boston, MA)

Two methods for point and interval estimation of relative risk for log-linear exposure-response relationships in meta-analysis of published ordinal categorical exposure-response data have been proposed. Here, we compared the results of a meta-analysis of published data using each of the two methods, to the results that would be obtained if the primary data were available, and investigated the circumstances under which the approximations required for valid use of each meta-analytic method break down. Finally, we extended the methods to handle non-linear exposure-response relationships. Methods were illustrated by studies of the relationship between alcohol consumption and colorectal and lung cancer risk from the Pooling Project of Prospective Studies of Diet and Cancer. In our examples, the differences between the results of a meta-analysis of summarized published data and the pooled analysis of the individual original data were small. However, incorrectly assuming no correlation between relative risk estimates of exposure categories from the same study gave biased confidence intervals for the trend and biased p-values for the tests for non-linearity and between-studies heterogeneity when there was strong confounding by other model covariates. The use of two publicly available user-friendly programs implementing meta-analysis for dose-response data in Stata and SAS is illustrated.

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PERFORMANCE OF CANCER CLUSTER Q-STATISTICS FOR CASE-CONTROL RESIDENTIAL HISTORIES: SIMULATION ANALYSES USING US AND DANISH STUDIES. CD Sloan, G M Jacquez, C M Gallagher, M H Ward, R Baastrup Nordsborg, O Raaschou-Nielsen, *J R Meliker (Stony Brook University, Stony Brook, NY)

Few cancer clustering investigations have evaluated residential mobility even though exposure to environmental carcinogens may occur decades before a cancer diagnosis. Recently developed Q-statistics can be used to investigate disease clusters based on mobility histories by quantifying space- and time-dependent nearest neighbor relationships. Qik identifies which individuals are centers of spatial clusters through time; and Qikt shows where and when local clustering takes place. Using case-control residential histories from 2378 participants in a US study and 6594 participants from a Danish study, we created a series of simulated clusters to examine Q-statistic performance. Results suggest the intersection of cases with significant clustering over their life course, Qik, with cases who are constituents of significant local clusters at given times, Qikt, allows us to identify simulated clusters. Using this intersection approach, Q-statistics identified large true positive cluster regions with few false positives; true smaller cluster regions were difficult to differentiate from false positives. Specifically, if three or more significant (Qik, $p = 0.001$, Qikt, $p = 0.05$) cases are detected in the same cluster region then it may be considered a true cluster. Setting k-nearest neighbors equal to 10 or 15 consistently showed strong performance. This approach has potential for identifying clustering in mobile populations but given differences in mobility patterns, future work is required to investigate generalizability of this rule set to other case-control datasets.

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RESULTS ON CAUSAL EFFECTS UNDER NON-DIFFERENTIAL MISCLASSIFICATION OF A BINARY CONFOUNDER. *E I Ogburn and T r VanderWeele (Harvard University, Boston, MA 02115)

Consider a $2 \times 2 \times 2$ table characterizing a study with binary exposure X and outcome Y, stratified by covariate C. Suppose that C is measured with error and let C^* be the measurement. We assume that the error is nondifferential, i.e. subjects are nondifferentially misclassified with respect to C. Epidemiologists have long accepted the unproven but oft cited result, frequently credited to Brenner (*Journal of Clinical Epidemiology* 1993; 46:57-63), that odds ratios, risk ratios, and risk differences which control for the mismeasured covariate, and thereby partially control for C, will lie between the crude and the fully controlled measures. We disprove this result via counterexamples for each of the three effect measures. We show that counterexamples can be found even when the confounder is binary and the sensitivity and specificity of the measurement are close to 1; that any ordering of the partially controlled measure, the fully controlled measure, and the crude measure is possible; and that the partially controlled measure can be closer to the crude measure than it is to the fully controlled measure (again even with sensitivity and specificity close to 1). We then present sufficient conditions under which Brenner's result is guaranteed to hold for the risk difference and risk ratio.

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WHY RARE DISEASE MAKE UP MOST OF THE GLOBAL BURDEN OF DISEASE ESTIMATES – THE IMPACT OF BEING COMMON. *H Carabin (University of Oklahoma Health Sciences Center, Oklahoma City, OK 73104)

Previous global burden of disease estimates have demonstrated that chronic diseases had the incurred largest number of DALYs globally. Several critics have identified methodological issues in the estimation of DALYs. However, one element which has never been mentioned is the influence of imperfect test sensitivity and specificity. Data for prevalence and incidence for estimating DALYs often come from surveillance data for which the diagnostic tests are not perfect. The prevalence (or incidence) estimates are therefore derived from observed data which contain error. We used the Bayes' theorem to assess several realistic scenarios of true prevalence, sensitivity and specificity values of common and rare diseases to estimate the absolute (observed-true) and relative (ratio observed:true) differences in prevalences. For diseases with true prevalences between 40% and 60%, with diagnostic test sensitivity and specificity of 50% and 98%, respectively, which is not uncommon for intestinal helminthic infections, the prevalence would be underestimated by 19% to 29% for a relative value between 0.51 and 0.53. Conversely, for rare diseases with prevalences between 1% and 5%, and diagnostic test sensitivity and specificity of 80% and 60%, respectively, which could be the case of using fasting blood glucose for diabetes, the prevalence would be overestimated by 37% to 39% or a factor between 8.4 and 40.4. Even a better test (sensitivity 98% and specificity 95%) would result in an overestimate of about 5% with a ratio between 1.9 and 5.9. Adjusting future DALYs estimates for measurement errors could lead to changing the ranking in global burden of diseases.

301-S

COMPETING RISK BIAS TO EXPLAIN THE INVERSE RELATIONSHIP BETWEEN SMOKING AND MALIGNANT MELANOMA. *C A Thompson, Z F Zhang, O A Arah (UCLA School of Public Health, Los Angeles, C, 90095)

Smoking has been shown to be inversely associated with the risk of malignant melanoma in 3 large cohort studies, and 7 case-control studies, with associations persisting even after adequate control for an exhaustive set of suspected confounders. Smoking is a known risk factor for many other malignancies; it has been shown to be positively associated with other types of skin cancer, and there remains no clear biologic explanation for a possible protective effect on malignant melanoma. In this paper, we propose a plausible mechanism of bias from smoking-related competing risks that may explain the negative association between smoking and melanoma as spurious. Using directed acyclic graphs for formalization, and Monte Carlo simulation techniques, we demonstrate how published results might be compatible with selection bias resulting from uncontrolled or unmeasured common causes of competing outcomes of smoking-related disease and malignant melanoma. We present results from various scenarios assuming a true null as well as a true positive association between smoking and malignant melanoma.

303-S

VALIDITY AND RELIABILITY OF MATERNAL RECALL OF PRESCRIPTION DRUG USE DURING PREGNANCY. *M van Gelder, I van Rooij, H de Walle, N Roeleveld, M Bakker (Radboud University Nijmegen Medical Centre, Nijmegen, Netherlands)

In case-control studies that assess associations between medical drug use and birth defects, detailed information on type of drug and timing of use is essential to prevent information bias. However, data on the accuracy of recall of drug use during pregnancy are scarce. Therefore, we validated a self-administered questionnaire by comparing it to pharmacy data which were checked for compliance by maternal interviews. Sensitivity, specificity, levels of agreement, and kappa statistics were calculated to quantify the validity and reliability of the questionnaire for any prescription drug use, groups of drugs, and individual drugs. In addition, we determined whether maternal characteristics influenced the reliability of the questionnaire. A total of 560 women were included. The sensitivity of the questionnaire for any prescription drug use was 57%, ranging between 12% (corticosteroids) and 83% (antihypertensives and thyroid therapy) for drug groups and between 0% (naproxen) and 73% (salbutamol) for individual drugs. Overall, specificity was high (93–100%). The sensitivity of the questionnaire for prescription drug use during the first 4 months of pregnancy was generally comparable or better than the sensitivity in the complete pregnancy period. Smoking during pregnancy and completing the questionnaire > 1 year after delivery decreased maternal recall of prescription drug use. In conclusion, the validity of maternal recall of prescription drug use during pregnancy is generally moderate to poor. As reliability also differed according to some maternal characteristics, future retrospective studies on the teratogenic risk of drug use may need additional sources of data next to self-reported methods.

302-S

TIME-DEPENDENT BIAS ON NON-BINARY EXPOSURES: EXAMPLES IN PERINATAL EPIDEMIOLOGY. *A P Nunes, G A Wellenius, E A Houseman, M G Phipps, E W Triche (Brown University, East Providence, RI)

Epidemiologic studies frequently treat time-varying exposures as if they were time-invariant, either for analytic simplicity or because detailed data on exposure timing are unavailable. For binary exposures this approach can lead to health effect estimates that are on average biased downward. The direction and pattern of this bias when using non-binary exposure metrics has not been adequately addressed in the existing literature. Using examples from perinatal epidemiology, we performed simulation studies to evaluate the pattern of bias and to evaluate a potential method for preventing the bias when exposure timing is unknown. Specifically, we simulated effects of trimester-specific and average exposures on time to event, and compared the results from time-fixed logistic and survival analyses with those from a time-varying survival analysis. Time-fixed analyses were biased downward for all exposure metrics considered. Moreover, when using average exposure metrics, we observed an artificial non-linear dose response function. We propose and illustrate a method based on multiple-imputation of timing-specific exposure that can be used to avoid this bias when data on exposure timing are unavailable. Using this method, we treat time of exposure as a missing variable and multiply impute based on prior information of the functional form of the exposure timing distribution. This method is demonstrated in an example assessing the association between delayed prenatal care and preterm birth. Considering a true time-varying analysis to be the gold standard we found that the multiply imputed time varying analysis produced unbiased results while the time-fixed analysis produced results biased in the negative direction. In conclusion, treating time-varying exposures as time-invariant can bias health effect estimates and yield incorrect dose-response functions. Where timing-specific data are not available, multiple imputation of exposure timing may be a useful tool in obtaining unbiased effect estimates or performing sensitivity analyses. This method may be applied to other epidemiologic substantive areas.

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THE PERILS OF ADJUSTING FOR GESTATIONAL AGE. *O Basso, A J Wilcox, C R Weinberg (McGill University, Montreal, QC, Canada H3G1Y2)

Gestational age is strongly correlated with neonatal mortality and is often adjusted for when assessing direct effects of a factor that shortens gestation. Adjustment implicitly assumes that no unmeasured factor affects both gestational age and outcome. There are, however, diverse pathologic factors that can cause early delivery and also independently increase mortality. (Severe birth defects and placental abruption are examples.) We use simulations to quantify potential bias in the odds ratio (OR) of a measured exposure X when trying to block the mediating effect of gestational age. We assume a quadratic baseline effect of immaturity on mortality. X reduces gestational age by 20 days and increases mortality both by reducing maturity at birth and via a separate direct effect (expressed by an OR of 1.7). We introduce three “unmeasured” factors: two rare factors (0.6%) that reduce gestational age by 50 days, and have high mortality ORs. The third factor is frequent (4%), reduces gestational age by 35 days, and has a weak direct effect on mortality. Adjusting for gestational age yields an OR for X of 0.75 – reversing the apparent effect (a similar reversal is seen in the relation between twinning and neonatal mortality, after adjustment for gestational age). Adjusting for only one of the two factors with a strong effect still results in substantial bias. Only by including both strong confounders does the adjustment yield an estimate close to the truth. Thus, if there is even one rare, unmeasured factor that strongly affects both gestational age and outcome, adjustment for gestational age as a mediating factor can severely bias the estimate of direct effects. Such factors can also cause apparent effect measure modification by gestational age.

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BEYOND BRENNER: PURSUING A NEW UNDERSTANDING OF THE IMPACT OF MACROECONOMIC FLUCTUATIONS ON POPULATION HEALTH. L M Bates and S Galea (Columbia University, New York, NY)

The seminal 1979 Lancet paper by Brenner¹ helped to establish an enduring empirical question regarding the nature and degree of impact of macroeconomic fluctuations on population health. Brenner's analyses suggested negative short and long term effects on morbidity and mortality of economic cycles, with differential impact on the economically worst-off, but his findings were subsequently challenged by a number of papers highlighting key methodological limitations of his approach. As indicated by a flurry of newly published commentaries, literature reviews, and comparative empirical analyses, interest in this question has been revived in recent years in light of the current global economic downturn, the largest and most protracted economic recession since the Great Depression. However, evidence of the impact of macroeconomic change on overall mortality remains mixed and context-dependent, and is largely inconsistent with individual-level evidence and with mental health outcomes, including suicide, despite common hypothesized etiologic pathways. This proposed symposium will present and interpret the totality of evidence on this question, and will discuss the array of implications for a) methodological approaches to macro-level data analysis, b) models of social determinants of health as mediated by psychosocial stress and health behaviors, c) the social production and amelioration of health disparities, and d) policies to mitigate the impact of macroeconomic fluctuations on health. 1. Brenner MH. 1979. Mortality and the national economy: a review and the experience of England and Wales 1936-1976. *Lancet*, 2:568-573.

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COMMUNICATING EPIDEMIOLOGY - THE CHANGING LANDSCAPE. *P Hartge (NCI, Division of Cancer Epidemiology and Genetics, Bethesda, MD)

Epidemiologists face new opportunities and challenges as they communicate research results. Peer-reviewed journals, the first audience for research findings, are undergoing a revolution in content and format. Science reporters must select noteworthy advances from a deluge of reports. Epidemiologists must learn how to present their work to lay audiences, even when strong competing interests interfere with the clear exposition of a scientific consensus. Four experts bring diverse perspectives to assess the challenging environment and suggest new ways to respond. Myles Axton, Editor of *Nature Genetics*, discusses "The rapidly evolving scientific journal", a snapshot of how premier science journals experiment with features that blur old distinctions: blogs, data repositories, standard-setting, and advance online publications. Axton, a geneticist and pioneer in genome-wide studies, highlights changes in communication across the biomedical sciences. Roni Rabin, a health reporter who has written for the *New York Times*, *Washington Post*, *Newsday*, and other publications, discusses "Choosing and telling science stories," a look at how science journalists synthesize meeting abstracts, articles, press releases and interviews with authors and commentators. Rabin, who also writes or *Real Simple*, *More*, and *Glamour*, explains how reports evolve in the web environment. Jennifer Loukissas, communications manager at the National Cancer Institute's Division of Cancer Epidemiology and Genetics, discusses "When epidemiologists talk to press and public". Many epidemiology departments now train scientists to speak more clearly to press and public. Loukissas evaluates recent examples to suggest which communication techniques work and how to teach them. Jonathan Samet, the Director of the USC Institute for Global Health, discusses "Communicating around conflict." Samet, an international authority on the effects of smoking and air pollution on health, considers real-world examples of meeting the communications challenge when political, commercial, or other interests work to obscure the information.

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CANCER EPIDEMIOLOGY: STATE OF THE ART. *C Ulrich (German Cancer Research Center, Heidelberg)

Cancer is a major public health problem worldwide. As a multifactorial disease, both genetic and environmental factors play a role in its etiology. However, not only are risk factors unique for each type of cancer, there may also be molecularly defined subtypes within tumors at the same organ site, which arise through different mechanisms. The field of molecular epidemiology has made substantial progress in defining cancer phenotypes and risk factors. This session will provide an overview of today's hot topics in cancer research, ranging from new cancer epidemics in the world to genetics and genomics and cancer risk. The speakers will present state-of-art research findings on cancer etiology and cancer prognosis. Speakers: *The current state of cancer in the world* - Paolo Boffetta (Mount Sinai Cancer Center) *Genetics and genomics in cancer epidemiology* - Gloria Petersen (Mayo Clinic) *Diet and cancer - complex relationships* - Susan Taylor Mayne (Yale University) *Linking cancer prevention to cancer survivorship* - Cornelia Ulrich (German Cancer Research Center, Heidelberg) Sponsored by: AACR and Molecular Epi Working Group of AACR

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EPIDEMIOLOGISTS AS EXPERT WITNESSES: EXPOSING THE INFLUENCE OF BIASED EPIDEMIOLOGICAL ASSESSMENTS IN TORT ACTIONS AND CONSEQUENCES FOR PUBLIC HEALTH. C L Soskolne, Shira Kramer, David Egilman, Devra L Davis, *Stanley H Weiss (Department of Preventive Medicine & Community Health, UMDNJ - New Jersey Medical School, Newark, NJ)

As industry funding of research has increased over time, the research agenda, priorities, methods, and reporting of results are shown to have been increasingly influenced by the vested interests of the sponsors instead of primary public health considerations. Examples of the failure to investigate important research questions and the biased application of methods serve to undermine the pursuit of justice in tort actions before the courts and ultimately to derail the fundamental role of epidemiology in protecting the public's health. Colin Soskolne will discuss Canada's Sydney Tar Ponds questioning whether conflicting interests resulted in a case of suppression bias and social injustice. Shira Kramer will present on refusing to look and failing to find: case studies in the systematic strategy to hide occupational and environmental exposure risks. David Egilman will discuss how corruption plays out: a review of big Pharma techniques in epidemiologic research. Devra Davis will discuss epidemiology in the courts: the case of cell phones and health damages. A discussion of the cases, moderated by Stanley Weiss, will conclude the symposium.

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CANADA'S SYDNEY TAR PONDS: CONFLICTING INTERESTS RESULTING IN A CASE OF SUPPRESSION BIAS AND SOCIAL INJUSTICE? *C L Soskolne and S Kramer (Department of Public Health Sciences, School of Public Health, University of Alberta, Edmonton, AB, Canada)

In this case study from Sydney, Cape Breton Island, Nova Scotia, Canada, the wanton disregard for environmental safeguards - through coal mining, coking operations and steel production effluents discarded over many decades into the Sydney area and harbour ? has served to create the Sydney Tar Ponds. For many years, Sydney has remained one of Canada's worst industrially contaminated sites. The ownership of these industrial operations has been held in more recent decades by provincial and federal authorities whose jurisdiction also includes public health. This presentation exposes conflicting interests and raises profound questions of social injustice in Canada. Despite knowledge and awareness of carcinogenic hazards both to workers and the local community, no analytical health studies - normative at that time - were ever undertaken to our knowledge, thereby suppressing the opportunity to develop compelling evidence in response to expressed community health concerns. Justice now is being sought in Nova Scotia's first environmental class action law suit, a process that has taken some seven years thus far, but, as of early March 2011, it remains at the class action certification stage.

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EPIDEMIOLOGY IN THE COURTS: THE CASE OF CELL PHONES AND HEALTH DAMAGES. *D L Davis, Monica Han (FACE, Environmental Health Trust, Teton Village, WY),

Under the Daubert rules, epidemiological evidence of established human harm has become the requirement to establish causation and take action to prevent future harm. The absence of general population increases in brain cancer has been erroneously invoked as proving the safety of cell phones. Chronic diseases such as brain cancer have been shown to have latencies of several decades, based on population-based studies of the atomic bomb survivors. Bradford Hills principles for inferring causation involve an assessment of the full body of evidence, including experimental findings, biological plausibility, along with the strength of findings in both experimental and epidemiological studies. When filed in the U.S. two decades ago, court cases alleging that cell phone radiation caused brain cancer failed, because they lacked sufficient evidence of human harm. New legal efforts are being mounted now that integrate the array of predictive information on this topic, including in vitro and in vivo experimental studies on cancer and reproductive harm, and detailed analyses of exposure to the human brain and body, along with recent reports from large case-control studies. Age-specific analyses of all brain tumors combined reflect unexplained increases in persons young enough to have used cell phones heavily. This presentation will highlight some of the remaining epistemological challenges to legal and public health analyses as they grapple with cell phones, brain cancer and reproductive impacts.

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HOW CORRUPTION PLAYS OUT: A REVIEW OF BIG PHARMA TECHNIQUES IN EPIDEMIOLOGIC RESEARCH. *D Egilman (Brown University, Providence, RI)

Researchers can manipulate epidemiological research. Researchers and reviewers can take steps to avoid unintended bias but there are limited actions that can be taken to prevent intentional abuse of epidemiologic studies. By controlling design, publications, and endpoints, Pharmaceutical companies are able to publish misleading findings to support sales and drug approval. Specific tactics include intentional use of selection bias, manipulation of study size, duration, adjudication, post-hoc changes to protocols and selective publication. Based on a review of information made available through litigation, including emails, drafts, memos and deposition testimony, I will describe some examples of methods pharmaceutical companies use to manipulate epidemiologic studies. I will also describe ethical issues related to seeding trials. I will suggest reform measures that may address these problems including FDA and academic sanctions against offending companies and individuals, changes in FDA disclosure rules, and publication of all protocol changes and data on the web.

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EPIDEMIOLOGY IN THE EVALUATION OF MEDICAL PRODUCTS. K A Chan (Harvard School of Public Health and Ingenix Life Sciences, Boston, MA)

The objective of this symposium is to highlight the extensive use of epidemiology in the evaluation of medical products and the recent methodology development. Regulatory agencies have increasingly utilized epidemiology findings to guide regulatory decisions. In 2009 the U.S. FDA initiated the Mini-Sentinel project as preparation for the Sentinel Network, a national strategy for monitoring medical product safety. In addition, under the American Recovery and Reinvestment Act of 2009, more than one billion U.S. dollars have been allocated for comparative effectiveness research to evaluate different treatment modality, in which epidemiology plays a critical role. The proposed topics of the symposium will include 1) The role of observational studies in regulation of medical products; 2) Signal detection and active safety surveillance; 3) Statistical reasoning in very large data sources; and 4) Comparative Effectiveness. Speakers: *Drug safety evaluation at the Center for Drug Evaluation and Research, Food and Drug Administration* - David Graham (Office of Surveillance and Epidemiology, Center for Drug Evaluation and Research, FDA) *Overview of FDA's Mini-Sentinel Program* - Sean Hennessy (University of Pennsylvania) *Statistical reasoning with very large datasets* - Michal Abrahamowicz (McGill University) *Comparative Effectiveness* - Sebastian Schneeweiss (Brigham & Women's Hospital and Harvard Medical School) Before the symposium, members of the International Society for Pharmacoepidemiology will be surveyed to solicit pertinent questions related to each topic, and a list of selected questions will be discussed after each presentation. Sponsor: International Society for Pharmacoepidemiology

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MENTORING IN EPIDEMIOLOGY. *J Vena and *Pauline Mendola (Centers for Disease Control and Prevention, Atlanta, GA)

Mentoring is an advisory role in which an experienced 'master' professional guides another individual in their professional development. The relationship is dynamic and reciprocal, with the mentor taking personal interest in helping the mentee or protégé develop into a successful professional. Mentoring or being a good mentee are of critical importance yet there have been few venues in the Epidemiology field to learn the principles and practice of mentorship. What are the features of effective mentoring relationships? What are the traits of a good mentor? What are the traits of a good mentee? Mentoring involves many stages and phases and development of the relationship is a gradual interactive process. This symposium will have an introductory presentation on the principles and practice of mentorship. The Congress 2011 award winner of The Alfred S. Evans Award for Excellence in Teaching and Mentoring Dr. Noel Weiss will give a featured keynote address on mentoring across the career lifetime. Examples of mentoring early career and senior professionals will be provided. A question and answer session will give attendees the opportunity to open the floor to topics of interest and address the speakers. Speakers: *Principles and practice of mentorship* - John Vena and Pauline Mendola *Mentoring across the career lifetime* - Noel Weiss (Winner, Evans Award) *Mentoring students and young professionals* - Stephen Buka *Mentoring at the senior career level* - TBN

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DIFFERENCES IN OBESITY-RELATED METABOLIC OUTCOMES IN AFRICAN-AMERICAN AND LATINO YOUTH: IMPLICATIONS FOR DISEASE RISK. *R Hasson (University of California, San Francisco, CA)

Obesity is a significant problem in ethnic minority children and adults with the most recent NHANES estimates suggesting a higher prevalence of overweight and obesity in African Americans and Latinos compared to non-Hispanic Whites. Obesity related complications such as type 2 diabetes also are more common between both ethnic groups (1.6 times higher prevalence in African Americans and 1.5 times higher prevalence among Latinos compared to whites). The lifetime risk of developing diabetes is almost 50% for African Americans and Latinos born in the year 2000. Despite a similar pattern of obesity, degree of insulin resistance, and risk for type 2 diabetes, there are marked differences in cancer incidence and fatty liver disease across race and ethnicity. African Americans have increased risk of certain forms of obesity-related cancers, whereas for some outcomes, Latinos appear "protected." In contrast, risk for fatty liver disease reflects an opposite pattern, with Latinos at higher risk and African Americans appearing to be "protected". Traditionally, biomedical researchers have turned to genetics to explain these differences in disease risk and prevalence, without fully examining the contributions of the social environment. Furthermore, behavioral interventions have traditionally focused on improving diet and physical activity while ignoring the social-contextual factors that influence health and health behaviors. This presentation aims to shed light on how traditional methods used to investigate racial/ethnic differences fall short of explaining disparities in health outcomes. In addition, cross-sectional and longitudinal data will be presented that examines how social-contextual factors contribute to obesity and subsequent disease risk in ethnic minority children and adolescents.

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OBESITY AMONG SOCIOECONOMICALLY DISADVANTAGED CHILDREN AND ADOLESCENTS IN THE US: IMPLICATIONS FOR HEALTH ACROSS THE LIFE COURSE. *J Ibarra and *Claudia Kozinetz (University of Texas, El Paso, Baylor College of Medicine, Houston, TX)

Purpose: Health disparities in the US are on the rise affecting low-income Americans, racial and ethnic minorities. The current unemployment crisis most likely will make health disparities worse. The purpose of this Symposium is to increase awareness among all professionals in the public health and epidemiology fields on health issues important to racial/ethnic minority populations. During the 3rd Epidemiology Congress, we would like to address issues related to the obesity among socioeconomically disadvantaged children and adolescents in the US, and its implications for health across the life course by leaders on the field. Since 1971, the prevalence of overweight among US children has increased by more than 100%, and this prevalence is expected to continue to increase. Overweight and obese children and adolescents are more likely to become overweight or obese adults. Overweight and obesity are a significant health problem among children and adolescents, since children and adolescents who are overweight or obese are more likely than those who are not to develop type 2 diabetes and other conditions placing them at risk of later cardiovascular disease. Reasons for racial and ethnic differences in childhood and adolescents overweight and obesity are not well understood. The purpose of this workshop is to disseminate and stimulate discussion about estimated racial/ethnic differences on overweight and obesity among rural and urban, low-income children and adolescents, their possible determinants of differences, and health impacts in the middle and long terms. Symposium speakers will present and discuss methods for assessing health disparities gaps on this health issues. Speakers: *Differences in obesity-related metabolic outcomes in African-American and Latino Youth: Implications for Disease Risk* - Rebecca Hasson (University of California, San Francisco) *Socio-demographic and environmental factors influencing adiposity and dietary patterns among US children and adolescents: The mediating role of depressive symptoms in adulthood and implications for cognitive aging in later life* - May A. Baydoun, PhD (National Institute on Aging, NIH)

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PRESIDENT OBAMA'S \$63,000,000,000 GLOBAL HEALTH INITIATIVE : THE CURRENT AND FUTURE ROLE OF EPIDEMIOLOGY IN THIS EFFORT. *D Spiegelman (Harvard University, Boston, MA)

Last year, the United States spent \$8.3 billion on global health programs, and the President's Emergency Program for AIDS Relief (PEPFAR) has spent over \$63 billion since its inception in 2004. This symposium will seek to address the following questions: • What role has epidemiologists and epidemiology played in the design, operations and evaluations of these massive efforts? What further contributions do epidemiology and epidemiologists have to offer? The Sydney Declaration (2007, Lancet) declared that 10% of all resources dedicated to HIV programming should be used for research towards optimizing interventions utilized and health outcomes achieved. To what extent has this directive been implemented and what are the barriers towards its full implementation? What role does epidemiology have to play in these efforts? What are the methodologic challenges facing the evaluation of these global health efforts? How have they been addressed so far? How can more experienced epidemiologists in the developed world partner with counterparts in the regions hardest hit by AIDS to apply our expertise to combat the global AIDS epidemic? This Symposium will include experts from a number of institutions, including: • Stanford Center for Health Policy • Makerere University School of Public Health, Uganda • East Africa-IeDEA Project, Indiana University School of Medicine • Division of AIDS, National Institute of Allergy and Infectious Diseases • Imperial College School of Public Health, London • Harvard School of Public Health The speakers will focus on a variety of topics, including the use of observational data to evaluate HIV care and treatment programs, the use of transmission dynamics models to design and evaluate the impact of large scale HIV prevention programs, and perspectives from those responsible for funding this important research as well as from our partners abroad.

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WHAT YOU DON'T KNOW WILL HURT YOU: A SERIES OF STUDIES ON THE IMPACT OF LOSS TO FOLLOW-UP IN MONITORING AND EVALUATION OF HIV/AIDS CARE AND TREATMENT PROGRAMS IN EAST AFRICA. C Yiannoutsos (Indiana University School of Medicine, Indianapolis, IN)

The Human Immunodeficiency Virus (HIV) epidemic represents one of the most pressing public-health challenges of our time. In the developing world, over the most recent decade, an extraordinary effort scaling up antiretroviral therapy to combat the epidemic has been mounted. It represents the largest pharmacological intervention in human history. Evaluating the effectiveness of HIV care and treatment programs, to ensure that patient outcomes are optimized, is critical but is complicated by the high levels of losses to follow-up (LTFU) among individuals participating in these programs. In this talk I will present a number of biases arising from LTFU, which invalidate or, at least, render suspect, much of the published data arising from analyses of observational studies which do not take LTFU into account. I suggest statistical approaches, which can be used to provide adjustments to estimates in the presence of LTFU.

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HAS ALL THIS MONEY TRANSLATED INTO IMPROVED HEALTH? *E Bendavid (General Internal Medicine, Stanford University, and Associate, Stanford Center for Health Policy /Primary Care and Outcomes Research, Palo Alto, CA)

The Great Recession. Sovereign debt crisis. Budget deficits. Events outside the realm of medicine are changing the landscape for development assistance for health. The last decade's growth in spending on global health, culminating in the \$63 billion US Global Health Initiative, is yielding to an era of flat funding for global health programs. At the same time, expansion of services and a proliferation of priorities in global health such as non-communicable diseases and neglected tropical diseases are forcing a re-thinking of resource allocation and funding decisions. In this talk I will touch upon several non-intuitive aspects of the organization of US assistance for global health: the paradoxical relationship between disease burden and financing priorities, the promise and perils of cost-effectiveness analyses, and the ambiguities in choosing partner countries. I will then present data on an overlooked dimension of decisions in financing global health: do the investments improve the health of the individuals they aim to serve (and does it matter if they do)? I will conclude with opportunities for improving the decision-making process in resource allocation for global health.

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THE USE OF TRANSMISSION DYNAMICS MODELS TO DESIGN AND EVALUATE THE IMPACT OF LARGE SCALE HIV PREVENTION PROGRAMMES. *M-C Boily (Department of Infectious Disease Epidemiology, School of Public Health, Imperial College London, UK)

There is increasing recognition that to achieve equitable and effective HIV/AIDS interventions, more analytical support is required to help design large scale interventions and objectively evaluate their impact. However, as many prevention programmes are being scaled up simultaneously to entire populations in different parts of a country or the world, it becomes difficult to conduct randomised experiments to evaluate their impact. In this talk, I will illustrate how transmission dynamics models (epidemiological modelling) are currently being used to evaluate the impact of large scale HIV interventions using Avahan, the Bill & Melinda Gates Foundation-funded India AIDS Initiative, as an example. Avahan is a large-scale core group intervention programme targeted to high-risk population in the 6 highest HIV prevalence states in India. The objective of Avahan is to reduce HIV transmission among high-risk groups (core groups) and to subsequently reduce outwards transmission from these groups to the lower-risk general population. I will also briefly discuss how transmission dynamics models are increasingly being used at an early stage to optimise multi-components prevention package. I will also highlight the need to conduct modelling studies, prior to programme implementation, to help design evaluation studies.

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THE FETAL ORIGINS OF HEALTH AND DISEASE: CONCEPT, METHODS, AND CHALLENGES. *C Lynch (Ohio State University, Columbus, OH)

The purpose of this symposium is to provide attendees with an overview of the fetal origins approach to studying health and disease throughout the lifespan. The symposium will begin with Dr. Klebanoff providing a history and overview of the approach and how it became popular. Dr. Klebanoff conducted a follow-up study of children born to mothers in the Collaborative Perinatal Project in Philadelphia and therefore has experience in this area, including how to query individuals regarding health events that have occurred in their lives since birth. Dr. Hertz-Picciotto will discuss the methodologic work that has been done in relation to the measurement of exposure and covariate data during pregnancy. Specifically, Dr. Hertz-Picciotto's work has focused on the optimal methods for collecting exposure and covariate data during pregnancy. Dr. Oken will finish up the presentations by discussing the conduct of Project Viva, a currently ongoing longitudinal study of children and their mothers, including the challenges facing investigators who undertake this type of research. Project Viva is one of the largest studies utilizing the fetal origins approach that has been fielded to date. At the end of the symposium, we intend to provide attendees a list of published papers to which they can refer for guidance should they wish to use the approach in their own work. Speakers: *Historical Development of Fetal Origins of Health and Disease: How We Got to Where We are Now* - Mark Klebanoff, MD MPH (Professor of Pediatrics, The Ohio State University) *Studying Prenatal Exposures and Consequences for Development: Timing, Pathways & Mechanisms* - Irva Hertz-Picciotto, PhD MPH (Professor of Public Health Sciences, UC Davis) *Project Viva: a Study of Health for the Next Generation* - Emily Oken, MD MPH (Associate Professor of Population Medicine, Harvard Medical School)

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THE ROLE OF PREDICTIVE MODELS IN CAUSAL INFERENCE. *J Lessler and B K Lee (Johns Hopkins School of Public Health, Baltimore, MD)

There are distinct differences in the way epidemiologists interested in causation and those in other fields, who are predominately interested in prediction, approach statistical modeling tasks. The former tend to favor models with low numbers of covariates and easy causal interpretation, while the latter may prefer complex models with high number of covariates and no clear causal interpretation. The perceived dichotomy between predictive models and causative models is striking, as ultimately we evaluate our causal hypotheses based on their ability to predict future events. However, the divergent approaches may be a necessary result of the difference between focusing on a particular risk factor versus looking for predictive patterns in general. In this symposium experts on causation and predictive models from epidemiology and computer science will discuss the role that predictive models have in epidemiological studies of risk factors and causation. In talks and subsequent discussion we will address such questions as: What role do predictive models have in controlling for poorly measured confounding and complex causal relationships? How might complex diagnostic models be useful in understanding disease causation, if at all? What role do agent based or deterministic models that make predictions based upon our mechanistic understanding of the disease process have in testing causal hypotheses? How do we translate causal inferences into predictions useful for setting health policy? After a series of short presentations the speakers will be asked to participate in a broad ranging discussion of the issue guided by the session chairs and audience questions. Speakers: *The role of simulations in estimating population level effects for determinants of infectious disease* - Justin O'Hagan *Towards Patient-Specific Treatment: Medical Applications of Machine Learning* - Russell Greiner *Biases of purely predictive models in causal inference problems* - Miguel Hernan

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EPIDEMIOLOGY FOR HEALTH EQUITY IN A GLOBAL, DYNAMIC, AND UNEQUAL WORLD: PERSPECTIVES OF THE INTERNATIONAL EPIDEMIOLOGICAL ASSOCIATION (IEA). *N Krieger, (Department of Society, Human Development and Health, Harvard School of Public Health, Boston, MA, USA)

What contributions can epidemiology make to promoting health equity in a global, dynamic, and unequal world? This question has been at the core of the mission of the International Epidemiological Association (IEA) since its founding in 1954. In this symposium, current IEA leaders will present their views on the critical importance of – and obstacles to – developing a truly global epidemiology. A key challenge is for epidemiology to move meaningfully from beyond its historical base in the global North to be as much – if not more – of and for the global South. At one level, this entails equitably developing the capacity for epidemiologic research and population health data within diverse country contexts and improving the terms for conduct of egalitarian global collaborative research projects. Equally important is critically addressing the theoretical frameworks used, methodologies employed, and the extent to which the work addresses the societal determinants of health and health inequities. Speakers: *Global Epidemiology in a Changing World* - Neil Pearce (The current IEA President, New Zealand) *Monitoring inequalities in maternal and child health in low and middle-income countries: Countdown to 2015, the IEA, and findings from recent national surveys* - Cesar Victor (The IEA President Elect, Brazil) *Non-communicable diseases in Latin America and the Caribbean: a new challenge to be met in overcoming health inequities* - Maria Inês Schmidt (The IEA Latin American and Caribbean Councillor, Brazil) *IJE and health equity: what can we achieve* - Jane Ferrie (Academic Editor of the International Journal of Epidemiology (IJE) (from UK; presenting co-author) and Shah Ebrahim, co-editor of IJE (from the UK and India))

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CAUSES OF MENTAL DISORDERS: CONTRIBUTIONS FROM PSYCHIATRIC EPIDEMIOLOGY (A SYMPOSIUM IN HONOUR OF PROFESSOR LEE ROBINS). R Fuhrer (McGill University, Montreal, QC, Canada)

The burden of disease related to mental disorders is very high in countries across the range of high, middle, and low socio-economic development. The health, social, and economic impacts of mental disorders on the individual, his or her family, and society, make them pervasive, and often underserved, public health problems. The epidemiological investigation of the causes, outcomes, and consequences of mental disorders is far below their share of the spectrum of diseases. This symposium will present an overview of the present state of knowledge on psychiatric epidemiology from the lens of the contributions on methods developed and championed and inspired by Professor Lee Robins during her career that spanned over 50 years in the field as one of the pioneers. Ezra Susser will present a life course epidemiological perspective on migration and the risk of schizophrenia. Andrew Pickles will discuss the epigenetic contributions to the development of psychopathology and present the role of gene*environment interaction and this may vary by gender. Jamie Robins will review causal models in psychiatric epidemiology. The discussant will provide a critical appraisal of the presentations in order to start the dialogue. Speakers: *Introduction* - Rebecca Fuhrer, PhD, (Department of Epidemiology, Biostatistics, and Occupational Health, McGill University, Montreal, QC) *Migration and Psychosis: sensitive periods in the life course* - Ezra Susser, M.D., Dr.PH. (Department of Epidemiology, Mailman School of Public Health, Columbia University, New York, NY) *Of mice and men: can epidemiology map comparable epigenetic processes?* - Andrew Pickles, Ph.D. (Institute of Psychiatry, King's College, London, UK) *Causal Methods for Confounding, Noncompliance, and Lost to Follow-up in Psychiatric Epidemiology* - Jamie Robins, M.D. (Department of Epidemiology, Harvard School of Public Health, Boston, MA) Discussant: TBN

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EPIDEMIOLOGY, SCIENCE POLICY, AND SOCIETY—REMOVING PUMP HANDLES MORE EFFECTIVELY WHEN THE FACTS DON'T SPEAK FOR THEMSELVES. Roger Bernier (Epidemiology Monitor, Roswell, GA)

The authority of science has come under challenge with rising levels of public skepticism about epidemiology and science more generally. Examples of policy gridlock include climate change disagreements, battles over autism and vaccines, and failure to accept recommendations about mammography screening for women under fifty. Also, many proven effective interventions are not being translated into public health practice. Clearly, facts do not speak for themselves. Something more is needed. As applied scientists funded by society, epidemiologists have a responsibility to promote effective translation of their data and to prevent its misuse or neglect. The consequences of failure to translate data into scientifically sound and supportable policy translate nevertheless into preventable morbidity and mortality. This symposium is structured as a participatory panel discussion intended to deepen the understanding and ways of thinking about the process of data translation and to provide examples of innovative approaches being used to achieve it more effectively. Panel members will each be asked to provide their perspectives on data translation by answering three questions— 1) What conceptual framework works best to help epidemiologists understand and navigate the process of data translation? 2) What have we learned from our study and practice about what works to successfully translate data into action? 3) What promising approaches are being used today that can serve as models to make more effective use of data? Following brief presentations in answer to these questions, the session will be open for discussion by the panel of the different perspectives offered, followed by discussion between the panel members and participants in the audience. Panel Members: Kay Dickersin (Director, Center for Clinical Trials, Johns Hopkins Bloomberg School of Public Health) Janesse Brewer (Director, Health and Social Policy, The Keystone Center) Robert A. Hiatt (University of California San Francisco) Stanley H Weiss (UMDNJ, New Jersey Medical School)

META-ANALYSES: NEW INSIGHTS INTO HETEROGENEITY OF EFFECT-MEASURE ESTIMATES, DATA INTERPRETATION AND DECISION-MAKING. *R Platt (McGill University, Montreal, QC, Canada)

Although the evidence-based movement suggests that meta-analyses represent the highest level of evidence, handling heterogeneous estimates remains a controversial topic. Furthermore, how heterogeneity affects beliefs about effects of treatments, exposures and other risk factors has received little attention. Dr. Poole will review descriptions of heterogeneity and differences between random and fixed effects approaches. Next, he will address important concepts related to reporting random effects distributions informatively, as well as strengths and limitations of different heterogeneity measures, stratification versus meta-regression, and omitting an overall summary measure altogether. Dr. O'Rourke will discuss bias modeling in meta-analysis. In brief, these models can incorporate variables related to methodological features (including weaknesses) that affect the parameters of interest. Because bias models are not identified, results are extremely sensitive to the structure as well as to other distributional features, while standard fitting methods and model summaries may fail in unusual ways. Finally, Dr. Shrier will discuss how meta-analysts interpret meta-analyses. When presented with meta-analyses based on simulated data of idealized (unbiased) experiments, meta-analysts usually provide estimates of effect and uncertainty that differ from the calculated fixed and random effects results. Their estimates, and the subsequent decision-making process appear dependent on heterogeneity of estimates. Speakers: *Not just Another Random Face* - Charles Poole (UNC Gillings School of Public Health, University of North Carolina) *Beauty is in the Eye of the Beholder* - Ian Shrier (Centre for Clinical Epidemiology and Community Studies, SMBD-Jewish General Hospital, McGill University) *Modelling Multiple Biases Explicitly and Quantitatively: Using Beautiful Models to Show off What's not at all Glamorous* - Keith O'Rourke (O'Rourke Consulting, Ottawa, Canada)

CHILDHOOD ADVERSITIES AND ADULT PSYCHIATRIC DISORDERS: METHODOLOGICAL ISSUES AND A STRATEGY FOR ACCOUNTING FOR EXPOSURE CO-OCCURRENCE. *K A McLaughlin, J G Green R C Kessler (Division of General Pediatrics, Children's Hospital Boston, Harvard Medical School, Boston, MA)

Substantial evidence suggests that exposure to adverse childhood experiences is associated with the later onset of physical and mental health problems in adulthood. The first wave of studies in this area examined associations between individual adverse events—such as parental death, physical abuse, neglect, and family violence—with adult outcomes. Subsequent assessments of adverse childhood experiences in population-based studies indicated that these exposures were highly co-occurring, suggesting that studies focused on a single adversity were likely to overestimate the association between specific experiences and health outcomes. These findings sparked a second wave of studies that examined the associations of adult outcomes with measures of the number of different adversities that had occurred in a respondent's childhood. These studies documented dose-response relationships between adverse childhood experiences and a wide range of adult outcomes. This approach assumes, however, that the associations between adverse childhood experiences and adult health outcomes are additive and precludes identification of specific adversities that are more strongly associated with poor health than others. We utilized an innovative modeling strategy to examine simultaneously the associations of both type and number of childhood adversities with the subsequent first onset of DSM-IV psychiatric disorders using data from the National Comorbidity Survey Replication, a population-based sample of adults (N = 9,282). Results indicated that adversities related to maladaptive family functioning (abuse, neglect, family violence, parental criminality and psychopathology) were most strongly associated with psychiatric disorders. Multiple adversities had significant sub-additive associations with mental disorders. These findings highlight a novel approach for estimating the associations of co-occurring exposures with the onset of health problems.

METHODOLOGICAL ISSUES IN THE ASSESSMENT OF ADVERSE CHILDHOOD CONDITIONS AND POTENTIAL BIASES IN RELATION TO ADULT HEALTH CONSEQUENCES. *K Keyes (Department of Epidemiology, Mailman School of Public Health, Columbia University, New York, NY)

Adverse childhood events include such experiences as verbal, physical, and/or sexual abuse, neglect, witnessing interpersonal violence and/or substance use, and experiencing material deprivation. Recently, there has been a renewed focus on the association between these events and adult mental and physical health outcomes in the epidemiologic, psychiatric, and behavioral genetic literature. However, methodological issues preclude firm conclusions regarding the effect of adverse childhood experiences. In this symposium, we explore these biases and propose novel methods for mitigating three methodological issues pertinent to the study of early childhood: 1) Events often co-occur both with each other and with other adverse environmental exposures, creating difficulty in isolating the effect of each experience; 2) Events are not static but rather embedded in trajectories of accumulating risk which may be important for the prediction of health outcomes; and 3) Measurement is often based on retrospective report in adulthood, which is subject to substantial error and may be differential in nature. In this symposium, we examine the epidemiology of adverse childhood events, and will stimulate discussion on methodological tools relevant to the assessment and analysis of the associations between adverse childhood events and health outcomes in adulthood. Speakers: *Childhood adversities and adult psychiatric disorders: Methodological issues and a strategy for accounting for exposure co-occurrence* - Katie A. McLaughlin *A latent variables approach to estimating the associations between and among adverse childhood events and the internalizing/externalizing spectrum of psychopathology: strategies for coping with collinearity* - Katherine M. Keyes *Modeling lifecourse neighborhood exposures: accounting for trajectories of material deprivation in childhood in estimating risk of adult emotional distress* - Magdalena Cerda *Exploring differences in retrospective and prospective assessments of childhood adversity in the 1958 British Birth cohort* - Charlotte Clark *Discussant: Sandro Galea*

CHILDHOOD ADVERSITIES AND THE STRUCTURE OF COMMON PSYCHIATRIC DISORDERS. *K M Keyes, N R Eaton, R F Krueger, K McLaughlin, M M Wall, Bt F Grant, D S Hasin, (Department of Epidemiology, Mailman School of Public Health, Columbia University, New York, NY)

Existing literature suggests that various types of child maltreatment frequently co-occur and confer broad risk for multiple psychiatric diagnoses. However, it is unknown whether specific maltreatments effect latent psychopathology liability dimensions or instead effect specific disorders. We utilized a latent variable approach to study the associations of childhood maltreatment with latent dimensions of internalizing and externalizing psychopathology and to examine gender differences in these associations. Data were drawn from a nationally representative face-to-face survey of 34,653 adults in the U.S. general population. Lifetime DSM-IV psychiatric disorders assessed using the AUDADIS-IV. Physical, sexual, and emotional abuse and neglect were assessed using validated measures. Analyses controlled for other childhood adversities and socio-demographics. Results indicated that the associations of maltreatment with psychiatric disorders operated exclusively through a latent liabilities to experience internalizing and externalizing psychopathology, indicating that childhood maltreatment was associated with an underlying liability to express broad internalizing and externalizing psychopathology rather than with specific psychiatric disorders. Physical abuse was associated with the externalizing dimension among men only, and with the internalizing dimension among women only. Emotional abuse was associated with the externalizing dimension only among women. Neglect was not significantly associated with psychopathology dimensions. The association between childhood maltreatment and common psychiatric disorders operates through latent liabilities to experience internalizing and externalizing psychopathology, indicating that the prevention of maltreatment may have a wide range of benefits for many common mental disorders. Certain types of maltreatment have differential consequences for the expression of internalizing and externalizing psychopathology.

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MODELING LIFECOURSE NEIGHBORHOOD EXPOSURES: ACCOUNTING FOR TRAJECTORIES OF MATERIAL DEPRIVATION IN CHILDHOOD IN ESTIMATING RISK OF ADULT EMOTIONAL DISTRESS. *M Cerdá M Paczkowski, A Nandi, T Vanderweele, B Mezuk, R Shih, S Galea, (Department of Epidemiology, Mailman School of Public Health, Columbia University; New York, NY)

Neighborhood socioeconomic context (NSES) in childhood may play an important role in shaping adult emotional distress. The bulk of studies on neighborhoods and emotional distress fail to prospectively examine the relative influence of childhood vs. adult NSES on adult distress. We examine the extent to which childhood NSES has a direct effect on adult emotional distress, relative to an indirect effect mediated by adult NSES. We use data from the Panel Study on Income Dynamics (PSID), a household panel survey of a nationally representative sample of US families, followed from 1968-2007. Our analytic sample consists of respondents born in 1968-1978, with parents who were part of the study since 1968, and who themselves became adult PSID respondents in 1997-2007 (n = 1039). We use a composite measure of NSES, including the proportion of residents in poverty, receiving public assistance, in non-professional/managerial occupations, and median income. We estimate the average NSES from birth until the respondent left the parental household, and NSES in adulthood. Emotional distress is measured in adulthood using the K6. We use marginal structural models with stabilized inverse probability weighted Poisson repeated measures regressions to estimate the total, direct and indirect effects of childhood NSES on adult emotional distress. This study illustrates methodological issues involved in estimating the direct effect of early-life neighborhood exposures on health, when early-life neighborhood conditions strongly influence adult neighborhood exposures.

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ORGANOPHOSPHATE PESTICIDES & NEURODEVELOPMENT: BIOLOGICAL PLAUSIBILITY & FINDINGS FROM THREE CHILDREN'S ENVIRONMENTAL HEALTH CENTERS. S Engel, V Rauh, B Eskenazi (Mount Sinai School of Medicine, New York, NY)

Starting in 1998, NIEHS & EPA funded three Children's Environmental Health and Disease Prevention Research Centers to examine the influence of organophosphate pesticides in diverse exposure settings on childhood growth and development. Three independent birth cohorts were established, and the children from these cohorts were followed prospectively for 10 years, with periodic neurodevelopmental assessment. In 2001 and 2004 respectively, the residential use registrations for chlorpyrifos and diazinon were voluntarily cancelled. In this symposium, we will present pesticide-specific and non-specific organophosphate metabolite biomarker data in relation to neurodevelopment at 12 and 24 months, and psychometric intelligence at 7 years of age. The presenting Centers represent urban and rural/agricultural populations, with diverse exposure settings and demographics. We will incorporate a moderator-lead discussion on methodological issues and future directions of this research, as well as a synthesis of the findings. Speakers: *Organophosphate Pesticide Exposure Assessment* - Robin Whyatt *Prenatal Organophosphate Pesticide Exposure, PON1 and Neurodevelopment in the Mount Sinai Children's Environmental Health Center* - Stephanie Engel *Prenatal Organophosphate Pesticide Exposure and Neurodevelopment in the CHAMACOS study of Children's Environmental Health* - Brenda Eskenazi *7-Year Neurodevelopmental Consequences of Prenatal Exposure to Chlorpyrifos, a Common Organophosphate Pesticide* - Virginia Rauh Discussion leader: Robin Whyatt

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EXPLORING DIFFERENCES IN RETROSPECTIVE AND PROSPECTIVE ASSESSMENTS OF CHILDHOOD ADVERSITY IN THE 1958 BRITISH BIRTH COHORT. *C Clark, S Stansfeld (Centre for Psychiatry, Barts & the London School of Medicine, Queen Mary University of London, UK)

Experiencing adversity in childhood confers an increased risk of psychopathology in adulthood. However, assessment of childhood adversity is often based on retrospective recall in adulthood. This paper compares retrospective and prospective reports of childhood adversity in the 1958 British birth cohort, examining gender differences in prevalence and associations with psychopathology in adulthood. Data were from the 1958 British birth cohort, a 45 year study of 98% of births in one week (N = 9377). Prospective childhood adversities reported by parents and doctors included parental absence, institutional care, illness, and neglect. Retrospective reports of 17 childhood adversities including sexual and physical abuse were assessed at 45 years. Measures of psychopathology across the lifecourse were available. There were no gender differences in the prospective reports of childhood adversities. Retrospectively recalled adversities showed significant gender differences: males were more likely to report an unaffectionate father and poverty; females were more likely to report fourteen out of the seventeen adversities, including sexual abuse, unaffectionate mother, and neglect. Both prospective and retrospectively assessed adversities showed associations with psychopathology, with stronger associations for the retrospective measures. Methods of assessing childhood adversity influence associations with psychopathology. This could reflect recall bias; gender differences in thresholds for reporting experiences as adverse; a greater sensitivity of retrospective measures to detect adversity; or the potential for retrospective measures to cue individuals to recall adverse experiences.

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PLATFORMS AND PARTNERSHIPS FOR POPULATION STUDIES: CAN NEW COHORTS CONTRIBUTE? J McLaughlin (Cancer Care Ontario, Canada)

There is world-wide interest in large-scale cohort studies as a base for research on disease causes and determinants. This interest has contributed to a new era for epidemiology that benefits from collaborations and consortia, but which has also introduced new challenges now that studies must be conducted or pooled across diverse populations. The Canadian Partnership for Tomorrow project (CPTP) is a large-scale, pan-Canadian, prospective cohort that was launched in 2008 to serve as a platform for studies that advance knowledge of the risk factors for cancers, cardiovascular and other chronic diseases. Building on the experience of major cohorts internationally, the harmonization of methods and tools was a primary focus in the development of 5 regional cohorts that contribute to CPTP, which sets the context for this session on international roles and impacts of cohorts. The symposium examines whether new and emerging cohorts can make unique contributions, and the extent to which cohort platforms address local health concerns and contribute to scientific advances. The symposium also aims to inform the national/international research communities of the development and status of emerging cohorts including the CPTP, while inviting epidemiologists to make use of the platforms and to become actively involved through new grant-funded studies.

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TISSUE-BASED IMMUNE MARKERS AND CANCER. *W Lin (National Cancer Institute, Division of Cancer Epidemiology & Genetics, Bethesda, MD)

This symposium is for molecular epidemiologists interested in the most robust methods and techniques to study tissue-based immune markers and cancer. Immune cells of various subtypes represent the host-to-tumor reaction, and the current view is that some immune cells have both pro- and anti-tumor properties. Studies of various tumor sites have found that chronic inflammation may be associated with tumor development and progression, while other studies showed that the presence or absence of immune subsets may be correlated with patient prognosis and survival. Our panel of speakers will provide their expertise in individual talks and audience discussions regarding: 1) Tissue-based markers in general, including the value of measuring immune responses in the tumor tissue and their usefulness in epidemiologic studies of etiology and prognosis 2) Techniques and technology for high-throughput measuring of immune markers in tissues, including issues of tissue selection, tissue heterogeneity, and the utility of computerized algorithms 3) Potential of these methods to evaluate progression and regression of precursor lesions in well-characterized epidemiologic studies We aim to address the issues facing the molecular epidemiologist interested in designing a study to examine tissue-based immune markers and cancer. Speakers: *The impact of host immunity on cancer outcomes* - Brad H. Nelson, PhD (British Columbia Cancer Agency) *Sources of Bias and Misclassification in Assessing Protein Expression by Quantitative Immunohistochemistry* - Bonnie E. Gould Rothberg, MD, PhD, MPH (Yale University) *Evaluating immune markers in epidemiologic studies* - Jill Koshiol, PhD (National Cancer Institute, NIH)

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SOURCES OF BIAS AND MISCLASSIFICATION IN ASSESSING PROTEIN EXPRESSION BY QUANTITATIVE IMMUNOHISTOCHEMISTRY. *B E Gould Rothberg and D L Rimm (Yale University, New Haven, CT 06520)

Cancer survivorship research has expanded the scope of molecular epidemiology to include studies that evaluate the prognostic or predictive utility of differentially expressed proteins, as assessed by immunohistochemistry (IHC) or quantitative immunofluorescence (QIF), on formalin-fixed, paraffin-embedded tissue specimens. Innovations such as tissue microarrays, which allow assessment of large cohorts in a single experimental run, and automated quantification of results have enabled application of IHC or QIF on an epidemiologic scale. Although the REMARK, MISFISHIE and STROBE-ME guidelines outline the minimal methodologic rigor required for reporting quantitative TMA-based IHC data, none adequately address all sources of experimental uncertainty that can introduce bias or misclassification. We recognize five major sources for potential measurement error: 1) measurement or quantification method 2) tissue heterogeneity, 3) target probe (antibody) selection and validation, 4) detection technique, including antigen retrieval, titration of primary antibody and visualization technique, and 5) "pre-analytical" variables generated during surgical specimen handling from time-to-fixation through TMA sectioning and storage. Here, we will address the first two topics 1) quantification methods and 2) tissue heterogeneity on measurement error. We will compare QIF and IHC stain-based automated quantitative platforms with emphasis on the topic of compartmentalization – how the subset of reactivity that co-localizes with the cell type of interest is identified and measured. Then we will address heterogeneity by review of data supporting optimization of core location and quantity and requirements for whole slide assays.

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THE IMPACT OF HOST IMMUNITY ON CANCER OUTCOMES. Brad H Nelson (British Columbia Cancer Agency, Vancouver, BC, Canada)

Over the past decade, it has become increasingly clear that the immune system strongly influences clinical outcomes in human cancer. This is best documented by studies of tumor-infiltrating lymphocytes (TIL), which are present in a significant proportion of solid tumors. TIL consist of activated, clonally expanded populations of T cells and B cells that infiltrate stromal and epithelial regions of the tumor. TIL presumably arise through spontaneous recognition of abnormal gene products expressed by the tumor. In a broad range of cancers, TIL are associated with favourable responses to treatment as well as increased patient survival, strongly suggesting TIL can mediate anti-tumor activity. The most important TIL subsets underlying this activity are CD8+ T cells and CD20+ B cells. Other prominent cell types include CD4+ helper T cells and FOXP3+ regulatory (suppressor) T cells, although their association with patient survival remains incompletely understood. With better understanding of TIL, including their functional properties, mechanism of action, and interaction with standard treatments, it may be possible to enhance TIL activity through vaccination or immunomodulation, thereby engaging host immunity to further improve cancer outcomes.

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EVALUATING IMMUNE MARKERS IN EPIDEMIOLOGIC STUDIES. *J Koshiol (Division of Cancer Epidemiology and Genetics, Infections and Immunoepidemiology Branch, NCI/NIH/DHHS, Bethesda, MD)

Analysis of immune-related markers can provide clues into how and why cancer develops, along with therapeutic response and survival. Although many studies of cancer and immunity have focused on the analysis of circulating markers, particularly cytokines, these measurements may not or may not reflect immune responses that are biologically and clinically relevant at the target organ. Consequently, assessment of local immune responses in target tissues may provide the clearest data related to etiology, pathogenesis, natural history, and biological behavior of cancers and their precursors. An increased understanding of these site-specific biological mechanisms will enhance the development of biomarkers that can be applied to screening, prevention, and treatment efforts. This session will discuss the promise of using routinely collected and processed formalin-fixed tissue specimens to understand immune factors in molecular epidemiologic studies to understand the relationship between immune factors and cancer development. We will explore the strengths and weaknesses of this approach and identify future directions for advancing this field of research.

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TO SCAN OR NOT TO SCAN? THE PEDIATRIC CT DEBATE. *A Berrington de Gonzalez (National Cancer Institute, Bethesda, MD)

Worldwide radiation exposure from medical sources has approximately doubled in the last 15 years and in the US it has increased 6-fold since 1980. The primary reason for this increase is a dramatic rise in the number of CT scans performed. Whilst CT can provide great medical benefits its use also involves a risk of radiation-related cancer. These risks are likely to be higher for children because they have been shown to be more radiosensitive and have longer life-expectancy to accumulate risk. Both the benefits and the risks from the current levels of CT imaging in children have been hotly debated. The purpose of this symposium will be to discuss the risks and the benefits from the perspective of both epidemiologists and radiologists. Topics will include an overview of the ongoing epidemiological studies to evaluate cancer risks, trends in use, estimates of the potential future cancer risks, appropriate use criteria and efforts to reduce scanning levels and doses through public health campaigns like Image Gently. Speakers: *Overview of Epidemiological studies and Trends in Pediatric CT Use* - Mark Pearce, PhD (Institute of Health & Society, University of Newcastle, UK) *Projected Cancer Risks from Pediatric CT scans* - Amy Berrington de Gonzalez, DPhil (Division of Cancer Epidemiology & Genetics, National Cancer Institute) *A Clinical Perspective of the Appropriate Use of CT in Children* - Thomas Slovis, MD (Wayne State University School of Medicine)

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DEVELOPMENT OF A METHOD FOR ASSESSMENT OF RISK OF LUNG CANCER. *I Karp, M Abrahamowicz, K Leffondre, J Siemiatycki (University of Montreal, Montreal, QC, Canada, H2W 1V1)

Accurate assessment of risk of lung cancer represents an important part of health education, which can facilitate informed and rational decision-making regarding cigarette smoking cessation and lung cancer screening. To develop and validate a model for assessing the risk of lung cancer, we used data from a population-based case-control study conducted in Montreal, Quebec, Canada in 1996-2001. Individuals diagnosed with lung cancer ($n = 1205$) and age-/sex-matched lung cancer-free subjects ($n = 1541$) filled out detailed questionnaires documenting life-time cigarette smoking behaviour and occupational, medical, and family history. A multiple logistic regression model was fitted to the data, which were weighted by the inverse of age- and sex-stratum-specific "sampling fractions". In this model, incidence-density of lung cancer was represented as a function of age, sex, three dimensions of cigarette smoking history (time since cessation, duration of cigarette smoking, and the average number of cigarette smoked), family history of lung cancer, history of emphysema, pneumonia, and hay fever, and history of exposure to asbestos, fumes, benzene, fibers, pesticides, glues, and dry cleaning. Model overfitting was corrected using bootstrap cross-validation. Profile-specific incidence-density estimates were then converted to the corresponding risk estimates based on the exponential formula. The model was characterized by reasonably good fit and predictive ability, and has been made available on-line in a user-friendly format at http://episerve.chumontreal.qc.ca/calculation_risk/risk/riskadd.php. The developed risk assessment method may eventually become an important component of a comprehensive lung cancer control program.

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WHAT ROLE DOES THE EPIDEMIOLOGIST PLAY IN GENETIC EPIDEMIOLOGY? C Avery and K Monda (University of North Carolina, Dept of Epidemiology, Chapel Hill, NC)

Genetics and epidemiology share historical roots dating back to the 1950s. As a discipline, genetic epidemiology did not blossom until the mid-1990s when technological advances facilitated interrogation of the human genome. This has allowed unparalleled abilities to examine large-scale genetic data at low cost, prompting assembly of large databases and multi-study/international consortia. Given the diverse disciplines represented in these consortia, the direction of the field will undoubtedly be influenced by numerous perspectives. As genome sciences continue to mature, what role does the epidemiologist play? Should epidemiologists re-frame the genetic epidemiology paradigm to incorporate social, economic, and physical contexts into studies that examine the influence of genetic factors on human health? Ultimately how can epidemiologists incorporate lessons learned over the last 15 years to inform the direction of the field given the large amount of resources allocated and the lack of clarity regarding public health benefits? This symposium will address the evolving roles of epidemiologists in the rapidly advancing world of population genetics research.

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LUNG CANCER RISK AMONG SMOKERS OF MENTHOL CIGARETTES. W J Blot, S S Cohen, M Aldrich, J K McLaughlin, M K Hargreaves, *L B Signorello (Vanderbilt University, Nashville, TN)

Menthol cigarettes, preferred by African American smokers, have been conjectured to be harder to quit and to contribute to the excess lung cancer burden among black men, but prospective data on this issue are limited. The FDA is currently considering whether to ban their sale in the United States. In a prospective study of 85,806 racially diverse adults enrolled in the Southern Community Cohort Study during 2002-2009, we compared lung cancer incidence and mortality risks and quit rates for menthol vs. non-menthol cigarette smokers. Among both blacks and whites, menthol smokers reported smoking fewer cigarettes per day [1.6 (95%CI 1.3-2.0) fewer for blacks; 1.8 (95%CI 1.3-2.3) fewer for whites] than non-menthol smokers. During an average of 4.3 years of follow-up, 21% of participants smoking at baseline had quit, with menthol and non-menthol smokers equally likely to quit [odds ratio, OR = 1.0 (95%CI 0.9-1.2)]. In a nested case-control study of 463 incident lung cancer cases and 2,315 matched controls, the ORs for lung cancer for smokers of < 10, 10-19 and ≥ 20 cigarettes per day (relative to never smokers) were 5.0, 8.7 and 12.2 for menthol smokers and 10.3, 12.9 and 21.1 for non-menthol smokers. This pattern was mirrored for lung cancer mortality. In multivariate analyses adjusted for pack-years of smoking, menthol cigarette type was associated with a lower lung cancer incidence [OR = 0.65, 95%CI 0.47-0.90] and mortality [hazard ratio = 0.69, 95%CI 0.49-0.95] than non-menthols. The findings suggest that menthol cigarettes are no more, and perhaps less, harmful than non-menthol cigarettes.

ADIPOSIITY AND RISK OF LUNG CANCER IN A LARGE POPULATION. *Y Li, D Baer, Stanton Siu, N Udaltsova, G Friedman, and A Klatsky (Kaiser Permanente Medical Care Program, Oakland, CA)

Several previous reports suggest an inverse relation of adiposity to risk of lung cancer but residual confounding by smoking or existence of baseline illness have been suspected explanations. We performed a cohort study of 128, 874 men and women (mean baseline age 41.0 years) free of cancer history and with baseline data, including body mass index (BMI), at health examinations in 1978-85. Through 2008 lung cancer was subsequently diagnosed in 1852 persons. Cox proportional hazards models estimated relative risk (RR) of lung cancer adjusted for age, ethnicity, alcohol intake, education, and smoking. BMI was studied as a categorical and continuous variable. Adjusted RR (95% confidence intervals) vs persons with BMI < 25 kg/m² was 0.8 (0.7-0.9; $p < 0.001$) for persons with BMI 25-29 kg/m² and it was 0.6 (0.5-0.8; $p < 0.001$) for those with BMI ≥ 30 kg/m². With BMI as a continuous variable the adjusted RR per BMI unit was 0.96 (0.95-0.97, $p < 0.001$). Increased BMI had similar inverse relationships in men, women, whites, blacks, and Asians, as well as for the major non-small cell histological LC cell types. The RR associated with BMI ≥ 30 in never smokers was 0.6 (0.3-1.0), in exsmokers it was 0.7 (0.5-0.9), in < 1 pack/day smokers it was 0.7 (0.5-0.9), and in ≥ 1 pack/day smokers it was 0.7 (0.5-0.9). A test for interaction of BMI and smoking was not statistically significant. The RR associated with BMI ≥ 30 was 0.6 (0.4-0.8) if lung cancer diagnosis occurred within < 10 years and 0.7 (0.5-0.8) if the interval was ≥ 10 years. We screened 15 major cancer sites for adiposity-related risk; five had significantly ($p < 0.05$) increased risk and only lung cancer was inversely related. We conclude that, independent of smoking and interval to diagnosis, adiposity has an unexplained inverse association with risk of lung cancer.

ESTROGENIC BOTANICAL SUPPLEMENTS, HEALTH-RELATED QUALITY OF LIFE, FATIGUE, AND HORMONE-RELATED SYMPTOMS IN BREAST CANCER SURVIVORS: A HEAL STUDY REPORT. *H Ma, J Sullivan-Halley, A W Smith, M L Neuhaus, K Meeske, R McKean-Cowdin, C M Alfano, S M George, R Ballard-Barbash, and L Bernstein (City of Hope National Medical Center, Duarte, CA)

It remains unclear whether estrogenic botanical supplement (EBS) use has effects on breast cancer survivors' health-related quality of life (HRQOL), fatigue, or hormone-related symptoms. We examined the association of EBS use (overall, by number of EBS types, or by specific type) with HRQOL as measured by the Medical Outcomes Study short form-36 physical (PCS) and mental (MCS) component scale summary score, with fatigue measured by the Revised-Piper Fatigue Scale score, and with different hormone-related symptoms such as sleep interruption, hot flashes, and night sweats among 779 breast cancer survivors participating in the Health, Eating, Activity, and Lifestyle (HEAL) Study. 39.9% of breast cancer survivors reported having used at least one type of EBS since their breast cancer diagnosis. Neither overall EBS use nor the number of types of EBS used was associated with HRQOL, fatigue or hormone-related symptoms. However, analyses of specific types of EBS revealed that compared with non-EBS users, flaxseed oil users were more likely to have better overall mental health summary scores (OR = 1.91, 95% CI = 1.14-3.19) and were less likely to experience severe fatigue (OR = 0.60, 95% CI = 0.36-1.01). Compared with non-EBS users, ginseng users were more likely to experience severe fatigue (OR = 1.53, 95% CI = 0.94-2.47) and were also more likely to have different hormone-related symptoms. Alfalfa users were less likely to experience sleep interruption (OR = 0.30, 95% CI = 0.12-0.75) and DHEA users were less likely to have hot flashes (OR = 0.39, 95% CI = 0.15-0.98), although both statistically significant associations were based on small numbers of users. Our findings indicate that the importance of evaluating the effects of specific type of EBS in future studies.

TRENDS IN LUNG CANCER MORTALITY IN SOUTH AFRICA: 1995-2006. *O Fadahun, B Bello, D Kielkowski, and G Nelson (National Institute for Occupational Health, National Health Laboratory Service, Braamfontein 2000, Johannesburg, Gauteng Province, South Africa)

Background: Cancer remains a major cause of morbidity and mortality worldwide. In developing countries, data on lung cancer mortality are scarce. Methods: Using South Africa's annual mortality and population estimate data, we calculated lung cancer age-standardised mortality rates for the period 1995 to 2006. The population structure for the year 2001 was used as the standard population. Scatter plots and regression models were used to assess linear trends in mortality rates. To better characterise emerging trends, regression models were also partitioned for defined periods. Results: Lung cancer caused 52,217 deaths during the study period. There were 4,525 deaths for the most recent year (2006), with men accounting for 67% of deaths. Overall, there was no significant decline in lung cancer mortality in South Africa from 1995 to 2006 (slope = 0.02, $p = 0.847$). In men, there was a statistically non-significant annual decline of 0.24 deaths per 100,000 persons ($p = 0.138$) for the study period. However, from 2001 to 2006, the annual decline of 0.81 deaths per 100,000 persons was statistically significant ($p = 0.005$). In women, the mortality rate increased significantly at an annual rate of 0.17 per 100,000 persons ($p = 0.031$) for the study period, and at a higher rate of 0.28 per 100,000 persons ($p = 0.008$) from 1999 to 2006. Conclusions: The more recent declining lung cancer mortality rate in men is welcome but the increasing rate in women is a public health concern that warrants intervention. Smoking intervention policies and programmes need to be strengthened to further reduce lung cancer mortality in men and to address the increasing rates of lung cancer in women.

TOBACCO-RELATED CANCER RISKS AND MENTHOL CIGARETTES: A CASE-CONTROL STUDY. *S D Stellman (Dept. of Epidemiology, Mailman School of Public Health, Columbia University, New York, NY 10032)

The Family Smoking Prevention and Tobacco Control Act of 2009 authorizes the FDA to regulate cigarette content. The FDA Tobacco Products Scientific Advisory Committee is weighing recommendations to regulate menthol, the best-known cigarette additive. Most lung cancer studies and one esophageal cancer study have shown no evidence of additional risk in menthol cigarette smokers. We assessed risks for 5 cancer sites in 13,677 persons in the 1984-98 American Health Foundation hospital-based case-control study conducted in the three major New York City cancer centers (Memorial Sloan-Kettering, Columbia Presbyterian, New York University) and other cities (Stellman SD, *Ann Epidemiol* 2003; 13:294-302). Cases were confirmed by histopathology. Controls with non-tobacco-related illnesses were frequency matched to cases on sex, age, hospital, and year of interview. A total of 8,522 smokers had never smoked menthol cigarettes, 1,187 had smoked menthol cigarettes exclusively, and 1,445 smoked both types. Mixed type smokers accumulated 56-80% of total pack-years on menthol. We classified a person as a menthol smoker if he or she smoked ≥ 1 menthol brand, and adjusted for total pack-years in logistic regressions. Adjusted odds ratios (ORs) for current smoking ranged from 3.9 (95% confidence interval, CI: 3.0-5.1) for bladder cancer to 40 (95% CI 18-92) for larynx cancer, with intermediate ORs for mouth, lung, and esophageal cancer, all significantly > 1 . In current smokers, adjusted odds ratios for menthol smoking were between 0.7 and 1.0 for all sites, none significant. These data do not provide evidence of increased risk of lung or other cancers in menthol brand smokers beyond the well-known risks of cigarette smoking.

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SMOKING AT TIME OF BREAST CANCER DIAGNOSIS AND SURVIVAL. * J Brisson, S Bérubé and J Lemieux (URESP, Centre de recherche FRSQ du Centre hospitalier affilié universitaire de Québec, QC, Canada)

This study examines the relation of smoking status at time of breast cancer diagnosis to survival among 5,936 women diagnosed with invasive breast cancer treated in a Canadian breast center between 1987 and 2008. Date and cause of death were identified through linkage to Quebec Mortality File. Women were classified as never, former or current smokers, and according to duration of smoking (≤ 20 or > 20 years) and cigarettes smoked per day (≤ 15 or > 15 /day). Cox proportional-hazards models were used to assess the independent effect of smoking on overall and breast cancer mortality taking into account potential prognostic factors. Overall mortality rate was higher among current (mortality ratio, RR = 1.38, 95% confidence interval, CI: 1.20-1.59) and to a lesser extent among former (RR = 1.19, 95% CI: 1.04-1.37) smokers, relative to never smokers. There was a trend of an increased overall mortality with duration of smoking (p-trend < 0.0001) and with quantity smoked (p-trend < 0.0001). The patterns of the associations between smoking status at time of diagnosis and breast cancer mortality were consistent with those based on overall mortality: breast cancer mortality was slightly higher among current (RR = 1.14, 95% CI: 0.96-1.35) and former (RR = 1.08, 95% CI: 0.91-1.28) smokers, relative to never smokers. Relative to never smokers, breast cancer mortality was 1.32 (95% CI: 1.07-1.63) times higher among current smokers who are smoking for more than 20 years and 1.21 (95% CI: 0.98-1.51) times higher among those currently smoking more than 15 cigarettes/day. Smoking at time of breast cancer diagnosis decreases life expectancy, and also seems to interfere with breast cancer prognosis.

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USE OF SUPPLEMENTS CONTAINING ISOFLAVONES (PHYTOESTROGENS) AND BREAST CANCER RISK: CASE-CONTROL STUDY AMONG WOMEN IN ONTARIO, CANADA. *B A Boucher, M Cotterchio, L N Anderson, V A Kirsh, N Kreiger, L U Thompson (Cancer Care Ontario, Toronto, ON, Canada M5G 2L7)

Phytoestrogen (PE) intake has been associated with reduced breast cancer risk, however, most studies have evaluated food sources only. The association between supplements containing isoflavones (a major PE) and breast cancer risk was evaluated using cases recruited from the Ontario Cancer Registry (n = 3101) and controls identified through random digit dialing of Ontario households (n = 3471) in 2003-2004. Multivariate logistic regression was used to evaluate associations for 28 supplements listing ingredients known to contain isoflavones (confirmed through laboratory analysis) and breast cancer risk. Several supplements were independently associated with reduced breast cancer risk (e.g., bioflavonoid, cranberry, wild yam). Considering all isoflavone supplements, breast cancer risk was reduced among women who ever used > 2 supplements (age-adjusted odds ratio (AOR) = 0.68; 95% confidence interval (CI): 0.54, 0.86), and if total duration of use was greater than 5 years (AOR = 0.63; 95% CI: 0.50, 0.80). Considering only high potency supplements ($> 600 \mu\text{g}$ isoflavones/daily dose), ever use was also associated with reduced breast cancer risk (AOR = 0.72; 95% CI: 0.56, 0.91), as was use for 1 or more years (AOR = 0.53; 95% CI: 0.34, 0.83) or of > 2 items (AOR = 0.65; 95% CI: 0.48, 0.88). Associations did not differ by hormone receptor status, but were stronger among postmenopausal than premenopausal women. Overall the results of this study suggest that ever use of supplements containing isoflavones may reduce breast cancer risk, particularly among postmenopausal women.

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PHYTOESTROGEN FOOD AND SUPPLEMENT INTAKE AMONG WOMEN NEWLY DIAGNOSED WITH BREAST CANCER. *B A Boucher, M Cotterchio, S A Harris, V A Kirsh, N Kreiger, P Goodwin (Cancer Care Ontario, Toronto, ON, Canada M5G 2L7)

Phytoestrogens (PE) are found in foods such as soy (isoflavones) and flax (lignans), and in some supplements. Their role in breast cancer recurrence and treatment involving estrogen receptors (ER) is controversial, and it is unclear how this affects patient PE intake. A questionnaire was mailed to 417 newly diagnosed breast cancer cases identified using the Ontario Cancer Registry, to determine intake of PE foods and supplements in the last 2 months, changes since diagnosis, and differences by ER tumor status or hormonal treatment (HT). Of 278 (67%) patients who completed questionnaires, ER status was available for 72% and 67% reported HT. Fifty-six percent of cases reported consuming soy foods in the last 2 months, and 39% included important isoflavone foods (tofu, soybeans, soy milk, soy nuts). Most women reported non-soy foods high in isoflavones (86%) or lignans (70%). Among consumers, most PE foods were infrequently eaten; only soy milk, flaxseed and flaxseed bread were commonly consumed ≥ 1 -2 times/week. Four percent of cases took isoflavone (e.g. soy, red clover) or lignan (flax) supplements in the last 2 months, and 17% started or stopped soy foods since diagnosis (most stopped). There was no difference in current PE food or supplement intake by ER status or HT. However, starting or stopping soy foods was more frequently reported by those receiving HT (20%; 95% confidence interval (CI): 14, 26) versus no HT (6%; 95% CI: 1, 12), and most reported stopping. Results suggest some important PE foods but few PE supplements are consumed after a recent breast cancer diagnosis; intake may not vary by ER status or HT, other than more frequently stopping soy foods with HT.

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MULTIPLE IMPUTATION IN SMALL CLINICAL DATASETS: A PREDICTION MODEL FOR LUNG CANCER. *S A Deppen; J B Putnam, T Speroff, J Nesbitt, E Lambright, M C Aldrich and E L Grogan (Vanderbilt University Medical Center, Nashville, TN 37232)

No validated models exist to predict lung cancer in populations being evaluated by thoracic surgeons. Missing data plagues clinical datasets. Using only cases with complete data for analysis may introduce bias. We hypothesize that imputation can improve the accuracy of a model to predict lung cancer in a surgical population. A retrospective cohort of 268 patients underwent an operation for known or suspected lung cancer. Systematic chart review collected epidemiologic and radiologic data. All patients had pathologic tissue diagnosis. Multiple imputation with chained equations generated 10 datasets. Separate multivariate logistic regression models using complete and imputed data were developed to predict the risk of lung cancer. 92 of 268 patients had complete data across all 11 variables of interest. Overall lung cancer prevalence was 75% among all patients and 83% among those with complete data (n = 92). Models using imputed and complete data both had areas under the receiver operating curve of 0.87 and were well calibrated. The predictive model using imputed data was more precise (95% confidence interval [CI]: 0.82-0.92) compared to the complete case model (95% CI: 0.78-0.97). Age (odds ratio [OR] 1.10, 95% CI 1.05-1.14), positron emission tomography result (OR 6.5, 95% CI 2-21), and nodule size (OR 1.07, 95% CI 1.02-1.13) were predictors of lung cancer in the imputed model. Our model predicts lung cancer in patients being evaluated for thoracic surgery and should be validated in an independent dataset. Multiple imputation is effective in small clinical datasets with missing data and improves the predictive model precision.

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HORMONE CONCENTRATIONS, FATIGUE, AND SELF-RATED HEALTH AMONG BREAST CANCER PATIENTS. *L Gallicchio, B Wood, R MacDonald, K Helzlsouer (The Prevention and Research Center, Mercy Medical Center, Baltimore, MD)

Purpose. To examine the associations between serum hormone, vitamin D and C-reactive protein (CRP) concentrations with self-rated health and fatigue among breast cancer patients. **Methods.** Baseline data from a cohort study of 100 breast cancer patients initiating aromatase inhibitor therapy were analyzed. Questionnaire data on demographics, medications, symptoms (including fatigue), and self-rated health were collected and blood was drawn. Blood specimens were assayed for testosterone, androstenedione, dehydroepiandrosterone sulfate, sex hormone-binding globulin, 25-hydroxyvitamin D, and CRP. Generalized linear models were used to examine the associations between the hormones, vitamin D, CRP, and the outcome variables of self-rated health and fatigue adjusting for age, body mass index, prior chemotherapy, prior radiation, and time since diagnosis. **Results.** In unadjusted analyses, lower vitamin D and higher CRP concentrations were associated with worse self-rated health and more fatigue. After adjustment for potential confounders, trends persisted but only the association between CRP and self-rated health remained statistically significant (excellent/very good self-rated health, mean CRP 1.8 mg/L; good self-rated health, mean CRP 3.0 mg/L; fair/poor self-rated health, mean CRP 4.0 mg/L; p -for-trend = 0.049). Hormone concentrations were not associated with either outcome variable. **Conclusions.** Findings from this study suggest that vitamin D and CRP concentrations, but not hormone levels, may be associated with self-rated health and fatigue among breast cancer patients. This study was funded by NCI (CA132147-01A2), Astra-Zeneca, and Susan G. Komen for the Cure.

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SMOKING, BODY MASS INDEX AND GASTRO-ESOPHAGEAL REFLUX AND THEIR ATTRIBUTABLE FRACTION FOR ADENOCARCINOMA OF THE ESOPHAGUS AND THE GASTRO-ESOPHAGEAL JUNCTION. C M Olsen, *N Pandeya, A C Green, P M Webb and D C Whiteman for the Australian Cancer Study (Queensland Institute of Medical Research and the University of Queensland, Brisbane, QLD Australia 4000)

Of the several risk factors identified for adenocarcinoma of the esophagus (EAC) and the gastro-esophageal junction (GEJAC), smoking, body mass index and gastro-esophageal reflux symptoms are the three major established independent risk factors that are potentially modifiable or controlled. We aimed to quantify the proportion of adenocarcinoma attributed to these risk factors by estimating the population attributable fractions. We used data from a population based case-control study in Australia during 2002-2005. Participants included 791 cases (365 with incident EAC, 426 GEJAC, and 1580 population controls). After adjusting for other confounding factors, ever smoking attributed for 29% of EAC [95% Confidence Interval (95%CI) 16% - 45%] and 43% of GEJAC [95%CI: 32% - 54%] and overweight/obese attributed for 36% [95%CI 23% - 53%] of EAC and 22% [95%CI 10% - 41%] of GEJAC. Together, ever smoking and being overweight/obese attributed for 50% of EAC and 48% of GEJAC, while also including reflux symptoms accounted for 76% [95%CI: 66% - 84%] of EAC and 78% [95%CI 67% - 85%] of GEJAC. Partial population attributable fraction was highest among smokers who were overweight/obese and also experienced at least weekly reflux symptoms. Smoking, obesity and gastro-esophageal reflux symptoms accounted for more than two-thirds of cases of EAC and GEJAC in the population. Thus these cancers may be largely prevented by maintaining healthy BMI, avoiding smoking from the population, particularly among those experiencing regular reflux symptoms.

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CIRCULATING MARKERS OF INTERSTITIAL LUNG DISEASE AND SUBSEQUENT RISK OF LUNG CANCER. *M S Shiels, A Chaturvedi, H Katki, B Gochoico, N Caporaso, and E Engels (NCI, Rockville, MD 20892)

Pulmonary diseases and inflammation are associated with increased lung cancer risk. Circulating levels of surfactant protein-D (SP-D) and Krebs von Lungren-6 (KL-6) are elevated in patients with interstitial lung diseases, and may be useful markers of processes contributing to lung cancer. We conducted a nested case-control study (532 lung cancer cases, 582 matched controls and 150 additional controls with chest x-ray (CXR) evidence of pulmonary scarring) in a U.S. cancer screening trial. Serum levels of SP-D and KL-6 were measured using enzyme-immunoassay. Logistic regression was used to estimate the associations of SP-D and KL-6 with lung cancer and pulmonary scarring, adjusting for age, sex, smoking status, pack-years smoked, and years since quitting. Lung cancer risk increased with SP-D (p -trend < 0.001) and KL-6 levels (p -trend = 0.005). Compared to the lowest quartile, lung cancer risk was elevated in the highest quartiles of SP-D (odds ratio [OR] = 1.9; 95% confidence interval [CI] 1.3-2.6) and KL-6 (OR = 1.6; 95% CI 1.1-2.3). Above median levels of both markers were associated with twice the lung cancer risk (OR = 2.0; 95% CI 1.4-2.8). Lung cancer was associated with SP-D at 2.0-4.0 and ≥ 4.1 years after blood collection, and with KL-6 at 0-1.9 and 2.0-4.0 years after blood collection. Associations were limited to adenocarcinoma and squamous cell carcinoma, and to current and former smokers for SP-D and current smokers only for KL-6. CXR scarring was associated with higher levels of SP-D (p -trend = 0.05), but not with KL-6 (p -trend = 1.0). Two markers of interstitial lung disease were associated with increased lung cancer risk. Our findings support a role for pulmonary inflammation and scarring in lung cancer etiology.

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RISK PREDICTION FOR BARRETT'S ESOPHAGUS: TOOLS FOR THE POPULATION AND CLINIC *A P Thrift, N Pandeya, A C Green, P M Webb & D C Whiteman (Queensland Institute of Medical Research, Brisbane, Australia, 4029)

Barrett's esophagus (BE) is the only known precursor to esophageal adenocarcinoma. As BE is asymptomatic and diagnosis requires costly, invasive investigations, we sought to develop a risk prediction tool to aid clinicians in deciding whom to screen for BE. In a population-based case-control study, we collected data from 285 simple BE patients (without dysplasia), 108 dysplastic BE patients, and two control groups: 313 endoscopy controls and 644 population controls. We used two phases of stepwise backwards logistic regression to select an optimal subset of predictor variables: firstly including all significant covariates from univariate analyses; then fitting non-significant covariates from univariate analyses to identify those effects detectable only after adjusting for other factors. Model discrimination and calibration were assessed using ROC curves and the Hosmer-Lemeshow test, respectively. Models were internally validated using bootstrap techniques. We constructed an ordinal risk index by summing odds ratios for each risk factor. Final models included terms for demographic and lifestyle factors, medical history, medication use and gastrointestinal symptoms. For comparisons with population controls, the simple BE model had excellent discrimination (c-statistic 0.84, 95%CI 0.81-0.86) and adequate calibration (p = 0.10). Bootstrap analysis confirmed internal validation. The ordinal risk index (range 9-36) performed well (sensitivity = 70%) for the high-risk group (index ≥ 29). Results were similar for dysplastic BE and comparisons with endoscopy controls. These prediction tools appear to have reasonable clinical utility, however further validation in external datasets is necessary.

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EFFECT OF SERUM ENTEROLACTONE ON PROGNOSIS OF POSTMENOPAUSAL BREAST CANCER. K Buck, A Vrieling, A K Zaineddin, S Becker, R Kaaks, J Linseisen, D Flesch-Janys, *J Chang-Claude (German Cancer Research Center, Heidelberg, Germany)

Background: Lignans – plant-derived compounds with estrogen-dependent and -independent anti-carcinogenic properties – have been associated with postmenopausal breast cancer risk, but data are limited regarding their effect on survival. Methods: We assessed prognosis of 1,140 postmenopausal breast cancer patients aged 50-74 years and diagnosed between 2002 and 2005. Vital status was ascertained via local population registries up to the end of 2009, and deaths were verified by death certificates. Information on recurrences and secondary tumors was collected and verified by clinical records or treating physicians. Hazard ratios (HR) and 95% confidence intervals (CI) for post-diagnostic serum enterolactone in relation to overall survival (OS) and distant disease-free survival (DDFS) were assessed using Cox proportional hazards models stratified by age at diagnosis and adjusted for prognostic factors. Results: Median enterolactone levels for deceased and non-deceased patients were 17.0 and 21.4 nmol/L, respectively. The multivariate HR of the highest versus lowest quartile of enterolactone levels was statistically significantly decreased for OS (HR = 0.58, 95% CI = 0.34-0.99, P_{trend} = 0.04) and non-significant reduced for DDFS (HR = 0.62, 95% CI = 0.35-1.09, P_{trend} = 0.08). Although there was no significant heterogeneity by estrogen receptor (ER) status (p = 0.09), the highest quartile of serum enterolactone was significantly associated with a better OS for ER-negative tumors only (HR = 0.27, 95% CI = 0.08-0.87, P_{trend} = 0.10). Conclusions: Postmenopausal breast cancer cases with high serum levels of enterolactone may have a better survival.

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TRENDS IN BREAST CANCER DETECTION, INVESTIGATION, TREATMENT AND RELATIVE SURVIVAL BETWEEN 1993 AND 2003 IN QUEBEC. *L Perron, D Major, N Vandal, J Brisson (Institut national de santé publique, Québec, QC, Canada G1V 5B3)

Breast cancer (BC) detection, investigation, treatment and survival in Quebec, between 1993 and 2003, were examined using three random samples of about 20% of all women diagnosed with BC (1993, n = 912; 1998, n = 1,143; and 2003, n = 1,158). Cases were identified through national computerised databases. Two cancer registrars extracted data from the medical charts using a developed standardized form. Patterns of investigation and treatment were examined in light of international guidelines published in the late 1990's. Absolute differences observed between 1993 and 2003 and their 95% confidence interval (CI) were estimated using Sudaan software for proportions and using Bootstrap for percentiles. Relative survival was assessed using an adapted version of Ederer II method. Percentage of women aged 50 to 69 diagnosed with in situ BC increased 6 percentage points (CI: 1-12), from 8 to 15%, during study period. In women under 50 years with invasive BC, the proportion diagnosed with positive nodes (T1-3N+M0), locally advanced disease (T4M0) or metastatic disease (M1) increased by 17% (CI: 9-26). There was a substantial reduction of the gap between treatment according to guidelines delivered to the oldest (≥ 70) compared with that given to youngest cases. Wait time for 95% of patients to go from diagnosis to surgery increased 11 weeks (CI: 7-25) for in situ cases and 5 weeks (CI: 4-7) for invasive cases. Five-year relative survival increased 6 points (CI: -2; 11), from 77 to 83%, in node positive and 3 points (CI: -2; 7), from 94 to 97%, in node negative cases. Evolution of BC prognosis in women under 50 should be closely followed in Quebec. Lengthening delay to surgery should also be investigated.

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SENSITIVITY/SPECIFICITY OF CERVICAL HPV TESTING FOR CIN2+ IN HIV-INFECTED WOMEN WITH ASC-US CYTOLOGY. *G D'Souza, R D Burk, J M Palefsky, H Minkoff, X Xie, A M Levine, T Darragh, X Xue, L S Massad, H D Strickler (Johns Hopkins, Baltimore MD 21205)

ASC-US is a common cytologic finding in HIV-infected women. Testing for oncogenic HPV is recommended for triage of ASC-US in immunocompetent women. However, there is little data regarding the utility of HPV DNA testing to identify ASC-US likely to reflect CIN2+ in HIV-infected women. Cervical swabs and Pap smears were obtained semiannually between 2000-2008 in a large prospective cohort of HIV-infected women. Swabs were convenience specimens stored in an RNA preservative (for HIV testing) whose composition was not expected to interfere with HPV DNA testing. The study protocol called for all ASC-US cases to receive colposcopy. All 24 ASC-US cases with CIN2+ histology and a stratified random sample of 116 ASC-US cases without CIN2+ were selected for HPV DNA testing. All CIN2+ histology was centrally reviewed to confirm their diagnosis. Among HIV-infected women with ASC-US Pap results, oncogenic-HPV was significantly more common among women with CIN2+ histology than those with ≤ CIN 1 (94% vs 36%, p < 0.001). Oncogenic HPV was detected in 100% of CIN3/cancer, 92% of CIN2, 24% of CIN1 and 41% of women with normal histology. Overall, HPV testing had 94% sensitivity and 64% specificity for CIN2+. We note, thought, that only 80% of cervical swab specimens (stored in RNA preservative) were adequate for HPV PCR, based on amplification of human beta-globin. These data suggest that HPV DNA testing has high sensitivity but moderate specificity for CIN2+ among HIV-infected women with a cytologic diagnosis of ASC-US. Given the paucity of prior data, larger studies are warranted to assess sensitivity/specificity and cost effectiveness in HIV-infected women.

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LONG TERM PREDICTION OF HISTOLOGICAL DISEASE OF THE CERVIX WITH HPV DNA TESTING AND CYTOLOGY: RESULTS FROM THE LUDWIG-MCGILL STUDY. *M Chevarie-Davis, A V Ramanakumar, S Ferreira, L L Villa, A Ferenczy, E Franco (McGill University, Montreal, QC, Canada)

Although many studies have compared human papillomavirus (HPV) DNA testing to cervical cytology for the detection of pre-invasive lesions of the cervix, most used cytology as an endpoint, thus being subject to outcome misclassification. Our objective was to use the gold standard of histopathology to ascertain lesion outcomes in a repeated-measurement, longitudinal study of HPV and cytology testing. A cohort study was conducted in Brazil and enrolled 2462 women for interviews, cervical cytology, cervicography, and HPV testing. HPV DNA testing and cytology were performed at each visit, i.e., every 4 months in the first year and every 6 months in subsequent years. Detection of high-grade lesions on cytology or cervicography prompted referral to colposcopy. The specificity, sensitivity and predictive values of HPV testing and cytology, cross-sectionally and as repeated longitudinal measurements, were summarized in receiver operating characteristic (ROC) analyses. Time-to-event analyses using Kaplan-Meier plots and Cox regression were also performed comparing screening modalities. When considering all subjects, those in whom a low grade squamous intra-epithelial lesion (SIL) or worse was detected had an 11 times higher risk of being diagnosed with cervical intraepithelial neoplasia (CIN) grade 2 or higher on histology, as compared with those who had atypical squamous cells of undetermined significance (ASCUS) or less. However, after stratification according to HPV status, the increase in risk was apparent only in women positive for high risk HPV. These results emphasize the importance of considering both HPV DNA testing and cytology for an optimal screening model.

PARITY AND RISK OF LUNG CANCER IN WOMEN: SYSTEMATIC REVIEW AND META-ANALYSIS OF EPIDEMIOLOGICAL STUDIES. I J Dahabreh, *J K Paulus (Tufts Clinical and Translational Science Institute, Boston, MA)

Multiple studies have assessed parity as a risk factor for lung cancer but results have been inconclusive. We identified studies investigating the association of parity with lung cancer risk allowing the calculation of dose-response trends. From each study we calculated per-child estimates of the relative risk (RR) for lung cancer using a linear dose-response model. We assessed between-study heterogeneity of the dose-response coefficients using Cochran's Q statistic and the I² index. We used random effects meta-analysis to estimate summary per-child RR's with their 95% confidence interval (CI). Results: We identified 16 eligible studies (8095 lung cancer cases and 350,295 unaffected individuals) that provided data for meta-analysis. There was significant between-study heterogeneity ($p < 0.001$; $I^2 = 72\%$). The summary RR was 0.99 (95% CI, 0.95, 1.02), indicating no effect of parity on lung cancer risk. Results were consistent in case-control [RR = 0.99 (95% CI, 0.94-1.04)] and cohort studies [RR = 0.99 (0.95-1.02)]. There was some evidence that studies enrolling exclusively patients with tumors of non-small cell lung cancer histology found a protective effect of parity [RR = 0.95 (95% CI, 0.89-1.01)] as compared to those including cases with small cell lung cancer [RR = 1.00 (95% CI, 0.98-1.03)]; this difference was borderline ($p = 0.05$). Conclusions: Studies assessing the association between parity and lung cancer risk have produced heterogeneous results. Overall, there is little evidence of a dose-response relationship between increasing number of live births and lung cancer. Future studies should include analyses in well-defined histological subgroups of patients.

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USE OF DIFFERENT COAL TYPES AND RISK OF LUNG CANCER IN XUANWEI, CHINA. *F Barone-Adesi, R Chapman, X He, W Hu, R C H Vermeulen, N Rothman, Q Lan. (National Cancer Institute, Bethesda, MD 20892)

Lung cancer rates in rural Xuanwei County, Yunnan Province, are among the highest in China, and have been causally associated with exposure to indoor coal emissions that contain very high levels of polycyclic aromatic hydrocarbons. This study evaluated the effect of lifelong use of two different types of coal, "smoky coal" (bituminous) and "smokeless coal" (anthracite), on lung cancer mortality. A cohort of 37,753 farmers, born from 1917 through 1951, was followed retrospectively from 1976 through 1996. During the study period, there were 9,845 deaths from any cause and 2,445 from lung cancer. Association of type of coal used with lung cancer mortality was analyzed with nonparametric survival analysis and multivariable Cox models. After adjusting for the presence of competing risks of death, the probabilities of death from lung cancer before 80 years of age for men and women using smoky coal were 18% and 20%, respectively, compared with less than 0.5% among smokeless coal users of both sexes. Before age 60, lung cancer alone accounted for about 40% of deaths among smoky coal users. Compared with smokeless coal, use of smoky coal was associated with a statistically significantly increased risk of death from lung cancer (men: Hazard Ratio [HR], 37; 95% Confidence Interval [CI], 22-51; women: HR, 121; 95% CI, 50-293). A monotonic increase in risk of lung cancer with longer time spent at home was observed among smoky coal users of both sexes. These findings suggest that the carcinogenic potential of household coal combustion products exhibits substantial variation by specific coal type. Use of less carcinogenic types of coal can translate in a significant reduction of lung cancer risk.

ESTIMATING THE POTENTIAL EFFECT OF INTERVENTIONS ON FAIR-POOR SELF-RATED HEALTH AMONG BREAST CANCER SURVIVORS. *M Schootman, A D Deshpande, S Pruitt, R Aft, D B Jeffe (Washington University, St. Louis, MO 63108)

To estimate the potential effect of changes in predictors on the incidence of fair-poor self-rated health (SRH) among a statewide sample of breast cancer survivors in Missouri. In 2007-2008, we interviewed 832 breast cancer survivors 1 year after diagnosis (baseline) and 1 year later. We estimated effects of potential changes in predictors on incidence of fair-poor SRH based on the theory of missing counterfactual observations. Predictors included: 1) sociodemographic factors, 2) access to medical care, 3) comorbid conditions, 4) psychosocial factors, 5) perceived neighborhood conditions, 6) cancer-related behaviors, and 7) clinical factors. First, multivariable logistic regression models estimated the association between the predictors and SRH. Second, we estimated the counterfactual probabilities of fair-poor SRH for each breast cancer survivor by calculating the participant-specific probabilities of fair-poor SRH. Third, by averaging the probabilities across all survivors and comparing to the current incidence of fair-poor SRH, we estimated the population-wide effect of potential changes in modifiable predictors on the incidence of fair-poor SRH. Bootstrapping calculated the confidence intervals around the population-level effect estimates. 7.4% of participants (92.4% white; mean age: 58.0 years) whose SRH was rated good-excellent at baseline reported fair-poor SRH one year later. The largest potential reduction in incidence of fair-poor SRH could be obtained by eliminating surgical side effects (27.8% reduction) and comorbidity (21.8% reduction) and with engaging in any physical activity (19.6% reduction)

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A COMPARISON OF PROVIDER AND PATIENT FOLLOW-UP RECOMMENDATIONS GIVEN LATINAS AFTER AN ABNORMAL PAP TEST. *M Sanderson, H M Brandt, M E Fernandez, K Harbi, A L Coker, M K Fadden (Meharry Medical College, Nashville, TN 37208)

The Texas-Mexico border has one of the highest cervical cancer mortality rates in the United States. A possible explanation is the failure of Latinas to receive appropriate follow-up care after an abnormal Pap test. Few studies of follow-up care among Latinas have utilized information from providers in conjunction with information from patients. We used data from providers and their patients who participated in a prospective cohort study conducted among 460 Latinas who visited primary care clinics from February 2004 through May 2008 on the Texas-Mexico border. In-depth interviews were completed by telephone with 20 providers. Follow-up procedures recommended by most providers included colposcopy, biopsy, cryotherapy, loop electrosurgical excision procedure (LEEP) and repeated Pap tests. Many providers also mentioned HPV risk factors and prevention such as practicing safe sex and stopping smoking. At baseline, nearly all women reported their provider recommended taking a closer look at the cervix/colposcopy (95%), repeat Pap test (88%), or another procedure (biopsy/LEEP/cryosurgery) (88%). Lower percentages of women reported they had received prevention messages like don't douche (70%), tell partner you have HPV (67%), use condoms (66%), don't smoke (63%), stop having sex (58%) and treat warts (10%). Our findings suggest that although Latinas living on the Texas-Mexico border are aware they should receive appropriate follow-up care they may not be taking measures to reduce the spread of HPV, which may partially account for the higher rates of cervical cancer mortality in this population.

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ASSOCIATION BETWEEN LEPTIN CONCENTRATION AND OBESITY IN MEXICAN-AMERICAN WOMEN WITH BREAST CANCER. K R, *Sexton T, Avery A, Brewster El-Zein R, Bondy M L (MD Anderson Cancer Center, Houston, TX)

Leptin is a hormone produced by adipose tissue and increases with obesity. It has been shown in in vitro studies to have mitogenic effects and is positively associated with breast cancer risk. Obesity increases the risk of postmenopausal breast cancer while decreasing the risk of premenopausal disease. However, in our previous study of Mexican-American women, obesity was not associated with breast cancer risk, regardless of menopausal status. It is important to identify biologic factors that may explain the differential effects of obesity between the races. We conducted a retrospective study of 490 non-Hispanic white (NHW, N = 172), African-American (AA, N = 164), and Mexican-American (MA, N = 154) women newly diagnosed with breast cancer. Blood samples were collected prior to treatment, and serum levels of leptin were measured by ELISA. Medical records were abstracted for body mass index, age at diagnosis, and tumor characteristics. The difference in mean levels of leptin was evaluated using the Kruskal-Wallis test. Leptin levels were significantly lower in MA women compared to NHW and AA ($p < 0.001$). Among obese women only, MA had significantly lower leptin concentrations (41.8ng/mL) than both NHW (52.0ng/mL) and AA (60.4ng/mL, $p < 0.001$). When stratified by menopausal status, leptin levels were significantly lower in MA compared to NHW and AA women in both pre- and postmenopausal obese women ($p = 0.002$ in postmenopausal, $p < 0.001$ in premenopausal). Although this was a small hypothesis-generating study, the data suggest that differences in leptin levels may play a role in the lack of association between obesity and breast cancer in MA women. Results will be validated in a case-control study of MA women.

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EXPOSURE TO ENVIRONMENTAL TOBACCO SMOKE AND RISK OF LUNG CANCER: EVIDENCE FROM A CASE-CONTROL STUDY IN MONTREAL, CANADA. *M Al-Zoughool, J Pintos, L Richardson, M-É Parent, P Ghadirian, D Krewski, J Siemiatycki (University of Ottawa, Canada, K1N 6N5)

Objective: to examine the association between environmental tobacco smoke (ETS) and risk of lung cancer among never smokers, defined as subjects who smoked less than 100 cigarettes in their lifetime. Methodology. We conducted a population-based case-control study of lung cancer in Montreal, Canada (1996-2001) including 1,203 cases and 1513 controls. Interviews elicited socio-demographic, occupational, and lifestyle factors information, including lifetime active smoking, and lifetime history of ETS. The present analysis was restricted to the 36 cases and 439 population controls who had never smoked. Odds ratios (ORs) and 95% confidence intervals (CIs) were estimated between ETS and lung cancer, adjusting for age, sex, SES, and exposure to occupational lung carcinogens. Results: Overall there was no association between ever exposure to ETS and lung cancer (OR = 0.77; 95%CI: 0.4-1.5). However there appeared to be some effect modification. Exposure to ETS seemed to be more strongly associated when it occurred after 20 years of age (OR = 2.0; 95%CI: 0.7-6.3) compared to earlier in life (OR = 0.41; 95%CI: 0.1-2.3), and when it took place outside the home (OR = 2.2; 95%CI: 0.7-6.7) rather than inside the home (OR = 0.47; 95%CI: 0.1-1.6). Discussion: Despite the imprecision of our estimates, our results are compatible with previous research that shows that ETS exposure in adulthood may be associated with lung cancer, contrary to ETS exposure during childhood.

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ACCELEROMETER MEASURES OF PHYSICAL ACTIVITY AND BREAST CANCER RISK: THE NCI POLISH BREAST CANCER STUDY. *C Dallal, L Brinton, C Matthews, B Peplonska, J Lissowska, G Gierach (National Cancer Institute, Bethesda, MD 20852)

Epidemiologic studies suggest that physical activity reduces breast cancer risk, but prior studies have relied primarily on self-reported activity. We evaluated the association between objectively measured activity and breast cancer risk, with the aim of assessing whether accelerometer-based measures are better discriminators of risk than self-report. This analysis includes 996 incident breast cancer cases and 1,164 controls, residents of Warsaw, Poland in 2000-2003. At the home visit (median = 60 days postdiagnosis for cases), women ages 20-74 years were asked to wear an accelerometer (Actigraph 7164) for 7 days and complete a questionnaire including activity history. Activity monitor levels were averaged across valid days of wear and summarized by minutes spent per day in sedentary (0-99 counts), light (100-759 counts) and moderate-to-vigorous (760+ counts) behavior. Odds ratios (OR) and 95% confidence intervals (CI) were estimated using unconditional logistic regression. Time spent in moderate-to-vigorous activity was inversely associated with breast cancer risk after adjustment for breast cancer risk factors, and sedentary and monitor wear time (OR_{Q4vsQ1}: 0.38, 95%CI: 0.26-0.54; p-trend < .0001). Increased sedentary time was related to increased risk, independent of moderate-to-vigorous activity (OR_{Q4vsQ1}: 1.69, 95%CI: 1.16-2.45; p-trend < .01). Restricting days since diagnosis and treatment yielded similar results. Associations did not differ by histology, tumor size, grade, or nodal involvement. These findings were stronger than those based on self-reported activity in these women, suggesting that studies of physical activity can be improved by more objective measures.

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VALIDITY OF SELF-REPORTED HISTORY OF CANCER IN A CANCER SCREENING COHORT. *A Shin, D-H Lee, J Kim (Cancer Epidemiology Branch, National Cancer Center, Goyang-si, Korea)

The self-reported cancer history is a main tool for epidemiological and clinical researches, since it is frequently used for identification of high-risk group for cancer, and determination of medical decision. Several previous studies have assessed the sensitivity and positive predictive value of self-reported cancer history using cancer registry data or medical records as a gold standard. The sensitivities of overall cancer history were between 0.27 to 0.93 and varied by cancer site, countries, gender, ethnicity, age, year data collected, time between diagnosis and questionnaire survey date, cancer stage at diagnosis, or method for data collection (self-administered vs. in-person interview). The purpose of the current study was to evaluate the sensitivity of self-reported cancer history among visitors of a cancer screening center in Korea. Study subjects were recruited from the Center for Cancer Prevention and Detection, the National Cancer Center, Korea between May 2002 and June 2009. The personal identification numbers of 23,142 participants were linked to the Central Cancer Registry database. Sensitivity of self-reported cancer history was calculated using the cancer registry data as a gold standard. Among 608 participants who had a record in cancer registry database before the questionnaire survey, 526 reported cancer history in the questionnaire. The sensitivity was 0.875 (95% confidence interval: 0.836-0.890). Sensitivity was lower in older age group compared to younger age group (0.840 for 60 and older vs. 0.956 for 39 and younger). Sensitivity did not differ by sex, educational attainment, duration between cancer registration and questionnaire survey, and the year of participants' recruitment. In conclusion, the sensitivity of self-reported cancer history in this cancer screening population was in acceptable range.

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VITAMIN AND CALCIUM SUPPLEMENT USE AND BREAST CANCER SURVIVAL AND RECURRENCE. E M Poole, X-O Shu, B J Caan, S J Nechuta, J P Pierce, W Y Chen (Harvard University, Boston, MA)

Introduction: Although vitamin supplement use is common after a breast cancer diagnosis, little is known about effects on breast cancer survival. Supplements may be beneficial, but could interfere with treatment. We examined post-diagnosis supplement use and risk of breast cancer death or recurrence in the After Breast Cancer Pooling Project, a consortium of 4 cohorts of 17,013 breast cancer survivors. Methods: Supplement use (Vitamins A, B, C, D, E, multivitamins (MV), beta-carotene, calcium, folic acid) was categorized as none, MV use, single supplement use (i.e. calcium only), or unknown. Associations were analyzed in Cox proportional hazards models separately by cohort, with time since diagnosis as the time scale, and using left-truncation to account for the time between diagnosis and study enrollment. Heterogeneity between cohorts was evaluated using random effects meta-analysis. If no heterogeneity was found, the cohorts were pooled; otherwise the random effects meta-analysis estimates were used. Results: Single supplement calcium and vitamin D use were associated with decreased risk of recurrence: HR: 0.89 (95% CI: 0.80-0.98) and HR: 0.73 (95% CI: 0.59-0.90), respectively. No association was observed for other vitamin supplements or for breast cancer death. Conclusion: In this large consortium of breast cancer survivors, calcium and vitamin D use were associated with decreased risk of breast cancer recurrence. While these results should be confirmed in other cohorts, future studies should investigate timing, duration, and dose of supplement use.

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EVALUATING THE EFFICACY OF CURRENT CLINICAL PRACTICE FOR ADJUVANT CHEMOTHERAPY (AC) IN POST-MENOPAUSAL WOMEN WITH HORMONE-RECEPTOR-POSITIVE, ONE TO THREE POSITIVE AXILLIARY LYMPH-NODES BREAST CANCER (HR+ 1-3 LN+ BC). *M Hannouf, M Brackston, B Xie and G Zaric (University of Western Ontario, London, ON, Canada N6A 5C1)

To evaluate the current versus previous clinical practice for AC in post-menopausal women with HR+ 1-3 LN+ BC, we used the Manitoba Cancer Registry and Manitoba administrative databases to identify all post-menopausal women diagnosed with HR+ 1-3 LN+ BC during the periods of January 1995 to December 1997, January 2000 to December 2002, and January 2003 to December 2005 (n = 156, 161 and 171, respectively). Seven-year survival data were available for the earlier two cohorts (1995-1997 and 2000-2002). Clinical practice for AC was not found to differ during the time period of 2000 to 2005. Thus, the earlier two cohorts were only included in this analysis. There were 103 women (64%) of those who were diagnosed later (2000-2002) versus 44 women (28%) of those who were diagnosed earlier (1995-1997) who received AC (mean difference = 36%, 95% confidence interval = 31% to 40%, p = 0.01). Disease free survival (DFS) of patients diagnosed later did not differ significantly than those diagnosed earlier (DFS = 69% versus 64%, respectively, log-rank test p = 0.42). In multivariate Cox regression analysis, patients in the later versus the earlier cohort were not significantly associated with incremental DFS benefit over 7 years (2000-2002 vs. 1995-1997, hazard ratio: 0.95; confidence interval = 0.64 to 1.4, p = 0.78), after adjustment for comorbidity, and receipt of radiation therapy. The treatment standard of AC may not be effective for all post-menopausal women with HR+ 1-3 LN+ BC. These data suggest the need to use predictive biomarkers to identify those who could be spared AC in this population.

* = Presenter; S = The work was completed while the presenter was a student

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THE ASSOCIATION BETWEEN PAP (PAPANICOLAOU) SMEAR AND PELVIC EXAMINATION SCREENINGS AND THE DEVELOPMENT OF INVASIVE VAGINAL AND VULVAR CANCERS IN AN OLDER POPULATION. *E F Osterbur, K A Rosenblatt, D Maduram, J Douglas (University of Illinois at Urbana-Champaign, Champaign, IL 61820)

The efficacy of performing Pap smear and pelvic examination screenings in older women has been strongly debated by researchers and policymakers. We utilized a matched case-control design that detected incident vulvar (N(number) = 1,103) and vaginal (N = 328) cancer cases, respectively, from the SEER(Surveillance, Epidemiology and End Results)-Medicare database between 1991 and 1999. Population controls were selected from a random 5% sample pool of Medicare beneficiaries living in the same regions of the United States as the cases. We identified vulvar (N = 8,825)and vaginal(N = 2,624) cancer controls that were matched on age and geographic location. Stratified analysis suggest that Pap smear and pelvic examination screenings have a stronger negative association among regional (OR (Odds Ratio) = 0.71, 95% CI (Confidence Interval) = 0.51-1.00), distant (OR = 0.68, 95% CI = 0.27-1.70 and unstaged (OR = 0.77, 95% CI = 0.37-1.59) invasive vulvar cancers as opposed to localized cancers (OR = 1.42, 95% CI = 1.16-1.73). Similar findings were observed for vaginal regional (OR = 0.78, 95% CI = 0.40-1.51), distant (OR = 0.31,95% CI = 0.09-1.03) and unstaged (OR = 0.86, 95% CI = 0.43-1.70)cancers as opposed to localized cancers (OR = 1.09, 95% CI = 0.65-1.83). In addition, screening has a stronger negative association among women who are between the ages of 65 and 74 for vulvar (OR = 0.55, 95% CI = 0.31-0.97) cancers as opposed to older women (< = 100 years old). Our findings suggest that Pap smear and pelvic examination screenings may reduce the risk of late stage vaginal and vulvar cancers in older women.

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FREQUENCY AND COST OF CHEMOTHERAPY-RELATED SERIOUS ADVERSE EFFECTS (CSAE) IN A CANADIAN POPULATION SAMPLE OF WOMEN WITH HORMONE-RECEPTOR-POSITIVE EARLY STAGE BREAST CANCER (HR+ ESBC) *M Hannouf, M Brackston, B Xie and G Zaric (University of Western Ontario, London, ON, Canada N6A 5C1)

To characterize the risks and economic impact of CSAE among women in the Canadian general population treated with adjuvant chemotherapy (AC) for HR+ ESBC, we used the Manitoba Cancer Registry to identify all women (n = 665) diagnosed with HR+ ESBC during the period from January 1, 2000 to December 31, 2002. One-year of follow-up information from diagnosis, including hospitalizations (HP) and emergency room visits (ERV) for all adverse effects that are typically related to AC, were identified by linking with the Hospital Discharge Database and the Physician Claims Database in Manitoba. 251 women received AC during the 12 months after the initial diagnosis with ESBC. We assessed the effect of AC on rate of CSAE using logistic regression, adjusting for menopausal status, lymph node status, type of AC, and comorbid indices. Women who received AC were more likely than those who did not to have HP or ERV for CSAE (2.6% versus 9%, mean difference = 6.4%, 95% confidence interval (CI) = 3.5% to 10%, p = 0.01). In a logistic regression analysis, the rate of CSAE was found to be significantly greater for women with post-menopausal status (post- versus pre-menopausal, odds ratio 2.4; CI = 1.7 to 2.8) and 1-3 lymph node positive (1-3 LN+) (0 versus 1-3 LN+, odds ratio, 3.1; CI = 2.5 to 3.6). AC recipients incurred large incremental expenditures for CSAE (pre-menopausal LN-: \$1100 per person per year; post-menopausal LN-: \$1600 per person per year; post-menopausal 1-3 LN+: \$2200 per person per year). The impact and costs of CSAE among HR+ ESBC population are much larger than predicted from clinical trials and vary by LN and menopausal status.

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PREDICTORS OF CHANGE IN PHYSICAL ACTIVITY DURING ACTIVE TREATMENT IN A PROSPECTIVE STUDY OF BREAST CANCER SURVIVORS. *M L Kwan, B Sternfeld, I J Ergas, A W Timperi, J Kim Roh, C P Quesenberry, L H Kushi (Division of Research, Kaiser Permanente, Oakland, CA 94612)

Physical activity (PA) offers many benefits to breast cancer survivors including reduction in treatment-related side effects, better quality of life, and improved prognosis, yet PA research during the immediate period following a breast cancer diagnosis is limited. In a prospective cohort study of over 1,700 women recently diagnosed with invasive breast cancer in the Kaiser Permanente Northern California Medical Care Program from 2006-2009, we describe PA levels 2 and 6 months post-diagnosis and determine the effects of socio-demographic, treatment, and other clinical factors on changes in PA. Participants completed a PA questionnaire at baseline (2 months post-diagnosis) and follow-up (6 months post-diagnosis) on frequency, duration, and intensity of select activities. Predictors of PA change were determined by multivariate linear regression. Reductions in all PA levels from baseline to follow-up were observed ($p < 0.0001$ from one sample t-test). Median (I-Q range) hours per week of sedentary, moderate, and vigorous activity at baseline were 17.6 (9.9), 3.0 (4.9), and 0.7 (2.3) and follow-up were 16.8 (9.6), 2.3 (4.1), and 0.4 (1.5). BMI at diagnosis, race/ethnicity, and chemotherapy were associated with declines in moderate-vigorous physical activity (MVPA), adjusting for age at diagnosis and cancer stage. Obese and Asian women were less likely to reduce their MVPA compared to normal weight and White women, while women on chemotherapy were more likely to reduce their MVPA compared to women not on chemotherapy. Associations with sedentary activity were also noted. Breast cancer patients reduce their activity levels during active treatment, and these changes are influenced by clinical and non-clinical factors.

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TWENTY-FIVE YEARS OF HIGH BLOOD PRESSURE FINDINGS AMONG MEXICAN AMERICAN ADULTS IN THE US. *C Fryar (CDC, National Center for Health Statistics, Hyattsville, MD 20782)

To provide estimates and trends in hypertension among Mexican Americans – part of the rapidly growing Hispanic population in the United States (US), data was used from the Hispanic Health and Nutrition Examination Survey (HHANES 1982-84) and the National Health and Nutrition Examination Surveys (NHANES III 1988-1994 and NHANES 1999-2006) in which Mexican Americans were oversampled. Estimates were stratified by country of birth. Standard errors were estimated by Taylor Series Linearization, incorporating sample weights and survey design variables. Statistical tests of linear trends by survey were performed using orthogonal polynomial contrasts and tests of differences between population subgroups for age, gender, body mass index, poverty, and health insurance status, using t-tests at the $p < 0.05$ level. Overall, the age-adjusted prevalence of hypertension for both US and non-US born Mexican American adults aged 20-74 years has remained stable over the past 25 years. However, Mexican Americans born in the US were significantly more likely to have a higher prevalence of hypertension than Mexican Americans born outside of the US. This finding was true for all survey periods: 1982-84 (24.5% vs. 20.1%); 1988-1994 (23.2% vs. 19.4%) and 1999-2006 (26.3% vs. 19.7%). Differences by country of birth were found for adults 40-59 years, males, and for those without health insurance for all survey periods. The prevalence of hypertension increased as age and body mass index increased regardless of country of birth for all of the survey periods. These findings may provide guidance for overall and targeted preventive efforts toward a condition that puts this rapidly increasing ethnic population at risk for more serious health consequences.

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SMOKING, BODY MASS INDEX AND LUNG CANCER RISK. *M El-Zein, M-E Parent, B Nicolau, A Koushik, J Siemiatycki, M-C Rousseau (INRS-Institut Armand Frappier, Laval, QC, Canada, H7V 1B7)

The inverse association observed between body mass index (BMI) and lung cancer has been mainly attributed to residual confounding by smoking and/or pre-clinical effects of lung cancer. In a population-based case-control study conducted in the Greater Montreal, Canada, from 1996-2002, we first assessed the association between smoking and BMI among controls. We then aimed to clarify the role of BMI in lung cancer development. Cases included men and women with incident lung cancer, while controls were randomly sampled from electoral lists. Analyses were based on 1071 cases and 1431 controls. Continuous values of BMI, in kg/m², were used as well as categorical: underweight (< 18.5), normal (18.5-24.9), overweight (25.0-29.9), and obese (≥ 30). Linear and logistic regression models were used adjusting for several a priori confounders including socio-demographic, lifestyle and occupational factors. Compared to never smokers, controls who currently smoked had a lower BMI. Among those who smoked 20-39 cig/day, the BMI was lower by 1.1 kg/m² (95% CI = -1.8, -0.4). The BMI among controls who quit 5-9 years prior to interview was 1.1 kg/m² (95% CI = 0.2, 2.0) higher than that of never smokers. Considering the association between BMI and lung cancer, underweight individuals had a two-fold increase in lung cancer risk (OR = 2.3, 95% CI = 1.3, 4.1), whereas no association was observed among obese individuals (OR = 0.9, 95% CI = 0.7, 1.3). In all analyses, stratifying by gender did not change the conclusions. Our results remain compatible with both possible explanations: residual confounding by smoking and weight loss from undiagnosed lung cancer.

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MARIJUANA USE AND LONG-TERM MORTALITY AMONG SURVIVORS OF ACUTE MYOCARDIAL INFARCTION. *L Frost, K J Mukamal, M A Mittleman, (Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA 02215.)

Background: Marijuana use can cause changes in heart rate and blood pressure that may lead to cardiac ischemia in susceptible individuals, and has been reported to increase short-term risk of myocardial infarction (MI) immediately after use. In a prior analysis of 1986 patients followed for 3.8 years, we found an increased risk of mortality in MI survivors who reported marijuana use, but this has not been examined in other studies. Methods: In the Determinants of MI Onset Study, 3886 patients hospitalized for MI in 64 centers nationwide from 1989-1996 reported their marijuana use prior to hospitalization. Using the National Death Index, we followed patients for mortality until Dec 31, 2007. Results: A total of 109 patients reported marijuana use (all aged < 65 years), and 1433 died during follow-up of 11 to 18 years. Among patients < 65 years old, after adjusting for lifestyle, medical, and socioeconomic factors in a Cox proportional hazards model, we found a hazard ratio (HR) of 1.41(95%CI,0.58-3.42) for less than weekly users and 2.00(95%CI,1.05-3.79) for weekly users at 5 years of follow up (p -trend 0.01). Over 10 years, those HRs decreased to 1.39(95%CI,0.69-2.81) for less than weekly users and 1.57(95%CI,0.94-2.62) for weekly users (p -trend 0.18). Conclusions: Marijuana use among patients who survive an MI is associated with a higher mortality rate over the ensuing 5 years, but this association wanes with longer follow-up. This may represent decreased use with aging and suggests that studies with repeated measures of marijuana use are needed to establish the magnitude of cardiovascular risk associated with smoking marijuana among patients with coronary heart disease.

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IMPACT OF PHARMACIST CARE IN THE CONTROL OF CARDIOVASCULAR DISEASE RISK FACTORS: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED TRIALS. *V Santschi, A Chiolero, B Burnand, A L Colosimo, and G Paradis (Department of Epidemiology, Biostatistics, and Occupational Health, McGill University, Montreal, QC, Canada)

Background: Pharmacists may improve the clinical management of risk factors for cardiovascular disease (CVD) prevention. We conducted a systematic review to determine the impact of pharmacist-care on CVD risk factors. Methods: The MEDLINE, EMBASE, CINAHL, and Cochrane CENTRAL databases were searched for randomized controlled trials (RCT) that involved pharmacist-care interventions among outpatients with CVD risk factors. Mean changes in blood pressure (BP), total cholesterol (TC), LDL cholesterol and proportion of smokers were estimated using random effect models. Results: 28 RCTs (11,138 patients) were identified. Interventions were conducted exclusively by a pharmacist or implemented in collaboration with other health professionals. Pharmacist-care was associated with significant reductions in systolic/diastolic BP [18 studies (10,077 patients); -7.8 mmHg (95% CI: -9.9 to -5.6)/-4.0 (-5.6 to -2.3)], TC [8 studies (896 patients); -19.5 mg/L (-27.5 to -11.4)], LDL [6 studies (699 patients); -15.2 mg/L (-25.3 to -5.1)], and a reduction in the risk of smoking [2 studies (196 patients); relative risk: 0.77 (0.67 to 0.89)]. While most studies tended to favor pharmacist-care compared to usual care, a substantial heterogeneity was observed. Conclusion: Pharmacist-care improves the control of CVD risk factors in outpatients. Pharmacists should be involved in CVD healthcare.

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RISK FACTORS FOR STROKE: UNMASKED BY AGE AND SEX. *N E Mayo, S Daskalopoulou, L Nadeau, J J Brophy, J Hanley, M S Goldberg (McGill University, Montreal, QC, Canada H3A 1A1)

The incidence of ischemic stroke is declining and the incidence for women is rapidly approaching that of men. This study estimated in a representative sample of the population, differences between men and women on the risk of stroke associated with specific medical, lifestyle and psychosocial factors and differences for men and women under the age of 70 when stroke is considered preventable. A prospective cohort study was carried out using the 1992 and 1998 Santé Québec Surveys linked through to 2007 to health administrative data for hospitalization and services. Cox proportional hazards model (HR) was used to model the time to stroke in relation to information available at time of survey. A total of 17,805 persons were followed for average of 11 years, yielding over 200,000 person-years; 360 strokes were identified over this period and these people were on average 70 years at time of stroke. For men of all ages, heart failure (CHF) and peripheral vascular disease (PVD) were the strongest risk factors (HR: ≥ 2.0) but hypertension, heart disease (IHD), and diabetes also posed important and statistically significant risk. Women of all ages were at very high risk of having a stroke if they had diabetes (HR: 2.4) or renal disease (HR: 4.3); for preventable strokes (< 70 years), the effects of these were even stronger (HR 4.1 and 5.8, respectively). Also in the younger population of women, PVD (HR: 3.7) and IHD (HR: 1.7) were of particular concern. Only men who were regular smokers had a significantly elevated risk of stroke (HR: 2.7) whereas any exposure to cigarette smoke increased the risk of stroke for women. The risk with very high BMI exceeded 3.5 for all but was as high as 5.4 for women under 70 years. Women showed a greater risk of stroke than men for indicators of psychological distress which were particularly strong for women under 70. This information indicates that greater tailoring stroke prevention approaches to men and women of different ages should be considered.

* = Presenter; S = The work was completed while the presenter was a student

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20-YEAR SURVIVAL AND YEARS OF POTENTIAL LIFE LOST POST-MYOCARDIAL INFARCTION: THE ARIC STUDY. *R E Foraker, K M Rose, A M Kucharska-Newton, A R Folsom, C M Suchindran, P P Chang, W D Rosamond (The Ohio State University, Columbus, OH 43210)

Coronary heart disease (CHD) is a major cause of death which results in a large number of years of potential life lost (YPLL). Data suggest that disparities in CHD mortality exist by race and gender. We assessed survival and YPLL following incident myocardial infarction (MI) among 1,188 black and white women and men from the Atherosclerosis Risk in Communities (ARIC) cohort (1987-2006) who did not have prevalent CHD at baseline. We used Cox proportional hazards regression to estimate hazard ratios and 95% confidence intervals (HR, 95% CI) for all-cause mortality following MI. Total YPLL was calculated for deaths occurring prior to age 65. By the end of follow up, 90 (51%) black women, 64 (44%) black men, 116 (37%) white women and 163 (30%) white men with MI died, and median survival was 8, 10, 13 and 16 years, respectively. Using white men as the referent category and with adjustment for baseline age, hypertension, diabetes, body mass index, current smoking and self-rated health, the hazards of all-cause mortality following MI were higher among black women (1.59, 1.38-1.83), black men (1.36, 1.17-1.59) and white women (1.30, 1.15-1.47). Mean YPLL per death was highest among black men (1.2) followed by black women (1.1), white women (0.7) and white men (0.6). In this biracial cohort, the hazard of death following incident MI was higher among all race/gender groups as compared to white men, while blacks had a higher mean YPLL per death than did whites. In these data, disparities in CHD survival and YPLL were more evident by race than by gender, suggesting that black patients are at highest risk for death and YPLL post-MI.

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WITHDRAWN

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ASSOCIATION BETWEEN ARTERIOLAR SCLEROTIC AND HYPERTENSIVE CHANGES IN RETINA AND CARDIOVASCULAR DISEASE RISK FACTORS AMONG JAPANESE URBAN WORKERS AND THEIR FAMILIES. *T Namekata and M Nakata, K Suzuki and C Arai (Pacific Rim Disease Prevention Center, Seattle, WA 98165)

The purpose of the study is to examine the association of arteriolar sclerotic and hypertensive (ASH) changes in retinal arteries with cardiovascular disease risk factors. Subjects were 7,272 employees and families who completed screening tests and filled out the self-administered questionnaire in major cities in Japan for 2006-07. Retinal photographs were taken and ASH changes were graded from 0 to IV, based on the criterion developed by Scheie (Arch Ophth. 1953; 49:177-138). To use logistic regression analysis ASH changes were transformed to binary variable: 0 for score 0 as normal and 1 for scores I-IV as abnormal. The results showed that ASH changes were associated with age (reference: age < 40): 40-59 years old (odds ratio:10.1, 95% confidence interval:2.8-36.3) and > 60 years old (49.1, 12.4-194.3), hypertension (28.5, 15.0-54.2), diabetes (34.0, 12.8-90.2), abnormally high cardio-ankle vascular index scores (2.5, 1.4-4.4) and smokers (2.3, 1.1-4.8) among women. The results for men were similar but additionally ASH changes were significantly and negatively associated with high density lipoprotein cholesterol and current smokers and positively with body mass index > 27. Our results confirm that risk factors of atherosclerosis in small arteries are mostly shared by the same risk factors of atherosclerosis in large arteries as we previously reported. One predictive factor of stroke is considered to be ASH changes and thus we need to remove the above positive risk factors for preventing stroke if possible.

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QUALITY OF LIFE OUTCOMES AMONG HEART FAILURE PATIENTS WHO SMOKE. *N C Peiper, M M Donneyong, C A Hornung (Department of Epidemiology and Population Health, School of Public Health and Information Sciences, University of Louisville, Louisville, KY 40202)

Cigarette smoking is an important risk factor for poorer quality of life in all age groups although few studies have directly addressed quality of life outcomes in smokers with heart failure. Using the Minnesota Living with Heart Failure Questionnaire, changes in overall, physical, and emotional quality of life were compared from baseline to six months among heart failure patients (n = 280). Minimally important (i.e., clinically significant) differences in quality of life were determined by anchor-based and distribution-based methods for each dimension. Multivariate linear regression models were fit to analyze change scores among current smokers controlling for demographics, comorbidities, clinical features, and HF treatment variables. At month six, current smokers and patients with high social support had poorer overall and emotional quality of life. However, while differences among current smokers met the criteria for a minimally important difference and are therefore significant for the clinical management of patients, they were not statistically significant (i.e., $p > 0.05$). Cigarette smoking is a clinically significant risk factor for poorer quality of life outcomes among heart failure patients, directly corroborating population-based and clinical studies. Studies that address quality of life issues and modifiable risk factors are warranted as aging populations continue to grow.

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PARENTAL DEATH DURING CHILDHOOD AND ADULT CARDIOVASCULAR RISK IN A DEVELOPING SOUTHERN CHINESE POPULATION: THE GUANGZHOU BIOBANK COHORT STUDY. *C M Schooling, C Q Jiang, T H Lam, W S Zhang, K K Cheng, G M Leung (School of Public Health, The University of Hong Kong, Hong Kong SAR, China)

In western observational studies childhood emotional adversity is associated with adult cardiovascular disease (CVD). The authors examined the association of a potential marker of childhood emotional adversity (parental death) with biological CVD risk factors in a developing population. Multivariable regression was used in cross-sectional analysis of older (≥ 50 years) men (n = 7,885) and women (n = 20,886) from the Guangzhou Biobank Cohort Study (2003-8) to examine the associations of parental death before 18 years (0, 1 or 2 deaths) with CVD risk factors, and with seated height and delayed 10-word recall as validation outcomes. Early life parental death was associated with shorter age- and sex-adjusted seated height. Adjusted for age, sex, socio-economic position, leg length and lifestyle, it was also associated with lower 10-word recall. Similarly adjusted, early life parental death was not positively associated with blood pressure, lipids, glucose or obesity. There was some sex-specific associations; among men death in early life of two parents was associated with lower waist-hip ratio (-0.007, 95% confidence interval -0.014 to -0.0001). These findings in a non-western developing context suggest that some of the observed associations in western populations may be socially rather than biologically based. Potential reasons for early adversity being negatively associated with CVD risk factors among men should be sought.

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ALCOHOL CONSUMPTION AND LONG-TERM MORTALITY AMONG WOMEN SURVIVORS OF ACUTE MYOCARDIAL INFARCTION. *J I Rosenbloom, K J Mukamal, L E Frost, M A Mittleman (Beth Israel Deaconess Medical Center, Harvard Medical School, Boston MA 02215)

Moderate alcohol consumption is associated with lower mortality rate among men with prior myocardial infarction (MI), however, the association in women has not been well studied. In the Determinants of MI Onset Study, 1199 women hospitalized for MI in 64 centers nationwide from 1989-1996 were eligible. All patients were followed for mortality through 12/31/2007. There were 245 deaths at 5 years and 422 deaths at 10 years. We created propensity scores for three categories of weekly alcohol consumption (low: 07) as compared to abstainers (0 drinks/week). Covariates used in the propensity score included age, body mass index (BMI) and BMI², first MI, history of cardiac and non-cardiac comorbidity, usage of cardiac medications, current and former smoking, exercise, income, education, and race. We used Cox regression to calculate hazard ratios (HRs) for all-cause mortality after 5 and 10 years of follow-up, with abstainers (n = 821) as the referent group. Models were adjusted for propensity score, age, and clinical features of the MI. For 5 years of follow-up HRs were: low(n = 281, deaths [d] = 35) 0.69 (95% confidence interval [CI] 0.47,1.01), medium(n = 50, d = 6): 0.91, (95%CI 0.40,2.09), high(n = 47, d = 3): 0.28 (95%CI 0.07,1.20), p-trend 0.03. After 10 years HRs were: low(d = 65) 0.67 (95%CI 0.51,0.89), medium(d = 11): 0.86 (95%CI 0.47,1.60), high(d = 8): 0.48 (95%CI 0.22, 1.07), p-trend 0.003. Results were similar in fully adjusted models without propensity scores. These results suggest that in women there is a dose-dependent negative association between alcohol consumption and long-term mortality after MI.

PREDICTORS OF 1-YEAR SURVIVAL AFTER ISCHEMIC STROKE AND INTRACEREBRAL HAEMORRHAGE: RESULTS FROM THE STROKE MORTALITY AND MORBIDITY STUDY (THE EMMA STUDY). *A C, Goulart T G, Fernandes A P Alencar, Fedeli L M G, Benseñor I M, Lotufo PA (University of São Paulo, São Paulo, Brazil, 05508000)

Introduction: Socioeconomic status plays an important role for stroke trends in developing countries. We aimed to analyze predictors of 1-year survival after ischemic stroke (IS) and intracerebral haemorrhage (ICH) among participants of the EMMA study. Hypothesis: to verify if there are differences in predictors of 1-year survival according to stroke subtypes. Methods: we prospectively ascertained consecutive first-ever stroke (IS and ICH) registered between April 2006 and December 2008, using the standardized World Health Organization (WHO)'s stepwise approach to stroke surveillance, in a hospital located in a deprived area in the city of São Paulo, Brazil. Results: From a total of 430 first-ever stroke cases with mean age of 68 years-old, 84.9% were classified as IS and 15.1% as ICH. We adjudicated 108 stroke deaths [ischemic, 79.6%; haemorrhagic, 20.4%] during 1-year of follow-up. The age-adjusted 1-year case-fatality rates for IS and ICH were 16.3% vs. 25.4%, respectively. Patients with ICH had a poorer 1-year survival compared to those with IS (log-rank test $P = 0.04$). The Cox-proportional-hazard model including age, sex, education, living status and alcohol consumption found the following independent predictors of death within 1 year among IS: age ≥ 80 years-old (hazard ratio [HR], 2.56; 95% CI, 1.31-5.03, $P = 0.006$) and none education (HR, 3.55; 95% IC, 1.33-9.46), $P = 0.01$). For ICH, alcohol consumption and other variables did not represent predictors of death. Conclusion: Low education was the most important predictor of poor survival among individuals with ischemic stroke during the first-year of follow-up.

SEX DIFFERENCES IN THE RELATION BETWEEN NEGATIVE SOCIAL PERCEPTIONS/INTERACTIONS AND STROKE RISK. *K Henderson, T Lewis, C Clark, N Aggarwal, T Beck, S Lunos, H Guo, D Evans, C Mendes de Leon, S Everson-Rose (University of Minnesota, Minneapolis, MN)

Psychosocial factors are associated with excess stroke risk, but few studies have examined whether associations differ for men and women. This study investigated sex differences in the association of psychosocial factors with incident stroke. Data are from 2,649 adults (54% black, 46% non-Hispanic white; 61% female; mean (SD) age = 77 (6.3)) without a self-reported history of stroke from a longitudinal study of chronic conditions in the elderly. Over 6 years (SD = 3.4) of follow-up, 470 incident strokes occurred (ascertained via linkage with Medicare claims files through 12/31/07). Prior analysis on six negative psychosocial measures revealed two factors labeled 'distress' (depressive symptoms, neuroticism, life dissatisfaction, perceived stress) and 'negative social perceptions/interactions' (hostility, perceived discrimination). A Cox model was conducted for each factor, testing the factor*sex interaction, and controlling for age, race, sex, education, systolic blood pressure, body mass index, physical activity, smoking, and chronic conditions. The negative social perceptions/interactions factor*sex interaction was significant ($p = .015$). In sex-stratified models, each 1-point higher score related to a 10% increased risk of stroke in women [hazard ratio (HR) = 1.10; 95% confidence interval (CI) = 1.02-1.19; $p < .02$], but not men ($p = .77$). The distress*sex interaction was nonsignificant ($p = .13$), but there was a main effect of distress [HR = 1.04; 95% CI = 1.01-1.08; $p < .01$]. Negative psychosocial factors contribute to excess risk of stroke in older adults, but women may have greater vulnerability to adverse effects of negative social perceptions and interactions.

DIFFERENCES IN CARDIOVASCULAR DISEASE RISK FACTORS BETWEEN ASIAN-INDIAN AND WHITE, NON-HISPANIC MEN IN THE CALIFORNIA MEN'S HEALTH STUDY *N R Ghai, V P Quinn, Reina Haque, A T Ahmed, S K Van Den Eeden (Kaiser Permanente Southern California, Pasadena, CA 91101)

Cardiovascular disease (CVD) rates are higher in Asian-Indians compared to other race/ethnic groups. To compare lifestyle CVD risk factors between Asian-Indian and white, non-Hispanic (WNH) men, we evaluated participants from the California Men's Health Study (CMHS), a multi-ethnic cohort of 84,170 men, ages 45-69, enrolled between 2001-2002, who were members of Kaiser Permanente Southern and Northern California. Descriptive and multivariable statistics were used to evaluate data from a mailed survey. In the CMHS cohort, there are 51,901 WNH men and 602 Asian-Indian men. Asian-Indians were more likely than WNHs to live in low income households (22% v. 15%), yet had considerably higher educational attainment (77% v. 53%, with college degree). Asian-Indians more often reported a healthy BMI (18.5-24.9) [Adjusted Odds Ratio (AOR) = 1.8 (95% CI 1.5-2.2)] and more often consumed $< 30\%$ calories from fat [AOR = 2.6 (95% CI 2.1-3.1)]. There were no differences for fruit and vegetable consumption; however, Asian-Indian men were more likely to have never smoked and to abstain from alcohol. While Asian-Indian men were less likely to report moderate/vigorous physical activity > 3.5 hours/week [AOR = 0.54 (95% CI 0.46-0.64)], there was little difference in sedentary activity time spent outside of work. We found Asian-Indian men had fewer CVD-related lifestyle risk factors compared to WNH men. These results suggest risk factors other than lifestyle behaviors may be contributors to CVD in the Asian-Indian population.

PHYSICAL ACTIVITY ON AND OFF THE JOB: CONFLICTING ASSOCIATIONS WITH LONG-TERM STROKE MORTALITY. U Goldbourt (Wingate College of Sports and Exercise Sciences, Nethnay 42902, Israel)

Leisure time Physical activity has been demonstrated to antecede reduced coronary heart disease (CHD) and all-cause mortality. The Association with stroke remains less clear. We followed-up 9500 apparently healthy male civil servants and municipal employees, free of heart disease, stroke or cancer. The degree of physical activity was assessed by questionnaires, administered individually. Prediction of 34 year fatal stroke (1963 to 1997) was estimated using a Cox proportional hazard regression, with age at death of stroke as the time variable. Hazard ratios were calculated using the method by Breslau. Proportionality of hazard was evaluated by Schoenfeld residuals. Over 34 years the risks of fatal stroke, relative to those on totally sedentary jobs (47 % of the cohort) were 1.09, 1.19 and 1.38, respectively, for men who had reported mainly sitting at work; men standing or walking; and counterparts on tasks that demanded heavy labour (P trend-test = 0.003). Conversely, the corresponding hazards of stroke mortality according to reported leisure time activity were 0.84, 0.81 and 1.01, respectively, among "sporadic", "light" and "energetic" off-job activity, relative to men who were not engaged in any physical activity. In multivariate analysis incorporating categories of both on- and off-job reported activity, hazards associated with occupational activity according to the categories listed above were modified only slightly to 1.10, 1.21 and 1.39 (P for trend = 0.006), whereas those associated with the categories of leisure time activity were 0.88, 0.80, and 1.02. Additionally adjusting for socioeconomic status (SES) removed most of the statistical association of non-sedentary work with stroke. No other adjustment changed the results appreciably. No known mechanism or associated characteristics are available to explain the unexpected relationship of on-job reported physical activity with fatal stroke, in this cohort of migrants with extremely varied occupations.

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RELATIVE TELOMERE LENGTH AND CHANGE IN RELATIVE TELOMERE LENGTH IN ISCHEMIC STROKE: A NESTED CASE-CONTROL STUDY. *M Schürks, J Prescott, I De Vivo, K Rexrode (Brigham and Women's Hospital, Boston, MA 02215)

Background—Shortening of telomere length has been implicated in cardiovascular disease. Data on an association of relative telomere length (RTL) with ischemic stroke are scarce and data on an association of change in RTL (cRTL) and stroke outcomes are unavailable. Methods—We used a nested case-control design among women participating in the prospective Nurses' Health Study. Participants provided blood samples in 1990 and 2000. We considered 1990 as baseline and matched women with confirmed incident ischemic stroke to controls by age, smoking, postmenopausal status, and postmenopausal hormone use. Quantitative real-time PCR was used to determine RTL in genomic DNA extracted from peripheral blood leukocytes. We used conditional logistic regression to determine the risk of ischemic stroke associated with RTL in 1990 and cRTL between 1990 and 2000. We investigated RTL and cRTL as quartiles. Results—Data on baseline RTL was available from 509 case-control pairs and on cRTL from 90 case-control pairs. RTL was not significantly associated with risk of ischemic stroke; the odds ratio [OR] (95% confidence intervals [CI]) for the highest vs. lowest quartile was 1.01 (0.64-1.57); p trend = 0.88. In contrast, cRTL appeared to be inversely associated with ischemic stroke: highest vs. lowest change quartile OR = 8.29 (95% CI 1.05-65.27) adjusted for baseline RTL; p trend = 0.04. However, estimates were nonsignificant in multivariable-adjusted models controlling for cardiovascular risk factors: OR = 5.26 (95% CI 0.46-60.35); p trend = 0.20. Conclusion—Our study does not support an association between RTL and ischemic stroke in women. While there is some indication that cRTL might be inversely associated with the risk for ischemic stroke, power was limited.

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CORONARY ARTERY DISEASE IN MIDDLE-AGE AFTER PRENATAL EXPOSURE TO THE DUTCH FAMINE OF 1944-1945. *L H Lumey, Lauren H Martini, R Prineas, M Myerson, Aryeh D Stein (Columbia University, New York, NY 10032)

Possible long-term effects of prenatal exposure to famine on coronary artery disease (CAD) have been examined previously with varying conclusions. We here compare CAD prevalence and future CAD risk from Framingham risk estimates in adults identified at birth in three clinics with exposure to the Dutch famine of 1944-1945 and in unexposed controls. We conducted standardized interviews and clinical examinations in 1,075 men and women at mean age 58 years, including 407 subjects with prenatal famine exposure, 344 subjects born in the same clinics before or after the famine as time controls, and 324 same-sex siblings of either of the above groups as family controls. CAD was defined as a history of myocardial infarction (MI), a history of angioplasty or bypass surgery, CAD positive symptoms using the Rose Questionnaire, or ECG Q wave abnormalities at examination. The 10-year future risk for MI and CHD death was estimated from the Framingham risk score based on gender, age, systolic blood pressure, total and HDL cholesterol, and current smoking status. There were 22 participants with CAD among the hospital controls (6.4%), 19 among the sibling controls (5.9%), and 29 among those with famine exposure in pregnancy (7.1%). The odds ratio (OR) for famine exposure in any week of pregnancy relative to controls was 1.11 (95% CI: 0.64 to 1.92; p = 0.71). The median risk for a future CAD event was 10% in men and 2% in women and the risk did not differ by exposure group. (OR for exposure 1.06; 95% CI: 0.84 to 1.33) There were no differences in age at onset CAD onset between study groups. In this study we found no relation between prenatal famine and adult CAD prevalence or risk, but the number of CAD events was limited. More sensitive markers of future CAD risk should therefore be considered for future studies.

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RISKS OF CARDIOVASCULAR DISEASE AMONG DIABETIC WOMEN WITH BILATERAL OOPHORECTOMY *D Appiah, C A Hornung and S J Winters. (University of Louisville, Louisville KY 40292)

Cardiovascular Disease (CVD) is the leading cause of death in women and the risk is increased threefold in diabetics. In postmenopausal diabetics, the ovary responds to hyperinsulinemia by increasing secretion of testosterone precursors which increases the risk of CVD. We used data from the third National Health and Nutrition Examination Survey to test the hypothesis that a history of Bilateral Salpingo-Oophorectomy (BSO) would reduce the risk of CVD among postmenopausal diabetic women due to reduced androgen levels. Logistic regression was performed with adjusted odds ratios (OR) and 95% confidence intervals (CIs) calculated. Of the 2367 postmenopausal women (81.4% non-Hispanic whites) included in the study, 33% had diabetes and 24% reported a history of BSO with 82% of these having the surgery before age 50. Diabetics were more likely to be older, live a more sedentary lifestyle and had higher prevalence of stroke and myocardial infarction than non diabetics. After controlling for age, sex, race, poverty income ratio, age at menarche and menopause, hormone therapy, hysterectomy, abdominal obesity, physical activity, high-density lipoprotein cholesterol, triglycerides, smoking and hypertension in models with progressive degrees of adjustments, BSO was protective in diabetics but not statistically significant (OR = 0.83, CI: 0.31-2.2). However, there was a significant interaction between BSO and controlled diabetes (OR = 0.03, p = 0.005), while interactions of BSO with undiagnosed diabetes (OR = 0.32, p = 0.07) and uncontrolled diabetes (OR = 1.18, p = 0.76) did not meet statistical significance. Our finding makes evident that BSO has a protective effect on the risk of CVD in women with controlled diabetes.

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ELECTROCARDIOGRAPHIC MARKERS OF SUBCLINICAL CARDIAC DISEASE IN MIDDLE AGE FOLLOWING PRENATAL EXPOSURE TO THE DUTCH FAMINE OF 1944-1945. *R J Prineas, L H Martini, A D Stein, M Myerson, L H Lumey (Wake Forest University School of Medicine, Winston Salem, NC)

The long-term consequence of prenatal famine exposure for cardiac disease in adulthood has been examined with inconsistent conclusions. We here compare differences in subclinical markers of cardiac dysfunction in adults identified at birth in three clinics with exposure to the Dutch famine of 1944-1945 and in unexposed controls. We completed standardized examinations of a birth series of 942 people at a mean age of 58 years, including 353 study subjects who had been exposed prenatally to famine, 287 unrelated births who were born before or after the famine in the same clinics to serve as time controls, and 302 same-siblings of the groups above to serve as family controls. From triplicate electrocardiograms (ECG's) we calculated the QT index, resting heart rate, heart rate variability (HRV), and the root mean square of successive N-N interval differences and the standard deviation of N-N intervals as two ECG time-domain measures of HRV. These measures serve as sub-clinical electrocardiographic continuous measures of cardiac autonomic neuropathy (CAN). We also evaluated ST segment deviations, minor T wave abnormalities, and other ECG indexes of subclinical disease such as the QRS/T frontal plane angle for comparisons between exposure groups. All markers were selected as they independently predict future coronary artery disease and total mortality. In our analysis, we found no significant relation between any of the ECG based subclinical markers of future cardiac disease in middle age and in-utero exposure to famine. All markers were independently related to coronary artery disease risk factor levels in the direction of increased risk as expected from other studies. In conclusion, we found no relation between prenatal exposure to famine and a variety of subclinical ECG markers of cardiac disease, shown in other populations to infer poor prognosis.

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MAJOR AND MINOR ECG ABNORMALITIES AND LEFT VENTRICULAR SIZE IN MIDDLE AGE AFTER PRENATAL EXPOSURE TO THE DUTCH FAMINE OF 1944-1945. *Merle Myerson, Lauren H Martini, Ronald J Prineas, Aryeh D Stein, L H Lumey (Columbia University, New York, NY 10032)

The long-term consequence of prenatal famine exposure for cardiac disease in adulthood has been examined with inconsistent conclusions. We here compare selected electrocardiographic (ECG) risk measures in adults identified at birth in three clinics with exposure to the Dutch famine of 1944-1945 and in unexposed controls. We completed standardized examinations of a birth series of 942 people at a mean age of 58 years, including 353 study subjects who had been exposed prenatally to famine, 287 unrelated births who were born before or after the famine in the same clinics to serve as time controls, and 302 same-siblings of the groups above to serve as family controls. In our study groups, we compared major and minor ECG abnormalities as defined by selected Minnesota and Novacode categories and left ventricular size as defined by Cornell voltage (CV). Ninety-one (9.7%) participants had major ECG abnormalities and 275 (29.2%) had minor ECG abnormalities. There were no differences among exposure groups. The Cornell voltage was 1292 (SD 523) among famine exposed subjects, 1301 (SD 492) among time controls and 1188 (SD 523) among sibling controls. Adjusting for gender, age, and clustering within sibships, the difference in CV among subjects exposed to famine at any week during gestation was 11 (95% CI: -56 to 78; $p = 0.75$). This study does not support an association of prenatal famine exposure with selected discrete and continuous ECG indicators of adult cardiac disease risk.

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IMPACTS OF THE AUGUST 2003 POWER OUTAGE ON MORTALITY IN NEW YORK, NY. *G B Anderson and M L Bell (Yale University, New Haven, CT 22301)

A power outage on August 14-15, 2003, affected all of New York, NY, the first citywide blackout since 1977. This blackout stranded commuters, shut hotels, and affected water supply to high-rise buildings. We used a generalized linear time series model to investigate the mortality risk associated with this power outage using mortality data from 1987-2005 and controlling for potential confounders (long-term and seasonal trends in mortality, day of the week, and daily mean and dewpoint temperatures). We found that mortality risk for all non-accidental deaths increased 25.3% (95% confidence interval: 11.7%, 40.5%) on August 14 and 15, 2003, resulting in approximately 78 excess deaths. Using a distributed lag model, we determined that this increase was not short-term mortality displacement; in fact, mortality risk remained slightly elevated for the remainder of August 2003. We found that individuals ≥ 65 years were particularly affected (42.8% increase in mortality risk for those 65-74 years and 23.8% increase for those ≥ 75 years, compared to 17.3% increase for individuals < 65 years). To our knowledge, this is the first investigation of the effects of a power blackout on non-accidental mortality. Understanding the impacts of power outages on human health is important, given that urbanization and climate change are likely to strain power grids, and terrorist attacks on a power grid remain a security concern.

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RESIDENTIAL RADON AND NON-LUNG CANCER MORTALITY IN THE AMERICAN CANCER SOCIETY COHORT. *M C Turner, D Krewski, Y Chen, C A Pope III, S Gapstur, M J Thun (University of Ottawa, Ottawa, ON, Canada, K1N 6N5)

Radon gas is a known cause of lung cancer. Previously, we demonstrated a positive association between residential radon and lung cancer mortality in the American Cancer Society Cancer Prevention Study-II (CPS-II). Here the association between residential radon and mortality from malignant and non-malignant diseases other than lung cancer is examined. CPS-II is a large prospective cohort study of nearly 1.2 million Americans recruited in 1982. Mean county-level residential radon concentrations were linked to study participants based on their ZIP code at enrollment (mean (SD) = 53.5 Bq/m³ (38.0)). Cox proportional hazards regression models were used to estimate adjusted hazard ratios (HR) and 95% confidence intervals (CI) for all cause (excluding lung cancer) and cause-specific mortality associated with radon concentrations. After necessary exclusions, a total of 811,961 participants in 2,754 counties were analyzed. As of 2006, there were a total of 314,311 deaths, of which 293,777 were due to causes other than lung cancer. No clear associations were observed between residential radon and mortality from cancer sites other than the lung. However radon exposure was significantly associated with chronic obstructive pulmonary disease (COPD) mortality (HR per each 100 Bq/m³ = 1.13, 95% CI 1.05 - 1.21). Findings were robust to the control of a variety of socio-demographic ecological risk factors, potential spatial clustering in the data, and ambient ozone concentrations. This large prospective study suggests that residential exposure to radon may increase COPD mortality. The significance of this finding will depend on replication in other studies.

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IMPAIRED DRINKING WATERS AND ASSOCIATIONS WITH GASTROINTESTINAL CONDITIONS. *J S Jagai, B J Rosenbaum, S M Pierson, L C Messer, K Rappazzo, EN Naumova, D T Lobdell (USEPA, Research Triangle Park, NC 27711)

Under the Clean Water Act, the U.S. Environmental Protection Agency (EPA) collects information on intended stream use and impairment. We hypothesized that counties with impaired drinking water environments will also have higher rates of gastrointestinal infections (GI) and gastrointestinal symptoms (GS). Impairment data were obtained and merged with stream length data to estimate the percent of drinking-water-impaired stream-length per county in the 13 states that report these data. GI- and GS- (defined per ICD-9 codes) related hospitalizations (1991-2004) were abstracted from the Center for Medicare and Medicaid Services (CMS), the only comprehensive national hospitalization dataset. Data were aggregated by county of residence; annual hospitalization rates in the elderly (65+ years) per county were calculated. A linear random effects model assessed county-level associations between percent impaired waters and hospitalization rates, adjusted for percent of population on public water supply and population density. Neither GI (unadjusted: beta coefficient (B): -0.064; 95% Confidence Interval (95% CI): -0.292, 0.164; adjusted: B: -0.014; 95% CI: -0.224, 0.196) nor GS (unadjusted: B: 0.561; 95% CI: -0.929, 2.050; adjusted: B: 0.677; 95% CI: -0.808, 2.162) hospitalization rates were associated with drinking water impairment. Low GI case counts and low GS outcome specificity may partially account for the lack of association with drinking water impairment. Impairment data from omitted states would possibly confirm these results. Though limited, this analysis demonstrates the feasibility of utilizing data collected for policy in environmental public health research. (This abstract does not necessarily reflect EPA policy.)

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INFLUENCE OF ENVIRONMENTAL FACTORS ON PNEUMOCYSTIS JIROVECI PNEUMONIA (PCP) HOSPITAL ADMISSION IN HIV PATIENTS IN SAN FRANCISCO GENERAL HOSPITAL (SFGH). *K Djawe, L Levin, A Schwartzman, S Fong, B Roth, A Subramanian, K Grieco, L G Jarlsberg, L Huang, and PD Walzer, (University of Cincinnati, Cincinnati, OH)

Pneumocystis jirovecii is a resourceful pathogen that continues to cause fatal PcP in immunosuppressed patients. Our goal was to determine environmental factors associated with PcP hospital admission. One hundred and forty-one PcP episodes were identified at SFGH between 2000 and 2008. A case-crossover design was used with the time of admission being a case time. One and two months before admission were used as control times. Daily climatic and air pollution data were collected. Conditional logistic regression was used to estimate the effect of climatic and air pollutant factors on PcP hospital admission. In univariate analysis, we found that temperature and SO₂ increase the risk of PcP admission (OR [95% CI]: 1.05 [1.02-1.08], 2.06 [1.63-2.60] respectively). In multivariable analysis, temperature, SO₂, and humidity were found to increase the risk of PcP admission (OR [95% CI]: 1.11 [1.06-1.16], 2.78 [1.99-8.73], and 1.04 [1.01-1.07] respectively). Other variables such as precipitation, carbon monoxide, nitrogen dioxide, ozone, and fine particles were not significantly associated with PcP admission. These data show that among climatic and ambient air pollutant constituents, temperature, humidity and SO₂ are independent risk factors for PcP hospital admission. Further studies are needed to see if these factors are also predictors of PcP in other geographic locations in the country.

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CLIMATE CHANGE AND RESPIRATORY HOSPITALIZATIONS IN NEW YORK STATE: ESTIMATING THE CURRENT AND FUTURE HEALTH BURDEN OF INCREASING TEMPERATURE. S Lin, *W-H Hsu, A R Caton, S-A Hwang (New York State Department of Health, Troy, NY 12180)

The global average surface temperature is likely to rise by 2 to 11.5°F at the end of 21st century relative to 1980-1999, and heat waves will be more intense, frequent and longer in duration. Our objective was to assess excess current and future public health impacts of respiratory disease attributable to extreme heat in summer in New York State. Previously, we reported the apparent temperature (AT) threshold and percent risk change above the threshold for New York State. Here we project change in temperature and other climate properties using a global climate model under various climate scenarios, which are plausible future trajectories for social, economic and technological development. Future climate was derived by shifting the baseline climate distribution according to these changes. Effects of extreme high AT in summer on respiratory hospitalizations, treatment costs, and lost workdays were estimated according to the risk change and increased AT above threshold under three climate scenarios. The New York State public health burden of respiratory disease attributable to extreme high AT in summer was estimated to be 100 hospitalizations, \$1 million in treatment costs, and 615 lost workdays per year in 1991-2004. The 100-year projection of public health burden was estimated to range from 259-796 hospitalizations, \$2.7-\$8.3 million in treatment costs, and 1587-4833 lost workdays per year under the three climate scenarios. This study estimated a 2.6 to 8-fold increase in the public health burden of respiratory hospitalizations due to global warming in the coming 100 years. If combined with other diseases and mortality, the health impacts would be more evident.

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FOOD OUTLET DENSITY AND OBESITY AMONG TEEN YOUTH IN CALIFORNIA. *P Shams, and J Lopez-Zetina, (California State University, Long Beach; Long Beach, CA, 90840-4902)

This research examines the ecology of teen obesity in Southern California and is based on analysis of secondary data. Aggregate measures of obesity and food outlet density are examined with the county as unit of analysis. Food outlet density is examined by using the Retail Food Environment Index Ratio (RFEI) developed by The California Center for Public Health Advocacy. The Retail Food Environment Index (RFEI) is compiled by dividing the total number of fast-food outlets and convenience stores by the total number of supermarkets and produce vendors (CCPHA 2007). Teen obesity data are from the California Health Interview Survey, CHIS 2007. Demographic data on Latino population density are from the Census Bureau. Spatial distribution of attributes of interest was examined with Geographic Information System technology (ESRI 2009). Much of the evidence pointed to an ecological positive association between high density of fast food outlets and greater obesity. Accessibility to supermarkets and fresh produce vendors appears to be more limited in counties with a high density of Latino population. Further, in counties with low RFEI ratios, (greater number of supermarkets and fresh produce vendors) lower levels of eating four or more times in past week was reported by Latino teenagers. Children and adolescents from racial/ethnically diverse communities are particularly affected by rising rates of obesity. Increased access to food fare of low nutritional value but high caloric and fat content is challenging public health efforts to reduce obesity in the U.S. A regulatory framework for food outlets offering fare with high caloric and fat content is urgently needed.

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ENVIRONMENTAL EFFECTS ON BIRTH WEIGHT AND CONSEQUENCES FOR LATER HEALTH. *C Imai, T Halldorsson, I Gunnarsdottir, T Aspelund, T Gudnason, I Thorsdottir (University of Iceland, 101 Reykjavik, Iceland)

Low birth weight has consistently been associated with adverse health outcomes in later life. The relative importance of genetic versus environmental factors for these associations has been minimally addressed. The authors examined the association between environmental decrease in birth weight and later health. Methods: Cohort of 3644 subjects born 1925-1934 in Reykjavik, Iceland. Anthropometric measures at birth and school age were collected from National registries. Subjects were medically examined as adults (35-65years). Calendar year was used as proxy for environmental effects, including access to food, by comparing infants born prior to (1925-1929) and after outbreak of the Great Depression in Iceland (1930-1934). Results: Birth weight, mean 3750 grams(g), decreased between 1925-1929 and 1930-1934 by 129g for males and 94g for females. Overall prevalence of low birth weight (< 3000g) increased from 4% to 6% and growth at school age was significantly reduced during the Depression. Age-adjusted odds ratios showed significantly increased risk of obesity 1.42 (95%confidence interval (CI) 1.01,1.99) and modest increased risk of dysglycemia 1.30 (95%CI 0.89,1.89) for females born 1925-1929 compared to 1930-1934. These changes were followed by significant increases in mean body mass index (0.6kg/m²) and fasting blood glucose (0.2mmol/L) at adult age. Risk of hypertension was not increased for females. Non-significant associations were observed for males. Conclusion: Reduction in birth weight due to sudden shift in environmental (economic) conditions appears to have significant but modest effect on later disease. The observed sex specific differences are in line with previous findings from this cohort.

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THE PUBLIC HEALTH IMPLICATIONS OF ENVIRONMENTALLY-INDUCED MIGRATION FOR HIGH-INCOME NATIONS. *A Blair, R S Kovats (London School of Hygiene and Tropical Medicine, London, England WC1E7HT)

Background: High-income nations are increasingly concerned about health and migratory implications of global climate change. The complexity of mechanisms leading to migration and politicized nature of the debate has led to a weak evidence base for planning future policy. Methods: We conducted a systematic literature search to identify the health burdens of environmentally induced migrants from low and middle-income countries resettling in high-income countries. Results: 17 articles met our criteria, showing that migrants experienced greater health burdens than host populations in high-income countries. Disparities were apparent upon arrival and over time, and were influenced by nation of origin and behavioural and structural factors affecting access to care. No studies specifically addressed "environmentally-induced" migrants. Conclusions: Health burdens in migrant populations are important and merit public health action. Assessment is complicated by a lack of consistency in defining migrants and the difficulty in attributing the cause for migration to environmental factors.

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BLOOD PRESSURE MEASURES AND ITS RELATIONSHIP TO THE ENVIRONMENT IN SCHOOL-AGED CHILDREN LIVING IN GHARB PLAIN (NORTH-WEST OF MOROCCO). *F-Z AZZAOU, H HAMI and A AHAMI (Equip of Clinic and Cognitive Neurosciences and Health, Laboratory of Biology and Health, Faculty of Science, BP.133 Kenitra, Morocco)

The "Gharb" plain (area of our study) located in the North-West of Morocco is one of the most important agricultural and industrial regions of the Kingdom. Unfortunately, it suffered from the increase of different polluting human activities which expose the population, especially children, to serious health problems. The aim of this study is to measure the systolic and diastolic blood pressure of 129 urban, periurban and rural schooled children (aged 6 to 8 years) living in Gharb plain (North-West of Morocco) and to study the possible relationship between variations of blood pressure and some environmental parameters, using a questionnaire. The obtained results had shown that 54.17% of rural, 52.63% of periurban and 42.10% of the urban children had normal systolic and diastolic blood pressure. However, 57.89% of urban, 42.10% of periurban and 41.67% of rural children suffered from hypotension. Further, 5.26% and 4.17% of hypertension were registered in periurban and rural children respectively. Moreover, a significant correlations between the diminution of diastolic blood pressure and the using of traditional clay utensil ($p < 0.05$), in one hand, and the number of pollution sources near the house ($p < 0.05$), in other hand, were registered. This last result highlights the possible involvement of environmental toxicants in hypotension. That is why deeper studies are needed. Key words: Blood pressure, environment, children, Morocco.

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BIRTH MONTH DISTRIBUTION IN LUPUS VS THE GENERAL POPULATION IN THE US MIDWEST: THE MICHIGAN LUPUS EPIDEMIOLOGY & SURVEILLANCE (MILES) PROGRAM. *M Senga, W J McCune, J Wing, L Wang, W Marder, P Cagnoli, E E Lewis, P DeGuire, C Helmick, P C Gordon, J Leisen, J P Dhar, E C Somers on behalf of MILES Group (University of Michigan, Ann Arbor, MI)

It is hypothesized that pre- and post-natal environmental exposures, which can vary by season, may increase risk of autoimmune disease. We investigated a possible association between birth month and development of systemic lupus erythematosus (SLE), using data from a large SLE registry, and a national health database for controls. We compared the distribution of birth months of SLE cases in the MI Lupus Epidemiology & Surveillance Program ($n = 2980$) to that of the Midwest regional subset of the 2008 US National Health Interview Survey (NHIS) ($n = 13,680$), and tested the equality of distributions by chi-square. Additional analyses were performed for birth season, and stratified by sex and calendar period (by decade and pre-/post-1960 birth year). The distribution of birth months for SLE vs NHIS lupus was not significantly different, with or without stratification by sex and calendar period. However, within each group, there was significant monthly variation overall ($p = 0.009$ SLE, $p = 0.007$ NHIS), and among females ($p = 0.025$ SLE, $p = 0.019$ NHIS). In NHIS, among females born after 1960, there was a significant difference in birth month distribution ($p = 0.016$); among females born before 1960, there was significant variation when birth month was categorized into 4 seasons ($p = 0.006$). We did not detect an association between birth seasonality and risk of SLE. However, within group variation in distribution of births by sex, month/season, and calendar period underscores the importance of controlling for such variables when exploring hypotheses regarding early life etiologic factors.

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META-ANALYSIS OF ACOUSTIC NEUROMA AND MOBILE PHONE USE. *M Kelsh, G Kanas, L Erdreich (Exponent, Inc., Menlo Park, CA)

Previous meta-analyses report conflicting interpretations of mobile phone use and acoustic neuroma risks. Although pooled results for gliomas and meningiomas have been published from the international INTERPHONE study, results for acoustic neuromas are still forthcoming. In this meta-analysis, we evaluate the exposure metrics of "regular," duration, latency, and ipsilateral mobile phone use and risk of acoustic neuroma. Relevant studies were identified through Medline searches and review of bibliographies. Meta-relative risks were calculated using random and fixed effect models for acoustic neuromas and heterogeneity and publication bias were assessed. Eight studies evaluated the association between ever or regular use of mobile phones and risk of acoustic neuroma. The meta-relative risk (metaRR) for regular mobile phones use was less than 1.0. Five studies reported information on latency and acoustic neuroma. For longer latency periods, the meta-analysis results showed a positive association with acoustic neuroma, however the confidence intervals are wide and heterogeneity of findings across the two studies was present. No associations were observed for ipsilateral use and acoustic neuromas based on regular usage, however, in the subgroup of ipsilateral users with longer latency, a positive association is observed. Data are limited for evaluation of long term use and latency greater than ten years. The exposure assessment method (self-report) used by all studies is subject to inaccuracy and potential recall bias. Given concerns about study biases and the heterogeneity of findings, these data cannot support a causal interpretation between mobile phone use and acoustic neuromas.

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A CASE-CONTROL STUDY OF GLIOMAS AND RESIDENCY WITHIN COUNTIES OF POTENTIAL ELEVATED RADON. *J F M Lewis, S Erdal, B J McCarthy, D Il'yasova, D Bigner, F G Davis (University of Illinois at Chicago, Chicago, Illinois 60612)

The only established environmental risk factor for brain tumors is ionizing radiation. Radon gas is a chief source of natural background ionizing radiation humans encounter. We assessed the association between potential radon levels within residential counties and the risk for gliomas. A case-control study, conducted between 2005 and 2009, included 505 cases and 811 hospital controls recruited from the NorthShore University Health System (Illinois) and the Duke University Medical Center (North Carolina) (National Cancer Institute Grant P50 CA108786-01). This study population represented twenty-eight states in the mid-west and southern United States. Residential counties were linked to potential radon levels from the U.S. Environmental Protection Agency's (EPA) Map of Radon Zones using geographic information systems. The EPA determined these levels with five factors: indoor radon measurements, geology, aerial radioactivity, soil permeability and foundation type of structures. Logistic regression analyses, adjusted for age and gender, were completed to estimate odds ratios (OR) and 95% confidence intervals (CI). Living within a county where potential radon was high or moderate (≥ 2 pCi/L (pico Curies per Liter)) versus low (< 2 pCi/L) resulted in an OR of 2.3 (95% CI:1.9–2.9). Living within a county where potential radon was high (> 4 pCi/L) versus low (< 2 pCi/L) resulted in an OR of 4.4 (95% CI:3.1–6.3). To conclude, there is evidence in these data of an association between potential elevated radon and gliomas although usage of the EPA Map is limited as a substitute for personal exposure.

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ONE-YEAR OUTCOMES OF COMMUNITY-ACQUIRED AND HEALTH CARE-ASSOCIATED PNEUMONIA IN THE VETERANS AFFAIRS HEALTH CARE SYSTEM. J L Hsu, *A M Siroka, M W Smith, M Holodniy, G U Meduri (Department of Veterans Affairs, Menlo Park, CA)

Background While studies have demonstrated higher medium-term mortality for community acquired pneumonia (CAP), mortality and costs have not been characterized for health care-associated pneumonia (HCAP) over a one-year period. *Methods* We conducted a retrospective cohort study to evaluate the mortality rates and health-system costs for patients with CAP or HCAP during initial hospitalization and for one year after hospital discharge. 50,758 patients were identified with CAP or HCAP admitted to the national Veterans Affairs (VA) health care system VA between October, 2003 and May, 2007. Main outcome measures included hospital, post discharge and cumulative mortality rates and cost during initial hospitalization and at 12 months following discharge. *Results* HCAP mortality in hospital and up to 12 months after discharge was nearly twice that of CAP (hospital: 9.9% and 5%, respectively; one-year post discharge: 34.4% and 17%, respectively). In logistic regression analyses, HCAP was an independent predictor for hospital mortality (odds ratio 1.62) and one-year mortality (odds ratio: 1.99) when controlling for demographics, comorbidities, pneumonia severity and factors associated with multidrug resistant infection including immune suppression, previous antibiotic treatment and aspiration pneumonia. When stratified by Charlson-Deyo Quan comorbidity index HCAP patients consistently had higher mortality in each stratum. HCAP patients incurred significantly greater cost during the initial hospital stay and in the following 12 months, however, this effect largely resolved with addition of aspiration pneumonia to the logistic regression model. *Conclusion* HCAP represents a distinct category of pneumonia with particularly poor survival up to one year after hospital discharge. While factors such as comorbidities, pneumonia severity and risk factors for multidrug resistant infection may interact to produce even greater reductions in survival compared to CAP, they alone do not explain the observed mortality differences.

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ORAL HEALTH STATUS, TREATMENT NEEDS AND LEVELS OF SATISFACTION AMONG A BEDOUIN POPULATION IN SAUDI ARABIA. *M Alamri and K Almas (King Saud University, Riyadh, Saudi Arabia)

The Bedu or Bedouins are the desert nomads. In Saudi Arabia, there are few studies describing oral health status of general population. But relatively negligible information is available about Bedouins. The objectives of the present study were to assess the oral health status, oral hygiene and smoking habits, dietary pattern, dental treatment needs and levels of satisfaction from oral health status of the Saudi Bedouin population around Medina, Qaseem and Khamis Moshayte area. The data were collected in questionnaire forms which were designed according to the World Health Organization criteria. 525 Bedouins (296 male, 229 female) with the age range 2-90 years were interviewed and examined clinically in July through October 2008. The mean DMFT (Decayed, Missing, Filled Teeth) of younger age group (2-14 years) was 8.18, with largest D components, and 13.46 for the adult group with less than 1 F component. Periodontal conditions found in 83% of the population. Twenty five percent of the subjects were miswak users, 30% used both miswak and toothbrush, while 26% never cleaned their teeth. Seventy percent were rice eaters while meat and dates were second and third preference. Tea was the most common drink with 2-3 teaspoons of sugar per cup. There were only 10% cigarette smokers and less than 5% used Shisha. Less than 10% had any kind of dental prosthesis. One fifth (20.8%) of the subjects were with pain or infection needing immediate care. More than 50% were satisfied with the function and esthetics of their teeth. While 82% of the subjects were found satisfied by their oral health status, ranging from fair to good level of satisfaction. The studied Bedouin population had low to moderate level of oral diseases with high level of unmet treatment needs. There is a need to develop organized health care services to the Bedouin population with special emphasis on oral health promotion.

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AGGREGATE HEALTH BURDEN – COEXISTENT HEALTH PROBLEMS MORE STRONGLY CORRELATED WITH SELF-RATED HEALTH THAN MEDICAL COMORBIDITY ALONE. *A V Perruccio, J N Katz, E Losina (Brigham and Women's Hospital and Harvard Medical School, Boston, MA)

Objective: To investigate the effects of aggregate health burden – a construct comprised of several health domains (medical comorbidity, musculoskeletal, physical and social functional status, mental health, geriatric functional problems) – on overall self-rated health (SRH), an important chronic disease health outcome. We investigate whether medical comorbidity effects are mediated through other health domains and whether these domains have independent effects on SRH. Study Design: Medicare recipients (n = 958) completed a questionnaire 3 years post primary total hip replacement surgery. Self-reported sociodemographic characteristics, SRH, and health domain statuses were ascertained. Probit regressions and path analyses were used to evaluate the independent effects of the health domains on SRH, the inter-relationships among these domains, and to quantify direct and mediated effects. Results: All health domains were independently associated with SRH. Medical comorbidity explained 11.7% of the variance in SRH and all other health domains explained 27.3%. The impact of medical comorbidity was largely direct, with only 21.5% mediated through the other domains. Medical comorbidity minimally explained the variance in other health domain scores. Conclusion: Self-rated health has multiple determinants. An exclusive focus on any one domain in health research, particularly medical comorbidity, is likely to limit researchers' ability to understand health outcomes or trajectories.

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A REVIEW OF CRIMINAL PROCEEDINGS AGAINST PHYSICIAN REGISTRANTS BY THE U S DRUG ENFORCEMENT AGENCY (DEA) 2003 -2009. *K Soyemi, (John H Stroger Hospital, Chicago, IL)

Background: Diversion of legitimately manufactured controlled substances is a serious problem in the United States. DEA through the diversion control program monitors physician registrants in the U.S. Objectives: To conduct a descriptive analysis of the criminal proceedings against physician registrants from 2003 through 2009. Methods: A retrospective cohort study of physician registrants with criminal proceedings listed on the on the drug diversion website was conducted. Physician education, training, professional certification, and practice information was obtained from the AMA physician master file, and the state licensure websites. Number of criminal counts, and punishment were obtained from court documents, media reports, and the website. Results: Of the 199 physician registrants listed, 139 (70%) were primary care physicians, 175 (88%) were males, and death of patients occurred in 11(5.6%) cases. By region, 76 (38%) were located in the South, 54 (27%) in the Northeast, 36 (18%) in the Midwest, and 32 (16%) in West. The median (inter quartile range [IQR]) age at conviction was 53 (29-80) years, median (IQR) number of years of imprisonment was 3 (0-328) years, median (IQR) number of criminal counts was 2 (1- 178) counts, and median (IQR) fine was \$6,986.50 (\$1500.00 - \$254,300.00). Age at conviction for primary care physicians did not differ compared with specialist (P = 0.4). Adjusting for region, gender, and practice type, there were no significant risk factors associated with conviction. Conclusion: Misuse of DEA registration by physician registrants threatens public health and safety. Programs regarding safe prescription practices should be developed to reduce misuse and drug diversion.

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SEVERE MENTAL ILLNESS AND HOSPITAL READMISSION IN DIABETIC ADULTS. *J Albrecht, J M Hirshon, R Goldberg, P Langenberg, H Day, D Morgan, A Comer, A Harris, and J Furuno (University of Maryland School of Medicine, Baltimore, M D 21201)

Severe mental illness (SMI) has been associated with higher hospital readmission rates in patients with cardiovascular disease. However, the impact of SMI on hospital readmission has not been assessed in patients with diabetes, who may be at increased risk of poor health outcomes. We hypothesized that among diabetics, SMI is associated with increased risk of 30-day hospital readmission. We conducted a retrospective cohort study including all adult (> 18 years) admissions to the University of Maryland Medical Center between 2/01/2005 and 1/31/2009 with diabetes (ICD-9 code 250.xx) included as a discharge diagnosis. Our independent variable was a co-occurring diagnosis of SMI, defined by the presence of discharge diagnoses codes for schizophrenia, schizo-affective disorders, bipolar and manic disorders, major depressive disorder or other psychosis. Our dependent variable was readmission to the index facility within 30 days of discharge. Generalized estimating equations were used to account for repeated outcomes in a logistic regression model. We identified 26,878 (16.5%) patients with diabetes, of whom 1,613 (6%) had SMI. Diabetic patients with SMI did not have higher odds [odds ratio(OR) = 0.88(95% CI = 0.76–1.02)] of 30-day hospital readmission compared to diabetic patients without SMI, controlling for age, length of initial hospital stay, sex, discharge to home and Charlson Comorbidity Index score. Our study highlights the importance of expanding research on SMI into different populations and exploring the relationship between mental illness and health outcomes.

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SCREENING FOR GENITAL CHLAMYDIA FOR YOUNG PEOPLE IN COMMUNITY PHARMACIES: A STRUCTURED LITERATURE REVIEW OF INTERNATIONAL EVIDENCE. *M Z Kapadia, P Warner, K. (Fairhurst University of Edinburgh, Scotland)

To review evidence and develop a conceptual framework regarding facilitators of and barriers to access and provision of chlamydia testing and treatment (CT&T) in community pharmacies from providers and users perspective. METHODS: Systematic searches were conducted for international research in electronic databases and grey literature from January 1990 to September 2010. The evidence categories used by the UK Department of Health in the National Service Framework (2001) was applied to each paper. RESULTS: We included 17 papers and reports. No systematic reviews and only one RCT was found. The conceptual framework developed can broadly be seen at three levels; i.e. i) Service delivery i.e. Community pharmacy action and behaviour, ii) Young people decision to receive service and iii) Stakeholders policy and action. Key facilitators identified were convenience of access - in terms of location, no need for appointment and extended opening hours for pharmacies - lack of social stigma to get the service from pharmacies rather than specialised sexual health clinics, incentives for pharmacies for provision of such care and in-pharmacy facilities such as counselling area and toilet. Identified barriers to access or provide CT&T service were level of privacy, anonymity and confidentiality achievable in a pharmacy setting, insufficient promotion of the service, pharmacy staff work load and lack of trained staff and perceived risk of chlamydia. CONCLUSION: Chlamydia screening in community pharmacies is broadly acceptable to both service users and providers. However if screening is to succeed, policy makers must consider the facilitators and barriers identified by young people and pharmacy staff.

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VALIDATION OF A PERSIAN VERSION OF THE QUALITY OF LIFE IN EPILEPSY INVENTORY-31 (QOLIE-31). *N Mohammadi, S Kian, M Nojomi, M A Akbarian (Tehran University of Medical Sciences, Tehran, Iran)

The psychometric properties of QOLIE-31, assessed in 84 adults with epilepsy: acceptability, test-retest reliability and validity (including internal consistency and item-to scale correlations, construct validity using factor analysis, discriminative validity using relationship with disease characteristics, and convergence validity using correlations with SF-36 scores). Internal consistency was high (Cronbach's alpha coefficient = 0.9). Discriminative validity was good for seizure control and epilepsy duration. Final scores of overall quality of life, cognition, medication effects, and social function was higher in patients without convulsion during recent one year ($p \leq 0.05$). Based on the time of diagnosis, quality of life showed different scores in energy/fatigue, cognition and medication effects ($p \leq 0.05$). Correlations between QOLIE-31 and SF-36 were 0.87 (good convergence validity). Factor analysis yielded seven factors by using principal component analysis. In most of questions, the first factor contained medication effects and two items of social function. The second factor in majority of questions was related to emotional well-being and energy/fatigue plus two items of social function. The third factor was related to seizure worry. Two factors were related to cognitive item and two other factors included emotional wellbeing and medication effects. We concluded the Persian version of QOLIE-31 meets established psychometric criteria for reliability and validity.

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INAPPROPRIATE EMERGENCY DEPARTMENT (ED) USE: PHYSICIAN POINT OF VIEW AND PATIENTS OUTCOMES. A STUDY IN 4 EMERGENCY DEPARTMENTS IN FRANCE. J Ladner, L Bailly, I Pitrou, M Cartoux, M P Tivolacci. (Rouen University Hospital, Rouen, France)

Objective: To assess the appropriateness of ED admissions, based on the senior physician justification and to identify factors associated to inappropriate ED admissions. Methods: Between September 2005 and June 2006, a cross-sectional study was carried out in four ED of public reference hospitals in Upper Normandy region (France). Inclusion criteria were patients 18 years old or older, volunteers and very low vital risk (without emergency procedures). For each patient, the outcomes collected were medical consumption during the last six month, socio-economic characteristics, referred to ED by a general practitioner (GP, diagnosis and care in ED, visit appropriateness according to ED senior physician point of view. Results: A total of 485 patients were included. The mean age was 43.4 years (standard deviation [SD] = 18.9); 307 patients (63.3%) were self-referred; 243 senior physicians assessed the visit as appropriate, 227 as inappropriate and 15 seniors were without opinion (excluded from the analysis). After adjustment (logistic regression), the patients whose visits were judged as inappropriate were self-referred (AOR = 1.78, 95% CI = 1.08-2.94, $p = 0.02$), already done a visit to the ED in the last 6 months (AOR = 2.31, 95% CI = 1.36-3.91, $p = 0.002$) and without hospitalisation after ED visit (AOR = 12.82, 95% CI = 6.23-26.37, $p < 10^{-4}$). Conclusion: In the context of an increasing number of patient admissions to the EDs in France, inappropriate use was characterised mainly by iterative recourse to ED for consultation. Our study shows that an emergency department adaptation, such as triage and ambulatory consultation, could be a solution to overcrowding. The availability of primary health care at the ED, providing continuity of care outside, might be evaluated.

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PRIMARY HEALTH CARE REFORM: WHO JOINS A FAMILY MEDICINE GROUP. *N Coyle, E Strumpf, P Tousignant, Y Roy and J Fiset-Laniel (McGill University, Montreal, QC, Canada H3A 1A2)

One new promising model of primary care delivery is Family Medicine Groups (Groupes de Médecine de Famille or GMFs) that are designed to provide all Quebecers with access to a primary care physician. The objective is to understand the characteristics of patients and providers that voluntarily join a GMF and assess whether differences between participants and non-participants are likely to confound the predicted effects of GMFs on health care system outcomes if implemented at the population level. A cohort of vulnerable patients (elderly or chronically ill) consisting of GMF and non-GMF users, includes information on inpatient care, outpatient care, death records, demographics, geographic and socioeconomic characteristics. Multivariate logistic regression and Bayesian analysis is used to identify key predictors of joining a GMF and these models are used to calculate propensity scores. Propensity score matching is used to evaluate the impacts of the GMF model among comparable physicians and patients. Physicians that join a GMF have a unique practice profile, such that they are younger and performed more services at local community service centres (CLSC), compared to physicians that do not join a GMF. After joining, GMF physicians also significantly increase their productivity, as measured by the number of services, patients seen and days worked. Patients, however, are fairly comparable, with some differences in chronic health conditions and utilization of services. The types of providers and patients who are attracted to group practice has important policy implications and helps to identify the causal effect of the GMF model on health care utilization, costs, and health outcomes.

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WITHDRAWN

THE INFLUENCE OF HEALTH POLICY ON SMOKING RATES: A NATURAL EXPERIMENT. *A B Araujo, G S Miyasato, D E Levy, J B McKinlay (New England Research Institutes, Watertown, MA 02472)

Cigarette smoking is the leading cause of preventable death in the US. In 2006, Massachusetts mandated a tobacco cessation treatment benefit (pharmacotherapy/counseling) with minimal copay for all MassHealth (MA state Medicaid program) members ≥ 18 years. Prior to this, MassHealth provided no cessation benefit. We assessed the impact of this change on smoking rates in a population-based study. The Boston Area Community Health (BACH) Survey is a longitudinal study of 5503 Boston residents. Assessments were conducted before (2002-05) and after (2006-10) the change in benefits. Subjects were asked about insurance coverage, and MassHealth members during both assessments were the "exposed" group. An independent group of subjects with low socioeconomic status (SES, defined by income and education) observed at both assessments served as the comparison ("non-exposed") group. We examined quit rates and smoking exposure among these two groups. There were 1,029 MassHealth members and 456 subjects with low SES. Baseline smoking prevalence and mean number of years smoking were 39.7% and 17.9 years (MassHealth) and 22.8% and 20.0 years (low SES) ($p < .001$ and $p = .312$, respectively). The quit rate among MassHealth members was 13.6%, which was 7.1% ($p = .869$) higher than the quit rate of 12.7% among low SES subjects. The two groups reduced smoking by a half-pack at similar rates (11.8%, 11.6%). At baseline, MassHealth members smoked an average of 0.71 packs per day, versus low SES subjects who smoked 0.96 packs per day ($p = .044$). At follow-up, MassHealth members smoked 0.70 packs per day compared to 0.90 packs per day among low SES subjects ($p = .397$). Introduction of mandatory insurance coverage for smoking cessation appears to have a minimal short-term impact on quit rates or reduction of exposure. Supported by Award Number U01DK056842 from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (NIH). Content is solely the responsibility of the authors and does not necessarily represent the official views of NIDDK or NIH.

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FACTORS CONTRIBUTING TO THE UPTAKE OF ROUTINE PEDIATRIC VACCINATIONS AMONG INFANTS. *B A Collisson, S W McDonald, S C Tough (University of Calgary, Calgary, AB, Canada)

Background: Children who are not adequately immunized are at risk of disease specific illness, hospitalization, disability, and death. In a country where preschool immunization strategies are publicly-funded and supported by public awareness campaigns, improving immunization rates constitutes a national priority. This study identifies the factors contributing to the vaccination status of four-month-olds in Calgary, Canada. Methods: Data were analyzed from the All Our Babies Study (2008-2010), a population based prospective birth cohort investigating factors related to maternal mental and physical health and infant outcomes. Participants completed 2 questionnaires during pregnancy and 1 at 4 months postpartum. Results: Of 1175 women, 91.8% had vaccinated their infants, 8.2% had not. Factors significantly associated with vaccinations included mother having a physician ($P = 0.045$), baby having a physician, ($P < 0.001$), baby having received a checkup since leaving the hospital ($P < 0.001$) and maternal consultation of a parenting resource book ($P < 0.001$). Socioeconomic and sociodemographic factors were not associated with vaccination adherence. Conclusions: Maternal use of existing health and wellness services and supports both preceding and during infant vaccination eligibility is significantly associated with uptake of routine pediatric immunizations. These results suggest those who are already engaged with health services and supports are more likely to comply with vaccination guidelines than mothers who are not. Improving immunization rates may require identification of barriers to engagement with primary care services, regardless of family economic profile.

UNMET MENTAL HEALTH CARE NEEDS AMONG WORLD TRADE CENTER DISASTER SURVIVORS. *R M Brackbill, S D Stellman, H P Nair, M Farfel (New York City Dept. of Health and Mental Hygiene, New York, NY 10013)

Post-traumatic stress disorder (PTSD), depression and anxiety are common among persons exposed to the 9/11 World Trade Center (WTC) disaster. It is important to understand factors underlying unmet mental health care needs (UMHC) and barriers to care in this population in order to increase access to mental health care. Methods: We studied 46,602 participants in the WTC Health Registry first follow-up (2006-7) survey, which included questions on perceived lack of care and barriers to needed care, diagnosed conditions in the past 12 months, and a screen for probable PTSD. Logistic regression was used to examine factors associated with UMHC. Results: 18% reported unmet health care need in the past 12m; of these 28% (2418) reported an unmet need for mental health care or counseling whether or not they were receiving mental health services. Those most likely to report UMHC were young adults (18-24 yrs) (adjusted Odds Ratio (aOR) = 5.0, 95% confidence interval (CI) 3.3-7.4), persons with annual household income $< \$25,000$ (aOR = 1.7, 95% CI, 1.4-2.0) and no social support (aOR = 1.9 CI-1.5-2.3). Other risk factors were 14 or more days of poor mental health in the past 30 days (aOR = 3.2, 95% CI, 2.9-3.6) and having probable PTSD or a previously diagnosed mental health condition (aOR = 5.2, 95% CI, 4.6-5.8). No association was found between having any chronic physical condition and UMHC. The two most frequently reported barriers to mental health care were lack of money (51%) and insurance (41%). Conclusion: These findings are highly important to Registry's treatment referral program that employs personalized outreach to encourage enrollees with UMHC to seek care with no out-of-pocket costs at WTC Centers of Excellence.

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USE OF ACADEMIC DETAILING TO INFLUENCE THE PRESCRIPTION PATTERNS OF FAMILY PHYSICIANS IN PRIMARY CARE - A SYSTEMATIC REVIEW. *H Chhina, V Bhole, D Lacaille (Arthritis Research Center of Canada, University of British Columbia, Vancouver, BC, Canada)

Introduction: Academic detailing (AD) or Educational outreach visits (EOV) have been widely used to influence the behaviour of health care professionals. Previous studies suggest that dissemination and uptake of guidelines by interactive techniques like AD is more effective than traditional methods. Objective: To synthesize current knowledge on effectiveness of AD in influencing drug prescription patterns of family physicians (FPs). Methods: A mapped search of MEDLINE, EMBASE, CENTRAL and Web of Science from 1983 to 2010 for epidemiologic studies of AD was conducted. Inclusion criteria were: 1) randomized control trial (RCT) or observational study with a control group; 2) drug prescribing as the targeted behaviour; 3) AD as the intervention; and 4) FPs in a primary care setting as participants. Results: The search strategy resulted in 570 studies, of which 271 were forwarded to abstract review and 24 studies forwarded to full manuscript review. Overall, 11 RCTs and 4 observational studies were included in the final review. 8 out of 11 RCTs and 3 out of 4 observational studies showed a positive effect of AD intervention on drug prescription patterns (i.e. a change in prescription pattern consistent with the treatment recommendation included in the AD). In these studies, the difference in relative change in prescription rate in AD group compared to control group (i.e. AD - control group) varied from 3.29% to 77.89%. Relative change was calculated as $[(\text{post} - \text{pre})/\text{pre}] * 100$ for both AD and control groups. Conclusion: AD is an effective strategy to influence the prescription patterns of FPs in primary care.

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PROMIS PAIN SCALES AND ADDICTION TREATMENT PATIENTS. *K Wiest, J Colditz, D McCarty, P Pilkonis (Oregon Health and Science University, Portland OR 97214)

Patients with substance use disorders have relatively high complaints of pain, anxiety and depression during treatment. Individuals receiving methadone maintenance for opioid dependence often report even greater levels of pain. Little is known about pain status at the beginning of treatment. The National Institutes of Health's (NIH) Patient-Reported Outcomes Measurement Information System (PROMIS) reliably and validly measures health outcomes using computer-assisted testing and scales developed with item response theory. PROMIS scales were used to explore pain symptoms and emotional distress among participants (n = 407) within the first 30 days of beginning methadone (n = 171) and outpatient (n = 236) substance use treatment. Clinical participants were recruited from substance use treatment programs in Portland, Oregon (n = 182), Seattle, Washington (n = 115) and Pittsburgh, Pennsylvania (n = 115) from March through October 2010. The comparison group (n = 1000) completed study measures through the YouGov Polimetrix internet panel. Study participation required respondents to report at least one alcoholic drink in the 30 days prior to completing the survey. Analyses adjusted for age and race. Mean pain interference, anxiety, fatigue and depression scores were significantly higher in substance use treatment patients. Patients receiving methadone maintenance were 3.5 times (p < .001) more likely to report severe pain interference relative to the comparison group. Obesity (body mass index ≥ 30.0) was not associated with increased pain. Incorporating treatment practices directed to patients with pain interference and related distress may enhance treatment efficacy for patients with substance use disorders.

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DIFFERENCES IN MALE BREAST CANCER STAGE, TUMOR SIZE AT DIAGNOSIS, AND SURVIVAL RATE BETWEEN METROPOLITAN AND NONMETROPOLITAN REGIONS. *J Klein, M Ji, N Rea, G Stoodt, (Walden University, Minneapolis, MN, 55401)

Although the incidence for breast cancer in men is lower than for women, male breast cancer (MBC) patients are diagnosed at a later stage and have a higher mortality rate than women. This study examined male cases reported from 1988 through 2006 in the Surveillance, Epidemiology, and End Results program of the National Cancer Institute for differences in cancer stage, tumor size at diagnosis, and survival rate between metropolitan and nonmetropolitan regions. Pearson's Chi-square was used to evaluate differences in stage and tumor size at diagnosis. Cox proportional hazards regression was used to assess survival differences after adjusting for confounders (race, marital status, median family income, age and education). Regional differences in tumor size and stage at diagnosis were not statistically significant, however survival differences were observed between metropolitan and nonmetropolitan regions. An interaction between nonmetropolitan area and regional stage MBC was a significant predictor of poorer survival. Raising awareness of MBC in nonmetropolitan areas could save the lives of many men and action should be taken to improve health care access, treatment, earlier diagnosis, and prognosis in this population.

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LIVER-RELATED OUTCOMES IN KIDNEY TRANSPLANT RECIPIENTS INFECTED WITH HEPATITIS C. *L M Kucirka, T G Peters, D L Segev. (Johns Hopkins Medicine, Baltimore, MD 21231)

Only 29% of Hepatitis C virus (HCV) (+) kidney transplant (KT) recipients receive HCV(+) kidneys, and these kidneys are discarded at 2.5-times the rate of their HCV(-) counterparts. We hypothesized that fear of worsening liver disease might be a disincentive to use of HCV(+) kidneys. The goals of our study were to (1) characterize post-KT liver disease in HCV(+) recipients, and (2) compare rates of post-KT liver-related outcomes between HCV(+) recipients who received HCV(-) and HCV(+) kidneys. Methods: We cross-referenced 6,250 KT recipients captured in UNOS between 1995 and 2008 with the liver dataset to identify those who later (1) joined the liver waitlist, (2) listed with a MELD > 15, or (3) received a liver transplant post-KT. Competing risk regression was used to account for potential survival bias and a matched cohort analysis was used to account for potential confounding. Each patient who received an HCV (+) kidney was matched to a patient of similar age, gender, diabetes status, and follow-up time who received an HCV (-) kidney. Results: Only 63 (1%) HCV(+) kidney recipients eventually the liver waitlist post-KT over our 13 year study period. Those who received HCV (+) kidneys had 2.5-fold higher hazards of joining the liver list (p < 0.001); however, the absolute difference in rate of listing between recipients of HCV(-) and HCV(+) kidneys was less than 2%. Competing risk and matched control analyses confirmed these findings. Conclusion: Previous studies have demonstrated that KT using an HCV(+) kidney can reduce waiting by over a year for an HCV(+) patient; given the high risk of mortality on the waitlist, the slightly increased rate of adverse liver outcomes shown in this study should not be a disincentive to the use of HCV(+) kidneys.

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FATHER MENTAL HEALTH, PARENTING AND CHILD WELLBEING IN THE EARLY CHILDHOOD PERIOD: RESULTS OF AN AUSTRALIAN POPULATION BASED LONGITUDINAL STUDY. *R Giallo, A Cooklin, C Wade, F D'Esposito, F Mensah, N Lucas, & J Nicholson (Parenting Research Centre, Melbourne, Australia)

This paper presents a longitudinal model of the relationships between mental health, parenting and child wellbeing in a large nationally representative sample of 1936 fathers participating in the Longitudinal Study of Australian Children. Data from three waves when the children were aged 0-12 months (Wave 1), 2-3 years (Wave 2) and 4-5 years (Wave 3) were used. Structural equation modeling revealed that fathers' mental health was associated with child wellbeing via its effects on parenting self-efficacy in the postnatal period and later parenting behavior. The model accounted for 15% of the variance in child outcomes. Specifically, latent growth modeling revealed that father's mental health was associated with low parental self-efficacy at Wave 1, and this was predictive of low parenting warmth and high parenting irritability at Wave 3. In turn, low warmth and high irritability were associated with increased child emotional and behavioural difficulties at Wave 3. These relationships remained significant after controlling for maternal mental health, child gender and socio-economic position. These findings underscore the importance of father mental health and parental self-efficacy in the early parenting period, and their contribution to later child outcomes. Implications for policy and practice will be discussed, with particular focus on improving mental health and parenting support to fathers in the early childhood period.

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ERECTILE DYSFUNCTION IS ASSOCIATED WITH INCREASED C-REACTIVE PROTEIN LEVELS IN MEN WITHOUT DIABETES OR HEART DISEASE. *V Kupelian, G E Chiu, R C Rosen, J B McKinlay (New England Research Institutes, Watertown, MA 02472)

There is increasing evidence suggesting that endothelial dysfunction will manifest sooner in the penile microvasculature than in systemic conduit vessels. Inflammation is a promoter of endothelial dysfunction and is a cardiovascular risk factor. The objective of this study is to investigate the association between erectile dysfunction (ED) and C-reactive protein (CRP), a biomarker of systemic inflammation. The Boston Area Community Health (BACH) Survey, a population-based study of urologic symptoms, used a multistage stratified design to recruit 5503 adults age 30-79. Analyses were conducted in 1,898 men with complete data on CRP levels. ED, assessed using the International Index of Erectile Function (IIEF-5), was defined as an IIEF-5 score < 17. CRP levels were categorized as < 1 mg/L (referent), 1-3 mg/L, > 3 mg/L. Comorbid conditions were assessed by self-report. The association between CRP levels and ED was assessed using odds ratios (OR) and 95% confidence intervals (95%CI) estimated using multiple logistic regression models to control for potential confounders. The association between elevated CRP levels and ED was modified by comorbid heart disease and diabetes status. Results show increased odds of ED with higher CRP levels (> 3 mg/L) in men without prevalent heart disease or diabetes (OR = 2.17, 95%CI:1.26-3.74) while no association was observed in men with prevalent comorbid conditions (OR = 0.74, 95%CI:0.32-1.74). Results show an increased inflammatory profile among men with moderate to severe ED symptoms, especially among men without prevalent heart disease or diabetes. These results support the hypothesis that ED is a marker of increased cardiovascular risk. The project described was supported by Award Number U01DK056842 from the National Institute of Diabetes and Digestive and Kidney Diseases. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Diabetes and Digestive and Kidney Diseases or the National Institutes of Health.

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SOCIAL NETWORK ANALYSIS OF A SYPHILIS OUTBREAK IN TORONTO, ONTARIO. B Kinniburgh, C Rank, A M Jolly, R Shahin, G B Clarke, D Al-Bargash, M-L Gilbert, and *M Ofner. (Toronto Public Health, Toronto, ON, Canada M5B 1W2)

An outbreak of infectious syphilis began among men who have sex with men in 2002 in Toronto when the number of cases increased 555% in one year. Cases increased again in 2009, when 579 cases were reported; a 72% increase over 2008. The Canadian Field Epidemiology Program was invited by Toronto Public Health to assist with enhanced surveillance of infectious syphilis, and specifically to identify where cases looked for sex partners. Routine surveillance data for 27 males diagnosed with infectious syphilis from April 15 to June 30, 2010 were supplemented with data from a self-administered online questionnaire developed for the purpose of this outbreak investigation. A social network was constructed to examine cases, sexual contacts, and venues where sex partners were sought. In enhanced surveillance, the median number of male sex partners reported was 5 (range 1-50). Only three cases (11%) reported identifiable names of sexual contacts in routine case follow-up. Multiple sex partners were reported more often in enhanced vs. routine surveillance (92% vs. 59%). Twenty-five cases named 31 venues where they recruited sexual partners. The most popular venue types were the internet (n = 22, 88%), bath houses (n = 15, 60%), and bars/clubs (n = 9, 36%). The largest network component included 24 cases, seven contacts, and 31 venues. Most cases (22 of 24) were linked by six common venues: three websites, two bath houses, and one bar. As data from routine contact tracing were limited, social network analysis was valuable as it identified venues where opportunities for public health messaging and case finding exist.

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DIFFERENCES IN ALCOHOL USE DISORDER PREVALENCE BETWEEN MEN AND WOMEN: A META-ANALYSIS. K Y Tzong *, J E Brady, A R Lusardi, C J DiMaggio, G Li. (Columbia University, New York, NY 10032)

Alcohol use disorders (AUD), encompassing alcohol dependence and abuse, are a serious public health problem in the United States. Men have higher rates than women for all three measures of drinking: alcohol use (drinking alcohol at all), binge drinking (drinking 5 or more drinks in 2 hours for men and 4 or more drinks in 2 hours for women), and heavy alcohol use (drinking 5 or more drinks per occasion on 5 or more days in the past 30 days). We conducted a meta-analysis of AUD to quantify the sex-difference in the prevalence of AUD. We searched literature databases and obtained 908 citations. We conducted manual review of abstracts written in the English language, published after 1980, and conducted on populations within the United States. A total of 17 articles were included in the meta-analysis. We extracted data on AUD prevalence in men and women residing in the United States from each of these studies and calculated study-level and summary odds ratios. Statistically significant excess risk of AUD in men was found in 16 of the 17 studies, with estimated odds ratios ranging from 1.1 to 4.2. The summary odds ratio of AUD for men compared to women was 2.1 (95% confidence interval 1.8- 2.4). The funnel plot and Rosenthal's fail-safe n indicated that publication bias alone was insufficient to explain the sex-difference in the prevalence of AUD found in this meta-analysis. The review of published literature indicates that AUD prevalence in men is twice that in women.

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DEPRESSION AND SOCIODEMOGRAPHIC RISK FACTORS AMONG MIDDLE-AGED AND OLDER MEN. *S D Cleary (George Washington University, Washington, DC, 20037)

Although depression is not as common among men as it is among women, it may lead to physical and social impairments that hasten morbidity and mortality. For example, rates of completed suicide are significantly higher among middle-aged and older men than women at any age as well as younger men. In this paper the prevalence of current depression, severity of depression, and lifetime depression is estimated among a community-based sample of adult males in 38 states and the District of Columbia that completed the anxiety and depression module in the 2006 Behavioral Risk Factor Surveillance System. Depressive disorders were measured using the Patient Health Questionnaire-8. Findings indicate that 6.6% of men aged 45 years and older have current depression, 12.3% have mild depressive symptoms, and 11.9% reported a depressive episode in their lifetime. Current depression decreased significantly among older age groups and was higher among men that were divorced/separated and widowed, unemployed or unable to work, and those with a functional disability. Lifetime depression was significantly higher among older men, those not married or cohabitating, unemployed or retired, and disabled, and lower among non-whites and men with lower education. Understanding the impact of depression on middle-aged and older men is important given the increasing size of this population, the mediating role of depression on treatment, recovery, and mortality for physical illnesses, and the increasing risk of suicide with age. Knowledge gained will facilitate the development of interventions to mitigate the effects of depression on overall health and well-being among middle-aged and older men.

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DOES THE EPIDEMIOLOGICAL TRANSITION CONTRIBUTE TO ISCHEMIC HEART DISEASE IN MEN? US HISPANICS. J Speicher, C M Schooling. (School of Public Health, City University of New York, NY)

Men die prematurely of ischemic heart disease (IHD) two to three times more than women in developed environments. This disease-specific disparity between the sexes largely emerged with the epidemiologic transition and is replicating in developing countries. The authors have previously hypothesized that growing up in a developed location has detrimental effects on specific IHD risk factors (waist-hip ratio (WHR) and HDL-cholesterol (HDL-c)) in men but possibly protective effects in women. Multivariable linear regression was used in the National Health and Nutrition Examination III survey of US adults (17+ years), 1988-1994, to examine IHD risk factors in US Hispanics by growth environment (US (n = 2418), non-US (n = 1226) or migrated before age 20 years (n = 938)). This had sex-specific associations with WHR and HDL-c (p values for interaction ≤ 0.001 and 0.03, respectively, adjusted for age, education and smoking). Hispanic men raised in the US had higher WHR (0.014, 95% confidence interval (CI) 0.005 to 0.018) than non-US-raised Hispanic men. In contrast, US-raised Hispanic women had lower WHR (-0.010, 95% CI -0.002 to -0.018) and higher HDL-c (3.67 mg/dL, 95% CI 5.13 to 2.21) than the non-US-raised women. These observations are consistent with those in other recently transitioned populations where generational changes in maternal-child early living conditions (nutrition and exposure to infections) have similar sex-specific associations. They are also consistent with the life-course hypothesis that upregulation of the gonadotropic axis underlies changing patterns of disease with economic development. Further investigation is required to prevent the tragedy of history repeating itself.

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PREVALENCE OF ERECTILE DYSFUNCTION IN PORTUGUESE MALE PRISON GUARDS. *C Pereira, O Amaral, N Veiga (CI&DETS. Polytechnic Institute of Viseu, Portugal)

Objective: The aim of this study was to quantify the prevalence of erectile dysfunction and analyse related factors in portuguese prison guards. Subjects and methods: In a cross-sectional approach we included all prison guards from 12 prisons in Portugal. The data was collected using a self-administrated questionnaire. We distributed 1190 questionnaires and received 1040 (87.4%). The questionnaires without information about sex and age and those referring to females (120) were excluded from the analysis (final sample = 748). Erectile dysfunction was measured using a IIEF-5 scale that includes five questions (scores ranging from 1 to 25). Erectile dysfunction were classified into four categories: severe (1-7), moderate (8-11), mild to moderate (12-16), mild (17-21), and no erectile dysfunction (22-25). Results: The prevalence of erectile dysfunction was 40.4%, distributed according to the following categories: severe/moderate = 0.6%, mild to moderate = 8.4%, mild = 31.5%. Erectile dysfunction was associated with age (≤ 40 years 29.5%, 41-50 years 40.0%, > 50 years 62.1%, $p < 0.01$), marital status (single 37.5%, married or living with partner 40.3%, divorced/separated/widowed 62.5%, $p < 0.01$), insomnia (yes 46.5%, no 35.6%, $p < 0.01$), depression (yes 60.9%, no 25.9%, $p < 0.01$), excessive daytime sleepiness (yes 44.6%, no 31.6%, $p < 0.01$), shift-working (yes 37.3%, no 50.0%, $p < 0.01$), sports practice (yes 33.0%, no 51.6%, $p < 0.01$), alcohol drinking (yes 53.8%, no 37.8%, $p < 0.01$) and life satisfaction (yes 39.2%, no 71.4%, $p < 0.01$). The life prevalence of medication used to help maintain erection was 6.2%. Conclusion: Erectile dysfunction is a high prevalent condition in male guards and it is associated with personal factors and work-related conditions.

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TESTOSTERONE LEVELS IN US MALES IN THE NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY, 1988-1991 TO 1999-2004. *S J Nyante, B I Graubard, G McQuillan, E A Platz, S Rohrmann, G Bradwin, K A McGlynn (National Cancer Institute, Bethesda, MD 20892)

Studies suggest that male testosterone levels have declined recently. To examine this in the US, we compared total testosterone (TT), free testosterone (FT), and sex hormone-binding globulin (SHBG) in the National Health and Nutrition Examination Survey (NHANES) from 1988-1991 and 1999-2004. Analyses included white, black, and Mexican-American men who were ≥ 20 years old and had serum available from morning examinations. TT and SHBG were measured in serum from 1999-2004 participants (N = 907) using the Roche Elecsys 2010 (CV: testosterone, 4.8%; SHBG, 5.6%). The same laboratory previously measured serum TT and SHBG in 1988-1991 participants (N = 1413) using the same methods. A subset of samples from 1988-1991 men was re-assayed at the time of the 1999-2004 population assays and had good reproducibility (CV: TT, 6.3%; SHBG, 5.3%). FT was calculated from TT and SHBG values. Means were estimated using linear regression that accounted for NHANES sample weights and design, and adjusted for age, race/ethnicity, body mass index, waist circumference, alcohol use and smoking. Differences in mean concentrations (Δ) and two-sided P-values were calculated ($\alpha = 0.05$). TT, SHBG, and FT did not change significantly comparing 1999-2004 participants to 1988-1991 (Δ : TT = -0.11 ng/mL, P = 0.24; SHBG = -1.62 nmol/L, P = 0.07; FT = -0.002 ng/mL, P = 0.45). Stratified by age, SHBG was lower in 1999-2004 among men 20-44, but not among older men (Δ , nmol/L: 20-44 = -4.40, P = < 0.01 ; 45-69 = 2.26, P = 0.07; ≥ 70 = 1.92, P = 0.31). TT and FT did not differ stratified by age (all P > 0.05). Overall, there was no evidence of a decline in total or free testosterone in US males between 1988-1991 and 1999-2004.

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IT'S NOT THAT COMPLICATED: WHAT MOTIVATES BLUE COLLAR WORKERS TO QUIT SMOKING? *S J Bondy, K L Bercovitz. (University of Toronto, Dalla Lana School of Public Health, Toronto, ON, Canada M5T 3M7)

Workers in construction and trades are a priority for smoking cessation efforts. They have smoking rates three times the population average, less access to preventive services, and have been poorly represented in research. This qualitative study describes views and experiences of (mostly) men working residential construction expressed in an online discussion forum unrelated to health behaviour. Having previously used this resource to describe workplace smoking policies, we focused here on what motivates these men to quit smoking and predicts success when they try. Analysis considered constructs in the Integrated Theory of Health Behaviour as well as research on smoking in relation to gender and class. Available data suggested that smoking and cessation were not largely influenced by distal social norms and pressures. Smoking was not linked to social power or masculinity as has been suggested elsewhere such as in youth. In terms of lessons for communications, smokers and nonsmokers were little moved by arguments for tobacco-control efforts if these were seen as supported solely by a precautionary principle or the preferences or attitudes of others. Smokers tended to feel quitting was important to maintain one's health and livelihood but described failure at cessation. Maintenance of cessation was described in terms of immediate and physical cues to smoke such as smell and access to cigarettes (e.g., unconscious smoking) which suggests the need to enhance self-regulation as opposed to motivation. Successful quitters motivated others to quit by emphasizing the immediate, tangible and positive gains to the individual smoker and offered advice to avoid relapse.

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CHOICE OF CORRECTION FOR RETENTION BIAS CAN GREATLY AFFECT STUDY CONCLUSIONS. *S J Bondy, J C Victor, L Zawertailo, R Dragonetti, P Selby (University of Toronto, Dalla Lana School of Public Health, Toronto, ON, Canada M5T 3M7)

Poor participation and retention rates are a reality in population- and community-based research. The impact of methods of correction for bias from missing data are demonstrated using the Stop Smoking for Ontario Patients study – a full-population intervention study which offered free nicotine therapy and minimal contact to all Ontario smokers. Using only non-missing data the intervention was estimated to have increased cessation rates by 75% relative to a contemporaneous, matched, population-based control group drawn from the Ontario Tobacco Survey. If estimated using the so-called conservative intent-to-treat approach, the impact of intervention, would be grossly penalized and show no benefit. Using multiple imputation supports the clear benefit shown using non-missing data. This paper provides a review and discussion of popular, emerging, and under-utilized means to assess and correct for actual bias due to loss-to follow-up and missing data. Use of weights, external validation sub-studies and continuum of resistance models should be incorporated at the design-stage of community intervention studies and surveys.

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OPENRECLINK A FREE AND OPEN SOURCE SOLUTION FOR PROBABILISTIC RECORD LINKAGE. *K Camargo, C Coeli (Universidade do Estado do Rio de Janeiro, Rio de Janeiro, RJ, Brazil, 20559-900)

In 1998 we began the development of a software package, called ReLink, that implemented the probabilistic record linkage techniques. Our main drive then was the lack of available low-cost alternatives. Since then we developed three successive versions of the program, which has been widely used in Brazil. OpenReLink is an evolution of that first attempt. Although based in the algorithms and experience acquired with the development of the previous iteration, the new version is a total rewrite of the program, based on a set of goals that we established for the new stage of its development: (1) migrate to a free and open source software (FOSS) platform; (2) to implement a multiplatform version; (3) to implement the support for internationalization. We adopted the Gnu Public License (GPL) v2 for the new software, as a warranty of maintenance of the open software status with the possibility of incorporation of third party modifications without risk of compromising its free and open characteristics. The development site for the program is housed in SourceForge. We kept C++ as the development language, for its versatility and high performance of the generated code. We adopted the FOSS wxWidgets library (www.wxwidgets.org) as the development framework; among its relevant features are the support for multiple platforms (Windows, Linux, MacOS) and the incorporation of the gettext() system of internationalization. Finally, we adopted the hamsterbase library (www.hamsterdb.com), which is available as a free and open tool for equally free and open programs and has a high performance and ease of use, as the data back-end.

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EXPLORING THE EFFECTS OF NON-RESPONSE TO THE BASELINE AND FOLLOW-UP ON THE VALIDITY IN COHORT STUDIES. *C Coeli, M Carvalho, D Chor, R Pinheiro, P Guimarães, D Skaba (Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil, 21941-598)

Few articles have evaluated the effects of non-response in cohort studies. The aim of this study was to assess if non-response, both to the baseline and to follow-up, may introduce selection bias on the association between occupational level and mortality. We applied the non-response and mortality estimates of the Whitehall III study to a hypothetical cohort encompassing 110.000 person.years (occupational level: low- 50.000; high - 60.000). We considered four scenarios: (1) full participation; (2) non-response to baseline; (3) non-response to follow-up; (4) non-response to baseline and follow-up. We calculated mortality rate ratios (RR) considering the high occupation level as reference and absence of confounding or information bias. The first scenario RR was 1.79 (95% confidence interval [CI] 1.6;2.1), with only the last scenario showing an important impact of the non-response on the rate ratio estimate (RR = 1.2; 95% CI 0.91;1.57). Our results suggest that combining non-response in different stages of cohort studies may cause selection bias. 1. Ferrie JE, et al. Non-response to baseline, non-response to follow-up and mortality in the Whitehall II cohort. *Int. J. Epidemiol.* 2009 Jun 1;38(3):831-837.

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NONCOVERAGE BIAS IN HOUSEHOLD LANDLINE TELEPHONE SURVEYS, BRFSS 2008. *L Balluz, S S Hu, M P Battaglia, M R Frankel (CDC, Atlanta, GA)

The Behavior Risk Factor Surveillance System is a state based telephone survey conducted in all 50 states, DC and the territories. To determine whether exclusion of adults with cell-phone-only may bias estimates from a landline-based survey, a cell phone survey was conducted in parallel with the ongoing, monthly landline data collection in 18 states in 2008. The landline and cell phone samples were weighted at state level. Logistic models were developed for each of 16 health indicators to examine whether survey approach affected estimates after adjusting for the impact of demographic characteristics. The relative biases for estimates were calculated to estimate the potential biases in landline telephone surveys that exclude cell phones. The study found that as noncoverage rate for cell-phone-only adults continued to increase, the biases of 16 health indicators resulting from their exclusion from landline-based health survey were significantly high and cannot be ignored.

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THE USE OF NATIONAL PROBABILITY SURVEYS TO DESCRIBE REGIONAL PATTERNS OF FUNGAL INFECTIONS IN THE UNITED STATES. *S Gallas, D Guo, S Niemcryk, R Jenrow, R Tresley (Abbott Laboratories, Abbott Park, IL 60064)

This study was designed to describe the regional distribution of ambulatory care visits for superficial and invasive fungal infections in the United States. Data from the National Ambulatory Medical Care Survey and the National Hospital Ambulatory Medical Care Survey, which rely on multi-stage probability sampling and which are conducted by the Centers for Disease Control and Prevention, were used to identify fungal infections diagnosed from 2000 through 2006 at physician offices, hospital outpatient settings, and emergency departments. A total of 52,492,640 (+2,582,422) physician office visits, 5,903,934 (+378,017) hospital outpatient department visits and 3,757,723 (+263,666) emergency department visits with fungal infections coded as an ICD-9 diagnosis were identified over the seven year period of study. Over 38% of physician office visits and nearly 46% of emergency department visits with a diagnosis of a fungal infection were in the southern region. Of the fungal infections diagnosed in the outpatient setting, 33% and 30% occurred in the mid-western and southern regions, respectively. Dermatophytosis and candidiasis were the two most frequently diagnosed fungal infections. The regional distribution of commonly diagnosed fungal infections, including dermatophytosis and candidiasis was described. Patients with serious fungal infections would likely require hospitalization and therefore would not have been captured in these datasets.

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MAINTAINING SAMPLE DIVERSITY AND RESPONSE RATES IN A LONGITUDINAL POPULATION-BASED STUDY, 2002-2010. *H Cochran, J Brewer, D Brander, J B McKinlay (New England Research Institutes, Watertown, MA 02472)

The Boston Area Community Health (BACH) Survey is population-based longitudinal study of 5,502 racially/ethnically diverse Boston adult residents. During our 5 year follow-up, we have achieved a high response rate (N = 4,145, 80% of eligible) in a mobile population while preserving the sample's diversity. A combination of panel maintenance and tracking methods is to be credited for this success. Since start-up in 2002, we have made yearly contact with subjects. (Holiday and birthday mailings with a return postage-paid card requesting updated contact information). During follow-up, a rigorous tracking protocol was implemented. Results showed that of the 5,502, the majority were successfully tracked using standard methods (e.g., letters, phone calls at varied times of day, outreach to "contacts" named by subjects and field tracking). Follow-up interviews were completed among 3,978 of these subjects. For the remaining 742 originally believed to be lost-to-follow-up, we used intensive methods (e.g., on-line databases). Of these, 37% were located and 16% of these were determined to be ineligible (death, etc.). Of the 84% that remained eligible, 73% (N = 167) completed a follow-up interview. Thus, these additional efforts increased our yield by > 4% of the sample who completed follow-up. This highly-mobile cohort of inner-city Boston residents poses significant recruitment challenges due to diversity in age, SES, race/ethnicity and country of origin. Additionally, study visits are long (~2 hours) and conducted *in-person*. The use of evolving tracking methods has kept diversity of the sample intact, for instance, in terms of the distribution of race/ethnicity (Baseline/follow-up: White 34%/36%, Black 32%/32%, Hispanic 34%/32%). Supported by Award Number U01DK056842 from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (NIH). Content is solely the responsibility of the authors and does not necessarily represent the official views of NIDDK or NIH.

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CONSIDERATIONS IN DEVELOPING AND USING ELECTRONIC HEALTHCARE DATA ALGORITHMS FOR EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH. *J Chubak, G Pocobelli, N S Weiss (Group Health Research Institute, Seattle, WA 98101)

Epidemiologic studies often use electronic healthcare data algorithms to classify persons as having health conditions or having undergone certain medical procedures. However, the data on which algorithms are based may be incomplete or inaccurate. We review uses of electronic healthcare data algorithms, measures of their accuracy, and reasons for prioritizing one measure of accuracy over another. High algorithm sensitivity is important for reducing the costs and burdens associated with the use of a more accurate measurement tool, for enhancing study inclusiveness, and for collecting information on common exposures. High specificity is important for classifying outcomes. High positive predictive value is important for identifying a cohort consisting of persons with a condition of interest but that need not be representative of or include everyone with that condition. Finally, a high negative predictive value is important for reducing the likelihood that study subjects have an exclusionary condition. Recognizing that electronic healthcare data algorithms will not be completely accurate, epidemiologists must prioritize one measure of accuracy over another when generating an algorithm for use in their study. We recommend that researchers publish all tested algorithms—including those that do not have acceptable accuracy levels—to help future studies refine and apply algorithms that are well-suited to their objectives.

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SELF-REPORTED ATRIAL FIBRILLATION AS A PREDICTOR FOR STROKE IN THE REASONS FOR GEOGRAPHIC AND RACIAL DIFFERENCES IN STROKE (REGARDS) STUDY. *E Z Soliman, G Howard, J F Meschia, M Cushman, P Muntner, P M Pullicino, L A McClure, S Judd, V J Howard (Wake Forest Univ Sch of Med, Winston Salem, NC)

Background: Self-reported atrial fibrillation (SR-AF) data is often called into question because of the possibility of unreliable information from the respondents. We compared the associations of SR-AF and electrocardiogram-detected AF (ECG-AF) with incident stroke in the REGARDS study. Methods: 27,109 participants aged > 45 years without prior stroke were included in this analysis. AF was identified by SR and ECG. Stroke cases were identified and adjudicated during an average of 4.4 years of follow-up. Multivariable Cox proportional hazards analysis was used to examine the association between AF ascertained by different methods with incident stroke. We also examined the impact of the AF ascertainment method on the predictive ability of the Framingham Stroke Risk Score (FSRS). Results: After adjustment for demographics and common stroke risk factors (the components of the FSRS), SR-AF, ECG-AF, and AF by either method were predictive of incident stroke [HR (95% CI): 1.41 (1.05,1.88), 1.90 (1.10,3.27), 1.53 and (1.16,2.01), respectively]. When SR, ECG or either method, separately, were considered as the method of AF ascertainment in the FSRS, the hazard ratios per 1% higher FSRS were the same regardless of the AF ascertainment method [1.04 (1.03,1.04); 1.04 (1.04,1.05); 1.04 (1.03,1.04), respectively]. Conclusion: SR-AF is a strong predictor of stroke that can be used interchangeably with ECG-AF in stroke risk stratification models.

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HOW SHOULD WE MEASURE ASTHMA AND ALLERGIC RHINITIS IN EPIDEMIOLOGIC STUDIES? A COMPARISON OF SELF-REPORTED AND POPULATION-BASED REGISTER DATA. *S Hansen, E Maslova, M Strøm, E L Mortensen, S F Olsen (Statens Serum Institut, Centre for Foetal Programming, Copenhagen, Denmark)

The study aim was to compare cases of asthma and allergic rhinitis ascertained by different assessment methods. The work was carried out in the Danish National Birth Cohort including around 93.000 live-born children who were followed-up at seven years of age. We identified cases of asthma and allergic rhinitis from three sources: a self-administered questionnaire, the Danish National Patient Register, and the Register of Medicinal Product Statistics. Using these rich data sets we found a substantial non-overlap between the number of cases ascertained by the three assessment methods ($\kappa = 0.08-0.38$). We found the highest lifetime prevalences of asthma and allergic rhinitis when we used the medication registry for the ascertainment of cases (32.7 % for asthma, 7.5 % for allergic rhinitis) and the lowest lifetime prevalences when we used the hospital registry (6.6 % and 0.5 %, respectively) for the ascertainment. In general, the self-reported asthma and allergic rhinitis measures had higher specificities and negative predictive values and lower sensitivities and positive predictive values compared with the registry data. The non-overlap between the three methods may be due to different abilities of the methods to ascertain cases with different phenotypes and aetiologies in which case they should be treated as separate outcomes in future aetiological studies. The non-overlap may also be due to bias in the measurements; if the ascertained cases across the methods are not phenotypically different, a combination of these methods could be used to create measures with high specificities which is desirable in aetiological studies.

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VERIFICATION OF RANDOM SELECTION ASSUMPTION IN RESPONDENT-DRIVEN SAMPLING IN EGOCENTRIC SOCIAL NETWORK DATA. *H Liu, and J Li (Virginia Commonwealth University, Richmond, VA 23298)

The primary aim of respondent-driven sampling (RDS) analysis is the estimation of population proportions in a hidden population. One of the key assumptions in RDS analysis, called "random selection assumption," is that respondents randomly recruit peers from their personal networks. The verification of this assumption in empirical studies is rare. The objective of this study was to verify this assumption in the empirical data of egocentric networks. We conducted an egocentric social network study among young drug users in China, in which RDS was used to recruit this hard-to-reach population. The evaluation of the RDS sample indicated its success in reaching the convergence of RDS compositions and including a broad cross-section of the hidden population. To verify the random selection assumption, we first randomly selected alters from an ego's social network. The number of alters randomly selected from an ego's social network was the same as the number of subjects that the ego actually recruited in this study. We refer to this randomly selected sample as an "ad-hoc random sample". Next, we compared the distributions of five visible variables (group traits) that were measured in both egos and alters between the RDS sample and the ad-hoc random sample. Findings demonstrate that the random selection assumption holds for three group traits, but not for two others. Specifically, egos randomly recruited subjects in different age groups, marital status, or drug use modes from their network alters, but not in gender and education levels. Future studies are needed to assess the extent to which the population proportion estimates can be biased when the violation of the assumption occurs in some group traits in RDS samples.

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RECRUITMENT RESULTS AND COSTS OF A COUPLES-BASED INTERVENTION TO CONTROL AND PREVENT DIABETES. *V P Quinn, E D Tuazon, R Contreras, D Ritzwoller, A Sukhanova, R E Glasgow, D DeRosa, R Chon, A Xiang, K Reynolds (Kaiser Permanente Southern California, Pasadena, CA 91101)

Background: To improve self-management of type II diabetes (DM II) we sought to recruit couples to the Prevention and Control of Diabetes in Families Study, an intervention targeting diet and physical activity. Subjects were from Kaiser Permanente Southern California (KPSC) a nonprofit, pre-paid health plan serving 3.3 million members. Methods: Couples were randomly selected to be contacted if one spouse had DM II and both were 30-70 years of age, able to speak and read English, and had no serious health conditions. We sent introductory packets and screened by phone for eligibility and interest. Results: We sent letters to 4366 patients with DM II, completed 3655 calls, identified 1606 ineligible couples, and randomized 305 spousal pairs. Participation ranged from 11% to 33% depending on assumptions about eligibility of refusers ($n = 1744$) and those we couldn't contact ($n = 711$). Refusers most often reported having no interest in the intervention. Participants were more likely to be older, non-Hispanic white, college educated and have a body mass index > 30.0 . Recruitment costs were \$113,128 or 17% of total study costs including intervention, data collection, labs and analyses. Conclusions: Recruiting couples to a lifestyle intervention was difficult and costly. Including spouses added to the recruitment burden, as did the high proportion with limited English language skills. Significant differences were found between subjects and non-participants. Strategies to motivate interest in lifestyle change in this high-risk population need to be improved.

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SCALING UP RESPONDENT-DRIVEN SAMPLING BEYOND THE LOCAL LEVEL: IMPLEMENTATION LESSONS FROM THE TRANS PULSE PROJECT. *G R Bauer, N Khobzi (University of Western Ontario, London, ON, Canada N6H 2B1)

Respondent-driven sampling (RDS) provides a systematic network-based option for sampling, tracking, and analysing data on hidden populations. It has been used extensively in local studies where researcher contact with participants continued through each successive recruitment wave, allowing for validation of eligibility, control in data collection, and consistent messaging regarding recruitment of new participants by prior participants. While evaluations of RDS have consistently confirmed point estimate validity, design effects are often large, suggesting that larger sample sizes may be needed than previously believed. The ability to scale up RDS to non-local samples presents one response, but requires new or adapted strategies. We evaluate strategies developed by the community-based Trans PULSE Project team to recruit a province-wide sample of trans (transgender, transsexual or transitioned) people in Ontario, Canada for a multi-mode epidemiologic survey of trans health. Trans PULSE recruited 433 participants within this moderately well-networked population (median network size = 8). This presentation provides an overview of validity issues specific to, or with unique implications for, RDS; lessons learned in scaling up RDS, and considerations in deciding whether RDS methods are appropriate for a study, and at what scale.

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FOLLOW-UP OF METHODS USED BY THE KAROLINSKA INSTITUTE (KI) TO ANALYZE THE SWEDISH CONSTRUCTION WORKERS COHORT STUDY: STILL INCONSISTENT AND UNJUSTIFIED. *K K Heavner, C V Phillips (Populi Health Institute, Wayne, PA 19087)

In 2009 we reported at these meetings on KI's inconsistent methods used to analyze data about smokeless tobacco (snus) exposure from the Swedish Construction Workers cohort study (see: tobaccoharmreduction.org/papers.htm). Instead of doing a single study with common methodology, KI researchers used different methods for different endpoints, apparently searching for the most upward-biased result for each. Varying methods included subject eligibility criteria and variable definitions (different cut-offs for continuous variables, failure to use available exposure variables that were more detailed, etc.) and inappropriate tests of significance were used. The consequent apparent bias has affected meta-analyses and tobacco harm reduction policy (specifically the discussions of the snus ban in the European Union). Subsequent to our last report, the researchers were made aware of our concerns about their methodology, but refused to share their data or even run additional analyses (reporting what their method for analyzing one endpoint would have produced for others, a way to detect biased methods choices) and basically conceded that their method was to dredge for larger associations. Another researcher then asked the Swedish courts to intervene, to enforce Swedish law that requires the data be made publicly accessible. The case is pending and the researchers continue to publish on the topic using the same plastic methods. While it is possible that KI's results are legitimate, the unexplained inconsistencies and anti-scientific hiding of the data suggest a threat to knowledge on the topic as well as the integrity of epidemiology.

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ASSOCIATIONS BETWEEN OCCUPATIONAL WHOLE BODY VIBRATION EXPOSURE AND PARKINSON'S DISEASE IN A POPULATION-BASED CASE-CONTROL STUDY. *M Anne Harris, Stephen A Marion, Joseph K C Tsui, John J Spinelli, Kay Teschke (University of British Columbia, Vancouver, BC, Canada, V6T1Z3)

Head injury events increase risk of Parkinson's disease (PD), suggesting that mechanical stressors are implicated in PD etiology. Sources of mechanical stress such as whole body vibration have yet to be explored as potential risk factors. To our knowledge, this study is the first to evaluate the relationship between occupational whole body vibration exposure and Parkinson's disease. We conducted a population-based case control study in British Columbia, Canada with 403 cases and 405 controls. From detailed occupational histories and measurements of whole body vibration in the published literature, metrics of occupational whole body vibration exposure were constructed and tested for associations with Parkinson's disease using logistic regression analyses while adjusting for possible confounders such as age, sex, smoking and history of head injury. Any history of occupational whole body vibration exposure was inversely associated with Parkinson's disease (odds ratio (OR) [95%CI]: 0.73 [0.52-1.04]), but the greatest values of the most intense equipment exposure were associated with increased odds of Parkinson's disease, particularly when exposures occurred 20 years or more prior to diagnosis (adjusted OR [95%CI]: 1.90 [0.91-3.95], $p = 0.08$). Possible mechanisms of an inverse relationship between low levels of whole body vibration exposure could include direct protective effects or correlation with other protective effects such as exercise. The relationship between high intensity of whole body vibration and Parkinson's disease could result from vascular or inflammatory effects of vibration exposure.

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WITHDRAWN

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SMOKE EXPOSURE AS AN ENVIRONMENTAL RISK FACTOR FOR MULTIPLE SCLEROSIS: A SYSTEMATIC REVIEW. *A Styles, S Karunanathan, C Wolfson (McGill University, Montreal, QC, Canada H3A 1A2)

The prevalence of Multiple Sclerosis (MS) in Canada has been estimated at 240/100 000¹, and is among the highest in the world. Although the etiology of MS remains unknown, evidence suggests environmental factors play a key role in the risk of developing this neurodegenerative disease. Recently, smoking has been suggested as a leading environmental etiological factor for MS. In order to consolidate the scientific evidence on smoking as a risk factor for MS we conducted a systematic review of primary studies reporting the relationship between smoking and MS. A literature search, using six electronic databases and hand searching, resulted in 129 articles published before July 9, 2010. Twenty articles, written in English or Italian, and focusing on MS etiology were included in this review. We identified several design and analysis limitations while conducting the review including overmatching, and the use of current smoking to assess etiology in prevalent cases. Not surprisingly, we found that study quality improved over time and that recent studies were more likely to incorporate duration and/or intensity of smoke exposure, and more recently passive smoke exposure. Smoking was dichotomized into ever versus never active smoking in eleven case-control studies. The five studies with the highest methodological quality reported low to medium effects of smoking with odds ratios (OR) ranging from 1.4 (95% CI 0.8, 2.3) to 3.3 (95% CI 1.8-5.9). In this presentation we will examine the effect that multiple measures of smoke exposure classification have on estimating the risk of MS associated with smoking. 1. Beck, C.A., et al. (2005). Regional variation of multiple sclerosis prevalence in Canada. *Multiple Sclerosis* 11(5): 516-519.

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SEVERITY OF DISABILITY MAY LEAD TO INCREASED RISK OF COGNITIVE DECLINE. *M B Cannell, E D Bouldin, W Z Akhtar, E M Andresen (University of Florida, Gainesville, FL 32610)

Previous research has shown an association between incident disability and severity of cognitive decline. There is still much to learn about the direction, temporal sequence, and strength of this association. The goal was to lay the groundwork for just such an endeavor. Our group funded questions on the 2009 Florida Behavioral Risk Factor Surveillance System (BRFSS), collecting information about severity and duration of disability. Using this representative sample of almost 6,000 adults from Florida we were able to study the association between incident worsening of memory and confusion (last 12 months) and severity of disability. In an adjusted logistic regression model, compared to persons with no disability there was a significant increase in odds of experiencing worsening cognition in the past year by severity of disability. Persons with disability (PWD), but no instrumental activity of daily living limitations (IADL) or activity of daily living (ADL) limitations had an odds ratio (OR) of 1.8 (95% Confidence Interval [CI] 1.2, 2.7). PWD with IADL limitations, but no ADL limitations, had an OR of 3.8 (95% CI 2.4, 6.0). Finally, PWD with ADL limitations had an OR of 5.9 (95% CI 2.8, 12.1). This study suggests that there could be a previously undiscovered pathway for the association between disability and cognitive decline, and that PWD may be in greater need of measures to prevent cognitive decline than their counterparts without disability. These data also provide evidence of a dose response between disability severity and incident cognitive impairment. While more research is needed, this study is an important first step.

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FUNCTIONAL DEPENDENCE AMONG ISCHEMIC STROKE SURVIVORS: SIX-MONTH FOLLOW-UP IN THE STROKE MORTALITY AND MORBIDITY STUDY (THE EMMA STUDY). T G Fernandes, A C Goulart, A P Alencar, L M G Fedeli, I M Benseñor, PALotufu * (University of São Paulo, São Paulo, Brazil, 05508 000)

Introduction: There are controversies about the role of socioeconomic status (SES), clinical risk factors and medical care post-stroke recovery. We aimed to investigate the predictors of functional dependence during six-month follow-up in ischemic stroke (IS) Hypothesis: to verify if there is an influence of SES, clinical and hospital characteristics at 28-day and six-month IS recovery. Methods: We investigated the predictors of functional dependence among IS survivors admitted from April 2006 to December 2009 in a community hospital located in a deprived area in the city of São Paulo, Brazil. Patients were classified as independent or dependent according to their functional status using the modified Rankin Scale. Results: From 401 stroke survivors evaluated during six-months follow-up, 355 were classified as having IS. Of these 52.4% were male, had a mean age of 67.9 years-old; 69% had < 7 years of education and almost 30% were classified as recurrent event. Higher proportions of current smoking (40.9%) and alcohol consumption (19.9%) were found among male. Beyond age, the most important predictors of physical dependence at 28 days were low education (illiterate [odds ratio (OR) 3.7; 95% confidence interval (95%CI) 1.60 to 8.54], stroke localization (total anterior circulation infarct OR 16.9; 95%CI 2.93-97.49), hospitalization \geq 11 days (OR 3.95; 95% CI 1.63-9.57). At six-months, the predictors of dependence did not change materially. Conclusion: Beyond advanced age, low education, cerebral damage and hospitalization were independently associated to ischemic stroke.

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SEROLOGIC BIOMARKERS FOR EARLY DIAGNOSIS OF ACUTE CEREBROVASCULAR DISEASE. *C Mercado (Columbia University Medical Center, New York, NY)

Ischemic stroke (IS) and intracerebral hemorrhage (ICH) constitute the major subtypes of acute cerebrovascular disease (CVD, stroke). Stroke is a debilitating disease that warrants an accurate and immediate diagnosis to augment outcome and prognosis. The diagnostic approach is based mainly on recognizing the clinical manifestations and confirmed by brain imaging studies, a few hours after onset of non-specific symptoms. While thrombolytic therapy has proven to improve outcome and survival for ICH, a rapid diagnostic test that would allow early diagnosis, classification, and intervention for stroke, is still limited by the sensitivity and specificity of existing biological serum markers. Ischemia generates multiple proteins in the blood stream, but the blood brain barrier slows down the release of brain markers to be detected in the serum, hence the lower specificity of the markers available within three hours from onset of clinical symptoms. Literature was systematically searched using OVID, MEDLINE, and Pubmed from January 1950 to July 2010 to identify English-language studies that evaluated the diagnostic accuracy and trials on serologic markers for stroke. A meta-analysis using the summary Receiver Operating Characteristic (sROC) was done to compare existing serum biological markers that have a significant potential to predict an underlying pathologic event leading to acute stroke. Preliminary data suggest that the epitope of glutamate/N-methyl-D-aspartic acid (NMDA) receptor subunit NR2A/2B (which is highly expressed in human brain) in the blood serum of patients with IS has a sensitivity of 98% and specificity of 86% and detectable within 30 minutes after onset of symptoms. The specificity of early diagnosis of IS can be augmented by screening for fatty acid-binding protein among patients presenting with stroke (Sp = 100%), which is detectable in the blood serum 4.5 hours after onset of symptoms. Biological serum markers will become increasingly relevant for developing targets for neuro-protective therapies, monitoring response to treatment, and as surrogate end-points for treatment trials.

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MORTALITY IN MULTIPLE SCLEROSIS: FINDINGS FROM BRITISH COLUMBIA, CANADA. *E Kingwell, M van der Kop, Y Zhao, A Shirani, F Zhu, J Oger and H Tremlett (University of British Columbia, Vancouver, BC, Canada)

We examined absolute survival, relative mortality and predictors of survival in a cohort of multiple sclerosis (MS) patients. Patients residing in British Columbia (BC), registered with a BC MS clinic from 1980-2004, were linked to BC Health Registry and Vital Statistics death data. The effects of sex and disease course on survival were estimated by the Kaplan-Meier method. Survival relative to the BC general population was measured by standardized mortality ratios (SMRs). We modeled relative survival to assess excess mortality associated with sex, disease course and time period of cohort entry. During 77,790 person-years, 1025/6917 patients died. The SMR was 2.90 (95%CI:2.72-3.08). Median survival age was greater for women (78.6 years;95%CI: 77.5-79.7) than for men (74.3 years; 95%CI:73.1-75.4) but similar for relapsing-onset (R-MS) (76.9 years; 95%CI:75.6-78.2) and primary progressive (PPMS) (76.3 years;95%CI:74.4-78.3) patients. Relative to the BC population however, MS women had a small survival disadvantage compared to MS men (relative mortality ratio (RMR): 1.15;95%CI:1.01-1.31), and PPMS had a higher relative risk of death than R-MS (RMR: 1.52;95%CI:1.30-1.80). Crude 10-year survival was significantly shorter in the earliest cohort (1980-85) than in more recent cohorts (1986-91 and 1992-97), but 10-year relative survival did not vary over time. Although women survive longer than men, MS women are at a disadvantage after accounting for higher male mortality rates in the general population. We found no evidence of improved survival over time when improved survival in the general population was taken into account. Findings highlight the importance of including population mortality rates in mortality analyses.

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RED CELL DISTRIBUTION WIDTH: A NEW PREDICTOR OF COGNITIVE AGING? *J Weuve, T S Perlstein, C F Mendes de Leon, D A Evans. (Rush University, Chicago, IL, 60612)

The red cell distribution width (RDW) is part of the complete blood cell count (CBC), indicating the heterogeneity of red blood cell sizes, ie, anisocytosis. New evidence suggests that RDW independently predicts cardiovascular outcomes and chronic disease mortality. Little is known about RDW's relation to cognitive aging. We examined RDW in cross-sectional relation to cognition and dementia in participants, aged 65-104, of the Chicago Health and Aging Project (CHAP). The cognition measure was based on cognitive assessments that included 4 tests, whose z scores we averaged into a composite score. We evaluated the association of RDW with cognitive score using linear regression (N = 798). Every 3 years, a stratified random sample of participants undergoes clinical evaluation, including neuropsychiatric assessment. Logistic regressions of dementia diagnosis on RDW and were weighted to account for the sampling scheme (N = 2667, 588 cases). Primary analyses were adjusted for age, sex, race and education. Participants who were black, had less education, or had higher indices of systemic illness had higher RDW. In primary adjusted analyses, cognitive scores were 0.038 standard unit worse (95% CI, -0.073 to -0.003) per unit increment in RDW, similar to the difference between persons in our data who were 1 year apart in age. Further multivariable adjustment attenuated the association. Likewise, a 1-unit increment in RDW corresponded to an adjusted dementia odds ratio (OR) of 1.10 (95% CI, 1.00-1.20), yet further adjustment generally yielded larger estimates (eg, OR = 1.14 [95% CI, 1.01-1.29]). Findings for both outcomes were larger in white than in black persons. These results support the plausibility of RDW as an independent predictor of cognitive aging.

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SERUM CYTOKINE LEVELS IN RELATION TO APOE 4 ALLELE STATUS, COGNITIVE IMPAIRMENT, AND ALZHEIMER'S DISEASE: A POPULATION-BASED STUDY. *R G Munger, C Corcoran, J Tschanz, M Norton, and H Wengreen. (Utah State University, Logan, UT 84322)

Systemic inflammation may be a causal factor in Alzheimer's disease (AD). The APOE $\epsilon 4$ allele is the strongest known susceptibility factor for AD and may induce a proinflammatory state. We evaluated the associations between serum cytokine levels and APOE genotype, cognitive status, and AD in the Cache County Memory Study, a population-based study in Utah. Serum cytokines were measured in participants in the 4th examination wave 2005. The cytokine panel included IL-1 β , IL-4, IL-6, IL-8, IL-10, IL-12p70, IL-15, IL-23, INF- γ , and TNF- α . Cross-sectional analyses evaluated the associations between cytokine levels and APOE genotype, cognitive status, and AD. The sample included 753 cognitively normal subjects, 260 with cognitive impairment but not demented (CIND), and 38 with AD. Among the cognitively normal subjects presence of the APOE $\epsilon 4$ allele was associated with elevated IL-12p70 (p = 0.01) and IL-15 (p = 0.025). Compared to cognitively normal subjects, CIND was associated with elevated IL-8 (p = 0.014) and AD was associated with elevated IL-10 (p = 0.035), IL-15 (p = 0.011), and TNF- α (p = 0.05). In logistic regression models that included age, education and gender no cytokine associations remained significant for CIND and elevated IL-15 was associated with a 2.75-fold increase in AD risk (odds ratio = 2.75, 95% confidence interval = 1.17, 6.46). The association of elevated IL-15 with the APOE $\epsilon 4$ allele in cognitively normal subjects and with prevalent AD suggests that inflammatory processes involving IL-15 may be associated with early stages in the development of AD in pathways that involve APOE.

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A DIFFUSION TENSOR IMAGING STUDY OF CUMULATIVE LEAD DOSE AND WHITE MATTER HEALTH IN FORMER ORGANOLEAD WORKERS. *B K Lee, B S Schwartz (Drexel University School of Public Health, Philadelphia, PA 19102)

Lead is a known neurotoxicant that can adversely influence both neurological structure and function. Compared with conventional magnetic resonance imaging, diffusion tensor imaging (DTI) offers more sensitive characterization of white matter microstructure. In a cohort of former male occupational lead workers, we observed that cumulative lead dose, as assessed by tibia lead levels, was associated with worse cognitive function, higher prevalence and severity of white matter lesions, and changes in white matter volume. Given these findings, we wanted to further characterize the white matter health of our cohort using DTI. We describe the voxel-wise associations of tibia lead with white matter health in 342 participants (mean [SD] age 65.3 [7.9] years) with an average (SD) of 24.8 (10.5) years between last occupational lead exposure and the date of DTI exam. DTI measured fractional anisotropy, the extent to which the diffusion of water is oriented in a single direction and which reflects the amount of myelin and axonal loss. After adjustment for age, education, and APOE genotype, higher tibia lead was associated with lower fractional anisotropy in specific areas in the brain, indicating that lead exposure adversely affected structural white matter integrity. Although participants were occupationally exposed, mean tibia lead was 14.3 $\mu\text{g Pb/g}$ bone mineral, which is less than in a population-based sample of older urban-dwelling adults. The implications of these findings in the context of what is already known about the cross-sectional and longitudinal associations of tibia lead with cognitive function and decline, brain volumes, and white matter lesions in this cohort will be discussed.

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RACIAL AND GENDER DIFFERENCES IN THE PREVALENCE OF DEMENTIA AMONG PATIENTS ADMITTED TO HOSPITALS. *Z Natto (Loma Linda University, Loma Linda, CA 92354)

The purpose of this study was to determine the prevalence of hospital admissions for dementia in the USA using a nationally representative sample and based on the demographic characteristics such as race and gender. We used Nationwide Inpatient Sample data (NIS) for the years 2000-2007 and limited our results to individuals aged 50 years and older from 17 states that disclose patients races and ages and represent about 53% of the total US population. The number of the cases were obtained by using survey adjusted statistical analyses. Hospitalization rates of people with dementia diagnosed were almost similar for females and males (167.98 per 100,000 and 164.47 per 100,000, respectively, p value > 0.05). White was not significantly different from African American (175.62 per 100,000 versus 177.64 per 100,000), but both are higher significantly than Hispanic and Asian/Pacific Islander (127.77 per 100,000 and 76.91 per 100,000, respectively, p value < 0.05). We concluded that the prevalence of dementia on hospital admission was higher among White and African American than among Hispanic and Asian/Pacific Islander, a finding that has implications for the delivery of care.

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DETERMINANTS OF 25-HYDROXYVITAMIN D IN A MULTIETHNIC POPULATION IN TORONTO: A PILOT STUDY. *J Wong, J A Knight, K M Blackmore, J M Raboud, T Lee, R Vieth, L D Marrett, D E C Cole (Samuel Lunenfeld Research Institute, Toronto, ON, Canada)

Vitamin D and its biomarker, 25-hydroxyvitamin D (25(OH)D), have been linked to many health outcomes, but questions remain. 25(OH)D is related to multiple factors including sun exposure, supplements, diet, skin colour, and genetics. Accurate assessment of exposure in large studies is challenging, leading to efforts to develop predictive models. We conducted a pilot study of 53 European, East/Southeast, and South Asian individuals aged 19-59 who had blood drawn, physical measurements, and a one-week diary at approximate 2-month intervals for 1-4 visits. Factors associated with 25(OH)D were assessed for the first visit using linear regression and combining all visits using generalized estimating equations (GEE). At visit 1, month, ethnicity, and vitamin D supplement use (> 400 or 1-400 IU per day vs. none) explained most of the variation in 25(OH)D ($R^2 = 0.71$). Adding the rs7041 (D432E) variant of the vitamin D binding protein gene increased the R^2 to 0.80 with incremental contributions from other variables. Using supplements > 400 IU per day or carrying a GG rs7041 genotype was associated with an approximate increase of 30 nmol/L in 25(OH)D and being of East or South Asian descent was associated with reduced levels of approximately 20 and 29 nmol/L respectively, similar to the deficit in the winter months. Ethnicity, a stronger predictor than skin colour, is a key determinant of 25(OH)D in a multiethnic population. Vitamin D supplement use is increasing in importance and genetic variation is also an important determinant. It may be possible to capture the majority of variation in 25(OH)D in this population with a small number of variables.

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LA SPROUTS: A GARDEN-BASED NUTRITION INTERVENTION IMPACTS MOTIVATION AND PREFERENCES FOR FRUITS AND VEGETABLES IN LATINO YOUTH. *N M Gatto, E E Ventura, L T Cook, L E Gyllenhammer, J N Davis (Department of Epidemiology, School of Public Health, University of California Los Angeles, Los Angeles, CA)

Garden-based approaches to nutrition education may be effective for improving dietary intake and reducing obesity risk in adolescents. We assessed whether our pilot garden-based intervention for Latino youth ("LA Sprouts") intervention had an effect on behavioral variables. LA Sprouts participants received weekly 90-minute, culturally tailored, interactive classes for 12 consecutive weeks at a community garden; control participants received an abbreviated delayed intervention. Questionnaire data was obtained before and after the intervention. Participants included 104 predominantly Latino 4th and 5th grade students in Los Angeles (mean age 9.8 ± 0.7 years; $n = 70$ controls, $n = 34$ LA Sprouts participants). Compared to controls, LA Sprouts participants had increased preferences for three target fruits and vegetables and improved perceptions that "vegetables from the garden taste better than vegetables from the store" ($p < 0.05$). In the overweight subgroup, LA Sprouts participants had a 16% greater increase in their preference for vegetables overall compared to controls (+10.9% versus -3.7%, $p = 0.009$). Results from this pilot study demonstrate that a cooking, nutrition and gardening after-school program in a garden-based setting can improve motivation, attitudes, and preferences for fruits and vegetables, which may lead to improved dietary intake and reduced health disparities.

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LA SPROUTS: A GARDENING, NUTRITION AND COOKING INTERVENTION FOR LATINO YOUTH IMPROVES DIET AND ATTENUATES WEIGHT GAIN. J N Davis; E E Ventura; L T Cook; L E Gyllenhammer; *N M Gatto (²Department of Epidemiology, School of Public Health, UCLA, Los Angeles, CA)

To date, no study has evaluated the effects of a gardening, nutrition, and cooking intervention on obesity measures in Latino youth. The objective of this study was to develop and test the effects of a 12-week, after school, gardening, nutrition and cooking intervention ("LA Sprouts") on dietary intake and obesity risk in Latino fourth and fifth grade students in Los Angeles (LA). One hundred and four primarily Latino children (mean age 9.8 ± 0.7 years), 52% male and 59% overweight, completed the program ($n = 70$ controls, $n = 34$ LA Sprouts participants). Weight, height, body mass index (BMI), waist circumference, body fat (via bioelectrical impedance), blood pressure, and dietary intake (via food frequency screener) were obtained before and after the 12-week intervention. LA Sprouts participants received weekly 90-minute, culturally tailored, interactive classes for 12 consecutive weeks in Spring 2010 at a nearby community garden, while Control participants received an abbreviated delayed intervention. Compared to Controls, LA Sprouts participants had increased dietary fiber intake (+22% vs. -12%; $P = 0.04$) and decreased diastolic blood pressure (-5% vs. -3%; $P = 0.04$). For the overweight sub-sample, LA Sprouts participants had a significant change in dietary fiber intake (0% vs. -29%; $P = 0.01$), reduction in BMI (-1% vs. +1%; $P = 0.04$) and less weight gain (+1% versus +4%; $P = 0.03$) compared to Controls. In conclusion, a gardening, nutrition, and cooking intervention could be a useful approach to improve dietary intake and attenuate weight gain in Latino children, particularly in those who are overweight.

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PROGRESSION OF SYMPTOMS SUGGESTIVE OF OVERACTIVE BLADDER DEPENDS ON WEIGHT CHANGE DIFFERENTIALLY BY GENDER: RESULTS FROM THE BOSTON AREA COMMUNITY HEALTH (BACH) SURVEY. *C L Link and J B McKinlay (New England Research Institutes, Inc. Watertown MA 02472)

We have previously shown that the association of adiposity and urologic symptoms varies by gender (Journal of Urology, 2011, 185(3)). With the completion of the first follow-up of the Boston Area Community Health (BACH) survey we consider the likelihood of progression of symptoms as a function of baseline body mass index (BMI) and change in BMI from baseline to follow-up. BACH recruited 5502 Boston residents (2301 men and 3201 women; 1767 Black, 1876 Hispanic, 1859 White) aged 30-79 years at baseline (2002-5) and re-interviewed 4145 respondents (1610 men and 2535 women; 1327 Black, 1341 Hispanic, 1477 White) after a median follow-up time of 4.8 years (2006-10). Interviewer measured height and weight at baseline and follow-up were used to calculate BMI (kg/m^2) and change in BMI. Symptoms suggestive of overactive bladder (OAB) are urinary frequency, urgency, and urge leakage. For respondents who did not meet the definition of OAB at baseline, the odds of progression of symptoms (change from none to mild/moderate/severe symptoms or from mild to moderate/severe symptoms) for men/women is 0.85/1.08 per unit increase in BMI $p = .0004/.0051$ after adjusting for baseline BMI, age, and baseline OAB symptoms. Men who lose weight and women who gain weight are more likely to have progression of OAB symptoms. This suggests a gender specific patho-physiology. Supported by Award Numbers U01DK56842 from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (NIH). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIDDK or the NIH.

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INFLUENCE OF THE NEIGHBORHOOD ENVIRONMENT ON WAIST SIZE OVER TIME AMONG IMMIGRANTS TO THE U.S.: THE MULTI-ETHNIC STUDY OF ATHEROSCLEROSIS. *S Albrecht, A Diez Roux, L Gallo, N Kandula, T Osypuk, H Ni, S Shrager (University of Michigan, Ann Arbor, MI 48103)

Greater time in the U.S. has been associated with a higher risk of obesity among immigrants. Few studies have examined this pattern longitudinally or considered measures of the neighborhood environment in evaluating weight-related change among immigrants the longer they live in the U.S. Using prospective data from 883 Hispanic and 688 Chinese foreign-born subjects aged 45-84 in the Multi-ethnic Study of Atherosclerosis, we used linear mixed models to examine whether neighborhood environments characterized by better greater food availability and greater walkability are associated with baseline waist circumference (WC) and with change in WC over a median follow-up of 5 years. Neighborhoods were characterized using survey items; higher scores represented better environments. Adjusting for age, sex, education, income, years lived in the U.S. at baseline, and neighborhood poverty, among Hispanics, only greater healthy food availability was associated with lower mean baseline WC (mean difference per standard deviation (SD) higher neighborhood score = -0.98 cm, $p = 0.028$). There was no association between neighborhood context and WC change over time. Among Chinese, greater walkability was associated with lower mean baseline WC ($\beta = -1.06$ cm, $p = 0.007$) and with smaller increases in WC over time (mean difference in annual change per SD higher walkability = -0.12 cm, $p = 0.003$). Associations with walkability also differed for long-term vs. more recent immigrants among Chinese (P heterogeneity = 0.001) (effect modification by baseline length of U.S. residence) Where immigrants reside may have implications for the health patterns that emerge with greater time in the U.S.

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PHYSICAL ACTIVITY, SMOKING AND ALCOHOL INTAKE AND INCIDENCE OF LOWER URINARY TRACT SYMPTOMS AND URINE LEAKAGE IN A POPULATION-BASED STUDY OF MEN AND WOMEN. *N N Maserejian, V Kupelian, C L Link, J B McKinlay (New England Research Institutes, Watertown, MA 02472)

We investigated the roles of physical activity, smoking, and alcohol drinking in the development of lower urinary tract symptoms (LUTS), weekly urinary incontinence (UI) and nocturia by conducting preliminary analyses of 4,145 men and women with ~5 yr follow-up data in the Boston Area Community Health survey (2002-2010). Moderate-to-severe overall LUTS were defined by the American Urological Symptom Index. Analyses of LUTS incidence were conducted first stratified by gender and subsequently combining men and women where results were similar. Logistic regression models adjusted for age, race/ethnicity, and body mass index. Results showed that men and women who were more physically active at baseline were 50-70% less likely to develop LUTS. The association in women was strong for UI and total LUTS (e.g., high vs. low activity, odds ratio [OR] = 0.29, 95% confidence interval [CI]: 0.16-0.54); among men, it was strongest for nocturia (OR = 0.48, 95% CI 0.26-0.88). Men who started to smoke between baseline and follow-up were twice as likely to develop LUTS, a magnitude of the association similar to that for men or women who remained current smokers. The association between alcohol consumption and incident LUTS differed by gender (P -interaction < 0.001) and was inconsistent across LUTS subtypes. In summary, modifiable behaviors of low physical activity, smoking, and alcohol drinking were significant predictors of the development of LUTS among men and women who had no or few urologic symptoms at baseline. Future studies should examine interventions of physical activity and smoking cessation for their effects on the treatment of LUTS. This work was supported by the National Institute of Diabetes and Digestive and Kidney Diseases (grants R21DK081844 and DK56842). The content of this work is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Diabetes and Digestive and Kidney Diseases or the National Institutes of Health.

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MICRONUTRIENT INTAKES AND URINARY STORAGE AND VOIDING SYMPTOMS IN WOMEN. *N N Maserejian, E L Giovannucci, J B McKinlay (New England Research Institutes, Watertown MA 02472)

We tested the hypothesis that carotenoid, vitamin C and calcium intakes are associated with lower urinary tract symptoms (LUTS) and urinary incontinence in women. Data were collected by validated food frequency questionnaire and in-person interviews as part of a population-based random sample survey, the Boston Area Community Health survey (2002-2005). Cross-sectional multivariate logistic regression analyses were conducted among 2,060 women aged 30-79y for dependent variables of total LUTS (American Urological Association Symptom Index ≥ 8 , $n = 425$), storage ($n = 744$), voiding ($n = 216$) symptoms, and urinary incontinence ($n = 257$). Results showed that higher intakes of vitamin C or β -cryptoxanthin from foods and beverages were inversely associated with LUTS, particularly voiding symptoms (P /trend/ ≤ 0.01). However, women who consumed high-dose vitamin C from supplements and diet were more likely to report storage symptoms, especially combined frequency and urgency (total vitamin C ≥ 500 vs. < 50 mg/d, OR = 3.42, 95% CI 1.44, 8.12). Both dietary and supplemental calcium were positively associated with storage symptoms (e.g., supplemental calcium ≥ 1000 mg/d vs. none, OR = 2.04, 95% CI 1.35, 3.09; P /trend/ = 0.0002). No consistent associations were observed for β -carotene, lycopene, or other carotenoids, although smokers using β -carotene supplements were more likely to report storage problems. Results indicate the possibility that micronutrient intakes contribute to LUTS in dose-dependent and symptom-specific ways, and that LUTS may be ameliorated by dietary supplement modifications. This work was supported by the National Institute of Diabetes and Digestive and Kidney Diseases (grants R21DK081844 and DK56842). The content of this work is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Diabetes and Digestive and Kidney Diseases or the National Institutes of Health.

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OBESITY AMONG WOMEN: A US-MEXICO BINATIONAL PERSPECTIVE. *M Ritterman Weintraub, S Guendelman, LH Fernald and M Kaufer-Horwitz (University of California, Berkeley, CA 94704)

This study investigates differentials in actual and perceived weight among women of Mexican origin residing in the United States (US) and Mexico and between national cohorts. We postulated that one potential pathway for national variations in perceived weight is the extent to which physicians and other healthcare providers screen for and provide obesity-related information that is recalled by their patients. We used linked data from 855 Mexican American (MA) adult women ages 20-59 who participated in the National Health and Nutrition Examination Survey waves 2001-2006 and 9,527 women of the same age who were part of the Mexican National Health and Nutrition Survey 2006. In Mexico, 71.7% were overweight or obese whereas only 50% perceived themselves as overweight or obese. This discrepancy was much higher than in the US where 71.4% of women were actually overweight or obese and 70.4% perceived themselves as such. After controlling for socio-demographic and weight-related variables, women residing in the US were significantly more likely to perceive themselves as being overweight or obese compared to women in Mexico (odds ratio = 1.93; 95% confidence interval, 1.56-2.40). Significantly fewer women in Mexico recalled having been screened by a health professional compared to MA women in the US (9.8% vs. 30.5%; $p < 0.001$). This study shows that women in Mexico and their MA counterparts in the US have high rates of overweight and obesity. While weight misperceptions may be associated with obesity in Mexico, low screening by health providers may be an important contributor to poor weight control in both countries. Further research is needed to assess the role of weight perceptions and of health providers in curbing the obesity epidemic.

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25-HYDROXYVITAMIN D LEVELS ARE INVERSELY ASSOCIATED WITH SUBSEQUENT COLDS AND INFLUENZA. *J A Knight, J Wong, K M Blackmore, J M Raboud, E J Parra, L D Marrett, R Vieth, D E C Cole (Samuel Lunenfeld Research Institute, Toronto, ON, Canada)

There is accumulating evidence for a role for vitamin D in immune system function and also some evidence that vitamin D may reduce the risk of colds and influenza. We conducted a pilot study of 51 European, East/Southeast, and South Asian individuals aged 19-59 in Toronto who provided blood, diary, and questionnaire information at approximate 2-month intervals for 2-4 visits with the second visit in September to March. We used generalized estimating equations for logistic regression to determine the relationship between serum 25-hydroxyvitamin D (25(OH)D), the indicator of vitamin D status, and reporting of subsequent colds or flu at the next visit. There were a total of 34 reports of having had a cold or flu at a post-baseline visit. The odds ratio (OR) for risk of a cold or flu was 0.84, 95% confidence interval (CI) 0.73-0.98 ($p = 0.02$), for a 10 nmol/L increase in 25(OH)D at the previous visit. After adjustment for age and body mass index (BMI), the OR and 95% CI were 0.76, 0.66-0.91 ($p = 0.002$), but after adding ethnicity, which is highly associated with 25(OH)D, the OR and 95% CI were 0.84, 0.70-1.01 ($p = 0.06$). Based on the QICu (Quasilikelihood under the Independence model Criterion) statistic, the model including 25(OH)D, age, and BMI had the better fit (month was not related). Although the numbers were small, the relationship appeared strongest in South Asians who also had the lowest mean 25(OH)D levels suggesting a possible threshold effect. These preliminary results from a prospective study in a multiethnic population support the evidence for an inverse relationship between vitamin D and the risk of colds and flu. A possible threshold effect should be considered in clinical trials.

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NEIGHBORHOOD DENSITY OF HEALTHY FOOD VENDORS AND OBESITY PREVALENCE AMONG ADULTS WITH DIABETES FROM THE DIABETES STUDY OF NORTHERN CALIFORNIA (DISTANCE) SURVEY. *J C Jones-Smith; B Laraia (University of California San Francisco, San Francisco, CA, 94118)

Few studies have addressed how neighborhoods food environments are associated with obesity among populations with chronic diseases. We assessed the association between food environments and obesity among a large sample of adults with diabetes ($n = 11,556$) and tested for differences by race/ethnicity, using a logistic model with post-estimation conversion to relative risks. The food environment was characterized by the difference in the weighted density of healthy versus unhealthy food vendors within a one-mile buffer of each participant's home. We assessed whether social stratification of neighborhoods posed a problem for inference. Prevalence of obesity was 52%. We found that having a higher density of healthy stores than unhealthy stores was associated with a decrease in the relative risk of obesity (RR 0.93; 95% confidence interval (0.89, 0.96)). However, this association varied by race/ethnicity, such that the association was strongest for Whites and non-existent for Blacks. Finally, g-computation methods were used to estimate the predicted population-level effect of healthy and unhealthy neighborhood food densities on obesity prevalence. We found a large difference in the expected prevalence of obesity at varying levels healthy versus unhealthy food vendor densities. The predicted prevalence of obesity had the entire population been exposed to a neighborhood in which the healthy store density exceeded the unhealthy by one unit was 46% obese, while the predicted prevalence of obesity had the population alternatively been exposed to a neighborhoods in which the unhealthy store density exceeded the healthy store density by one unit was 60%.

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ASSOCIATION OF EXERCISE AND EXERCISE MEDIATORS WITH CARDIOVASCULAR RISK FACTORS IN A COHORT OF 443 AFRICAN AMERICAN WOMEN. *Inacio, Maria C, Morton, Deborah J, Silverstein, Donna K, Barrett-Connor, Elizabeth, Wooten, Wilma (Kaiser Permanente/UCSD, San Diego, CA)

Although physical activity (PA) in African American women (AAW) has been linked to better cardiovascular (CV) health, AAW appear to have the lowest PA levels of all U.S. ethnic minorities. We examined whether physical activity mediators were associated with high PA levels in AAW, and, in turn, also associated with lowering of CV risk factors. 443 AAW were interviewed (1993-1997) about self efficacy, behavioral process of change, exercise social support, and physical activity measured by the Patient-centered Assessment and Counseling for Exercise (PACE) questionnaire and exercise frequency. Data collected included %fat, BMI, waist/hip ratio, blood pressure, lipids and glucose. Logistic regression was used to estimate which mediators of exercise were associated with higher levels of PA. Linear regression assessed whether mediators were also associated with known CV risk factors. Among these 443 AAW (mean age = 61, BMI = 30 kg/m²), 60.3% reported a high PACE score (≥ 4) and 56.6% reported exercising ≥ 3 times/week. Adjusted higher exercise self efficacy- "sticking to it" and higher behavioral process of change scores were significantly associated with both high PACE and exercise ≥ 3 times/week (all odds ratios $> = 2.5, P < 0.05$). Adjusted high PACE scores were inversely associated with %fat, BMI, and waist/hip ratio. "Sticking to it" was inversely associated with waist/hip ratio, and high behavioral process of change scores were inversely related to blood pressure ($P < 0.05$). Adjusted exercise ≥ 3 times/week was associated with lower %fat and BMI ($P < 0.05$). High behavioral process of change scores were inversely associated with waist/hip ratio, blood pressure, total and LDL cholesterol ($P < 0.05$). More PA, exercise self efficacy, and process of change were associated with favorable CV risk factors. PA interventions for AAW may prove more effective if promotion of self efficacy and readiness to change are included.

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SOCIOECONOMIC POSITION AND PROTEIN/MEAT CONSUMPTION PATTERN IN PAKISTAN. *N Z Janjua, B Mahmood, R Iqbal (BC Centre for Disease Control, Vancouver, BC, Canada)

Objectives: We previously found that people in high socioeconomic groups were more likely to be overweight/obese. We assessed the distribution of dietary patterns especially meat intake frequency across levels of socioeconomic position (SEP) in Pakistani adults. Methods: In 2006 we conducted a cross-sectional study including adult participants aged ≥ 15 years ($n = 3874$) residing in Sindh province of Pakistan. Dietary intake data was collected using a 40-items food frequency questionnaire. We performed factor analysis to explore dietary patterns. Wealth index (WI) was based on household assets/utilities scores. Results: We identified 4 dietary patterns; animal proteins, fruits/vegetables, starchy foods, and mainly vegetables. High animal protein pattern and meat intake frequency differ by gender. Multinomial model stratified by gender revealed that women in the 5th quintile (5thq) of WI were 2 times more likely to eat animal protein diet than those in 1stq. Illiterate women were 3 times more likely to eat high frequency of animal protein diet. These differences were not significant for men. For meat frequency, both men and women in 4thq and 5thq were more likely to eat meat daily compared to those in 1stq, though odds ratio for women were twice that of men (OR 5thq: 4 vs 2 for daily meat intake). There was inverse gradient in daily meat eating with education among both men and women (OR illiterate, men: 2.9, women: 3.6). Conclusions: Results highlight the change in dietary distribution patterns by SEP among men and women. With increase in wealth people consume diet high in meats/protein in Pakistan. Furthermore, consumption patterns of women are more sensitive to wealth and education.

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URINE VOLUME PREDICTS RATE OF RENAL DECLINE IN A GENERAL POPULATION SAMPLE. W F Clark,*J M Sontrop, J J Macnab, R Suri, L Moist, M Salvadori, A X Garg (University of Western Ontario, London ON, Canada N6A 5W9)

The effect of increased fluid intake on kidney function is unclear. This study evaluates the relationship between urine volume and change in estimated glomerular filtration rate (eGFR) over 6 years in a community-based cohort (2002-8). A 24-hr urine sample was obtained in years 1 and 5. Participants received a median of 6 annual eGFR assessments. Percentage annual change in eGFR was categorized as rapid renal decline ($\geq 5\%$), mild-to-moderate (decline $< 5\%$) or no decline. Of 2523 eligible adult participants, 2148 provided valid 24-hr urine samples at study entry, grouped as < 1 L/d (14.5%); 1-1.9 L/d (51.5%); 2-2.9 L/d (26.3%); and ≥ 3 L/d (7.7%). Baseline eGFR for each category of urine volume was 90.3, 87.6, 83.8 and 86.5 ml/min/1.73m². An inverse, graded relationship was evident between urine volume and renal decline: for each increasing category of 24-hr urine volume, the median annual decline in kidney function decreased, from 1.28, 1.04, 0.82, to 0.46 ml/min/1.73m²/yr ($p = 0.02$). After adjusting for age, sex, medication use for hypertension (including diuretics), proteinuria and cardiovascular disease; annual renal decline was 0.86 ml/min/1.73m² slower in those with urine volume ≥ 3 L/d compared to those with urine volume 1-1.9 L/d ($p = 0.02$). Those with urine volume ≥ 3 L/d were significantly less likely to experience mild to moderate renal decline [adjusted odds ratio (OR) = 0.59; 95% CI: 0.42-0.84] or rapid decline (OR = 0.40; 95% CI: 0.20-0.82). This is first large study of the general population to study the relationship between urine volume and change in kidney function over time. Decline in kidney function was significantly slower in those with higher vs. lower urine volume.

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ASSOCIATION BETWEEN SITTING-TIME AND ALL-CAUSE MORTALITY IN THE MULTIETHNIC COHORT STUDY. *Yeonju Kim, Lynne R Wilkens, Song Yi Park, Laurence N Kolonel (University of Hawai'i Cancer Center, Honolulu, HI 96813)

It has been proposed recently that time spent sitting increases total mortality, but evidence to support this hypothesis, especially for various ethnic group, is limited. We examined the relationship between sitting time (hr/d) and mortality not including sitting time during working, and overall by ethnic group in the Multiethnic Cohort (MEC). The MEC is a prospective study of chronic diseases and lifestyle factors that recruited over 215,000 adults (ages 45-75) between 1993-1996, mainly representing five ethnic groups: African Americans, Latinos, Japanese Americans, Native Hawaiians and Whites. For this analysis, only the 71,067 men and 81,423 women of the five main ethnic groups who had no missing data for exposures and confounders were included. Median follow-up was 11.6 years and 21,177 deaths were identified. Cox proportional hazards regression, with age as the time metric, was used to estimate the risk of mortality, after adjusting for potential confounders (including age, ethnicity as appropriate, smoking, education, obesity, alcohol consumption, and physical activity). Compared to sitting less than 4 hours, sitting more than 8 hours per day not including sitting time at work increased the risk of total mortality by 15% (Hazard Ratio (HR) 1.15, 95% Confidence Interval (CI) 1.09-1.22) in men, and by 18% (HR 1.18, 95% CI 1.11-1.26) in women. When the results were stratified by sex and ethnicity, all groups showed a positive relationship between sitting time and mortality. In conclusion, these findings suggest that the extent of leisure time spent sitting can have an adverse effect on overall mortality, independent of the level of physical activity.

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SERUM AMINOTRANSFERASES SEQUENTIAL CHANGES FOR SEVERELY OBESE PATIENTS WITH SUBSTANTIAL WEIGHT LOSSES. *M Jhaveri, J W Anderson (University of Louisville, Louisville, KY)

Nonalcoholic fatty liver disease (NAFLD) is very prevalent in obesity. However, increases in serum aminotransferase values during weight loss have raised concerns. This study documented sequential changes of serum aminotransferases for persons with severe obesity who lost substantial weight in a behavioral weight loss program. 103 severely obese patients who lost > 45.5 kg were treated in clinic program. Prevalence of all risk factors except diabetes was higher among those with elevated baseline serum alanine transferases (ALT, AE) values than those with normal values (AN). Weight losses at 8 and 24 weeks respectively were: Group AN (n = 79), 19.8 and 43.5 kg; and Group AE (n = 24), 21.8 and 45.5 kg. Total weight losses after completion of weight loss program were: Group AN, 58.4 kg in 42 weeks and Group AE, 57.6 kg in 38 weeks. Baseline values for were: Group AN, ALT (25.4 U/L), AST/ALT ratio (0.87); and Group AE, ALT (68.0 U/L), AST/ALT ratio (0.61). Peak ALT values were: Group AN: 75.4 U/L; and Group AE: 94.0 U/L. Final serum ALT values were: Group AN, 23.7 U/L, and Group AE: 27.3 U/L. This severely obese population had a very high frequency of ALT elevations with weight loss but elevations were transient and values usually returned to below baseline values after substantial weight loss.

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FOOD INSECURITY AND DIABETES IN CANADA: A POPULATION-BASED CROSS-SECTIONAL STUDY. *C Bickford and P Janssen (University of British Columbia, Vancouver, BC, Canada V6T 1Z3)

Food insecurity exists in 7.7% of Canadian households. Adequate nutrition is an important factor in controlling both Type I and Type II diabetes and in preventing Type II diabetes, however those who are food insecure typically have compromised access to nutritious foods. This study investigates the association between household food insecurity and diabetes using cross-sectional data collected through the 2007/2008 cycle of the Canadian Community Health Survey. It is the first nationally representative Canadian study in which a validated measure of food security has been used to investigate this relationship. Multivariate logistic regression was utilized for the analysis, with odds ratios (OR) and 95% confidence intervals (CI) being reported. The study sample (n = 111,394) represented a weighted population of 23,508,925 Canadians aged twelve and older. Diabetes was present in 5.7% of the population. Food insecurity was more prevalent among diabetics than among non-diabetics (6.8% and 3.7% of diabetics were *moderately* and *severely* food insecure, while 5.1% and 1.6% of non-diabetics were *moderately* and *severely* food insecure). After adjusting for age, sex, body mass index, and level of education, individuals who were *moderately* (OR = 2.1, CI = [1.8, 2.3]) and *severely* food insecure (OR = 3.3, CI = [2.9, 3.9]) were more likely to have diabetes than those who were food secure. These findings suggest that food insecurity may be an important risk factor for diabetes. They also highlight the importance of food insecurity as a public health issue among diabetics in Canada. Aiming to reduce food insecurity among this population may mitigate the impact of diabetes on both patient well-being and healthcare resource utilization.

DIETARY PATTERNS AMONG STUDENT ATTENDING THE UNIVERSITY OF THE WEST INDIES, ST. AUGUSTINE. *S Nichols and Nutrition and Metabolism 2010 Class (The University of the West Indies, St. Augustine)

University life represents a new experience where many lifestyle practices are acquired. In this study we investigated the dietary behaviours among students attending The University of the West Indies, St. Augustine. Trained interviewers conducted face-to-face 24-hr dietary recalls on a cross-section of 1,200 students. Participants also filled out a self-administered questionnaire consisting of socio-demographic and lifestyle behavioural items. Dietary recalls were evaluated using the Healthy Eating Index. Approximately, 20% of interviews were conducted each day from Monday to Friday of the indexed week. Our results suggest that 55.2% of participants consumed the majority of meals (≥ 4 days per week) at home. The percentage of participants meeting the recommended intakes for the following food groups are as follows: fruit (17.3%), vegetables (9.7%), meat and beans (42.1%), grains (47.9%) and milk (6.8%). Participants who took the majority of meals at home were significantly more likely that those who ate the majority of meals away from home to meet the recommended intakes of fruits (21% vs. 13%; $p < 0.01$). They also had significantly higher intakes of folate ($p < 0.05$), Vitamin A ($p < 0.01$) and Vitamin C ($p < 0.01$) and lower intakes of total fats ($p < 0.01$). Participant who ate the majority of meals away from home spent an average of \$38 dollars per day on meals. Our estimates suggest that an average of \$65 dollars is required each day for dietary adequacy. Our findings suggest that participants who took the majority of their meals away from home may be at increase risk of nutritional inadequacy.

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COHORT EFFECTS IN U.S. OBESITY PREVALENCE AMONG RECENT BIRTH COHORTS: MODIFICATIONS BY NATIVITY. *C L Martin, W R Robinson, K M Keyes (University of North Carolina at Chapel Hill, Chapel Hill, NC)

To examine the role of cohort effects in the obesity epidemic in the United States, we used data collected from 1971 to 2008 on 124,555 individuals in the National Health and Nutrition Examination Survey (NHANES). Obesity was defined as body mass index (BMI) ≥ 30 for adults aged 20-79 years and BMI ≥ 95 th percentile using the CDC 2000 sex- and age-specific cutpoints for children aged 0-19 years. The median polish approach was used to estimate age, period, and cohort effects. Obesity prevalence was arranged in tables by age and calendar year. Iteratively subtracting the median prevalence in each row or column isolated residual deviations from smoothed age and period trends. The deviations were regressed on cohort indicator variables to estimate the cohort effects. As previously reported, there were pronounced period effects, including a dramatic rise in obesity between 1991-1994 and the present, with some slowing in the 2005-2008 surveys. For those born after 1991, there were cohort effects significantly increasing obesity prevalence compared with those born 1956-1960. For native-born, positive cohort effects were found for contemporary (2005-2008) children compared to the birth cohort of 1956-1960. However, for the foreign-born, there were negative cohort effects for children compared to the 1956-1960 birth cohort. For instance, the 2005-2008 cohort effect was half that of the 1956-1960 birth cohort (RR = 0.55; 95% CI: 0.48-0.62). We demonstrated obesity risk escalating in the native-born among more recently born birth cohorts beyond that explained by secular trends. Results suggest divergent patterns in obesity trends between the native-born and foreign-born in the next generation of adults.

PREOPERATIVE PREDICTORS OF GASTROJEJUNAL STRICTURE AFTER GASTRIC BYPASS. *V Hannosh, A M Carlin (Henry Ford Health System, Detroit, MI 48202)

Gastrojejunal stricture (GJS), a common complication after gastric bypass, leads to additional medical procedures and healthcare costs. The authors examined patient characteristics to identify factors associated with stricture development to inform clinicians regarding patient risk and to allow modification of risk factors. Patients who underwent Roux-en-Y gastric bypass between 2005 and 2009 were identified from the Henry Ford Health System Bariatric Surgery database. The electronic medical record was used to identify patient demographics, comorbidities at pre-surgery evaluation appointments, and postoperative complications up to 6 months post-surgery. Of the 1085 patients, 82% were female, 74% were white and GJS occurred in 102 patients (9.4%). With univariate analysis there was no significant difference in the mean age (43 ± 10 vs. 45 ± 10 years) or mean preoperative BMI (50 ± 7.6 vs. 49 ± 7.2 kg/m²) for patients with and without GJS, respectively. GJS was positively associated with an age greater than 50 ($P = 0.02$) and tobacco use ($P = 0.04$), while a decreased risk of GJS was associated with lower extremity edema ($P = 0.01$). In a multivariable model, lower extremity edema persisted as a marker for decreased risk of GJS (odds ratio (OR) = 0.50, $P < 0.004$). In this model, only elevated cholesterol (OR = 1.60, $P = 0.04$) and higher BMI (OR = 1.04, $P < 0.003$) were associated with increased risk. Race, gender, GERD, ASA score, diabetes, hypertension, and alcohol consumption were not associated with GJS. Only higher BMI and hypercholesterolemia proved to be risk factors for GJS in our cohort. While lower extremity edema was found to be associated with decreased risk, the underlying pathophysiology requires further investigation to elucidate.

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BODY MASS INDEX AND ALL-CAUSE MORTALITY AMONG AFRICAN AMERICAN WOMEN. *D A Boggs, L Rosenberg, L A Wise, Y C Cozier, E A Ruiz-Narvaez, J R Palmer (Slone Epidemiology Center at Boston University, Boston, MA 02215)

A recent pooled analysis of 1.46 million white participants in 19 cohort studies has established an association of overweight and obesity with increased all-cause mortality in white populations; limited data from a few studies suggest a weaker association among African Americans. We prospectively assessed the association between body mass index (BMI) and all-cause mortality in African American women aged 21-69 years at enrollment during 14 years of follow-up in the Black Women's Health Study. Information on height, weight, and medical history was ascertained at baseline in 1995 through mailed questionnaires. Deaths were identified through next of kin, the U.S. Postal Service, and the National Death Index. Multivariable Cox proportional hazards models were used to estimate incidence rate ratios (IRR) and 95% confidence intervals (CI) for the relation of BMI to all-cause mortality. The analysis was restricted to 33,916 never smokers without a history of cardiovascular disease or cancer at baseline, among whom we identified 770 deaths from all causes. We observed a curvilinear association between BMI and all-cause mortality, with mortality rate lowest for a BMI of 20.0-24.9 kg/m². Relative to BMI 22.5-24.9, multivariable-adjusted IRRs and 95% CIs for overweight (25.0-27.4 and 27.5-29.9), obesity class I (30.0-34.9), obesity class II (35.0-39.9), and obesity class III (≥ 40.0) were 1.12 (0.87-1.44), 1.31 (1.01-1.72), 1.27 (0.99-1.64), 1.51 (1.13-2.02), and 2.19 (1.62-2.95), respectively (P for trend < 0.0001). These results indicate that all-cause mortality in African American women increases with increasing level of overweight and obesity, similar to the pattern found among white women.

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VALIDATION OF QUESTIONNAIRES TO ESTIMATE PHYSICAL ACTIVITY IN CHRONIC KIDNEY DISEASE. *C Robinson-Cohen and B Kestenbaum.(U of Washington, Seattle, WA 98104)

Chronic kidney disease(CKD) is an important public health problem affecting over 26 million Americans. Physical activity(PA) is a key determinant and amplifier of CKD development, progression, and associated complications. Measurement of PA is hampered by a lack of valid tools for use in the CKD population, which has expected differences in intensity, duration and types of activities performed, relative to the general population. Valid and precise assessments of PA in CKD are needed to determine the nature and quality of PA needed for health benefits and if interventions are successful in changing PA levels. To establish whether any of several readily available and widely used questionnaires related to PA or physical functioning predict gold-standard measures of PA in CKD, we conducted a cross-sectional study in 50 CKD patients. Questionnaires studied were the Physical Activity Scale for the Elderly, Human Activity Profile(HAP), Medical Outcomes Study SF36 questionnaire, International Physical Activity Questionnaire sedentary time questions(IPAQST) and Seattle Kidney Study Activity Questionnaire(SKSAQ). PA was measured using GT3X accelerometry over a 14-day period. Patients underwent a battery of physical performance tests. Twenty-nine patients participated in the validation phase of the study. The IPAQ-ST correlated best with accelerometry($r^2 = 0.41$). Seventy four percent of the variability in accelerometry data was explained by a model combining the IPAQST, SKSAQ, HAP, gait speed, age, race and gender. A sample of 21 participants is being enrolled for the replication phase of the study to test the predictive ability of the model PA combination of available PA questionnaires and functional measurements are adequate to assess PA levels in the CKD population.

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THE ASSOCIATION OF METABOLIC SYNDROME AND SERUM CAROTENOIDS RAWIWAN SIRIRAT. *K Jaceldo-Siegl, W L Beeson, K Oda and G Fraser (School of Public Health, Loma Linda University, Loma Linda, CA 92350)

Prevalence of individual risk factors for metabolic syndrome (MetSyn) was approximately 34% of adults in 2003-06 in the US. We investigated the association of MetSyn and serum carotenoids in 950 calibration study subjects of the Adventist Health Study-2. We obtained 12-hour fasted blood samples from each subject. Those with MetSyn met three or more of the five criteria: waist circumference, triglycerides, HDL cholesterol, blood pressure and fasting blood glucose. 264 participants met the MetSyn criteria and 589 did not. Covariate variables were age, sex, race, exercise, vegetarian status, supplement and medication intake, education level, alcohol and smoking habits. The strongest associations were observed in serum for lutein, zeaxanthin, α -carotenes, β -carotenes, cryptoxanthin, total serum carotenoids. The Odds Ratio (OR) for MetSyn were lower with the highest quartile of lutein (OR: 0.48, 95% Confidence Interval (CI): 0.25-0.92, trend $p = 0.014$), α -carotenes (OR is 0.227, 95% CI: 0.12-0.44, trend $p < 0.0001$), β -carotenes (OR: 0.16, 95% CI: 0.08-0.33, trend $p < 0.0001$), cryptoxanthin (OR: 0.38, 95% CI 0.195-0.736, trend $p = 0.0037$), total serum carotenoids (OR is 0.186, 95% CI: 0.09-0.37, trend $p < 0.0001$), zeaxanthin (OR: 0.46, 95%CI 0.25-0.86, trend $p = 0.018$). The highest levels of serum lutein, zeaxanthin, serum α -carotenes, serum β -carotenes, serum cryptoxanthin and total serum carotenoids had lower occurrence of MetSyn (52-84%) compared to the lowest level of each serum carotenoids. In conclusion, higher levels of most serum carotenoids have greater impact on metabolic syndrome than lower levels.

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THE SUPPLEMENTAL NUTRITION ASSISTANCE PROGRAM: DIFFERENCES IN DIETARY INTAKE BETWEEN PARTICIPANTS AND LOW-INCOME NONPARTICIPANTS. *C W Leung, E L Ding, W C Willett (Harvard School of Public Health, Boston, MA 02115)

Recent evidence suggest that individuals participating in the Supplemental Nutrition Assistance Program (SNAP) may have different metabolic profiles than low-income, eligible nonparticipants. We examined differences in foods, nutrients and dietary patterns important to cardiometabolic health between SNAP participants and nonparticipants. METHODS: Data from the 1999-2008 National Health and Nutrition Examination Surveys were used to estimate dietary intakes of 6,708 low-income, nonpregnant adults, aged 20-65 years, with household incomes $\leq 130\%$ of the federal poverty level. Dietary data came from one or two 24-hour recalls. Means of foods and nutrients and Healthy Eating Index (HEI)-2005 scores were estimated. Exaggerated standard deviations were corrected using appropriate between-person variabilities. RESULTS: SNAP participants and nonparticipants both had low intakes of whole grains, fruits and vegetables, and unsaturated fats, and high intakes of refined carbohydrates, saturated fat and sodium. For a 2000-calorie diet, SNAP participants consumed fewer whole grains (-0.4 servings(s)/day); fruits and vegetables (-0.4 s/day); fish (-0.3 s/week); and dietary fiber (-2.3 grams/day), and more processed meats (+0.3 s/week), sugary beverages (+2.6 s/week) and total carbohydrates (+0.6% energy) than nonparticipants. Mean sugary beverage intake for SNAP participants was 18.2 s/week. All differences were significant at $P < 0.05$. After adjusting for sociodemographic characteristics, SNAP participants had a 1.27-unit lower HEI-2005 score than nonparticipants (95% CI: -2.54,-0.01). CONCLUSION: SNAP participants consume poor quality diets; the nutritional aspects of the program deserve review.

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ADHERENCE TO DIETARY APPROACHES TO STOP HYPERTENSION (DASH)-STYLE DIET AND RISK OF GESTATIONAL DIABETES MELLITUS (GDM). *D K Tobias, C Zhang, F B Hu (Harvard School of Public Health, Boston, MA 02026)

The DASH Diet emphasizes high intake of fruits, vegetables, whole grains, nuts and legumes, and less red and processed meats. Previous studies observed an inverse association of adherence to a DASH-style diet with risk of type 2 diabetes. It is unknown, however, whether an inverse association exists between pre-pregnancy DASH-style diet and GDM risk. Our study population included 17,738 female participants from the Nurses' Health Study II study who reported at least one singleton pregnancy from 1991-2001 and were free of chronic disease at baseline. GDM was self-reported and validated by medical record review in a subsample. Dietary data was collected via validated food frequency questionnaire. A DASH Score was computed based on participants' usual intake of its components. Cox proportional-hazard models were used to estimate relative risks (RR) and 95% confidence intervals for incident GDM ($n = 1,027$). Adjusting for age and total calories, there was a strong inverse association of adherence to a DASH-style diet; RR[95% CI] across increasing quintiles (Q1-Q5) are 1.00, 0.76[0.61,0.93], 0.84[0.69,1.02], 0.68[0.55,0.84], and 0.61[0.49,0.76] (p -trend < 0.0001). The inverse association remained significant after adjustment for other GDM risk factors (Q5 vs Q1: RR = 0.73[0.58,0.91]; p -trend = 0.008). Further, there was a significant interaction between DASH Diet score and body mass index (BMI) (p -interaction = 0.02) with the inverse association between DASH Diet and GDM most significant among obese (BMI > 30) participants (Q5 vs Q1: RR = 0.53[0.32,0.85]). Our findings indicate that adherence to a DASH-style diet is associated with a reduced risk of GDM.

DETERMINANTS OF COMPLIANCE WITH UNIVERSAL PRECAUTIONS AT FIRST LEVEL CARE FACILITIES IN NORTH WEST FRONTIER PROVINCE OF PAKISTAN. *M T Yousafzai, A R Siddiqui, S Rozi, N Zr Janjua. (Aga Khan University Karachi, Pakistan)

Objectives: We assessed determinants of compliance with universal precautions (UP) including health belief model (HBM) in Health care Workers (HCW) of First Level Health Care Facilities (FLCF) in rural areas of North West Frontier Province of Pakistan. Methods: A stratified random sample of 370 FLCF from district Swabi comprising 29 public clinics, 58 licensed private clinics and 283 non-licensed practitioner clinics. Knowledge on blood borne pathogens (BBP), and constructs of HBM model (perceived susceptibility to BBP, disease severity, self-efficacy, benefits and barriers of practicing UP, cue to action) were measured on a 5 point likert scale; addition of all items gave a score. UP practice was assessed on an 11 item validated tool with responses never = 0 to 4 = always; addition of "often" or "always" defined overall compliance and an increasing score of sum of 11 likert items showed increased compliance. Multiple linear regression analysis performed to assess the relationship of BBP knowledge and HBM constructs with compliance to UP. Results: In 485 HCW, 75% were prescribers and 25% were assistants, had mean age of 38 (SD10) years, and median work experience of 10 years. Overall compliance for UP was 6.6%. Compliance with UP was positively associated with cumulative knowledge regarding transmission mode of BBP (adjusted beta coefficient (95% CI) 0.69 (0.54, 0.84), self efficacy 0.60 (0.28, 0.93), perceived benefits 0.40 (0.05, 0.75), susceptibility to BBP 0.25 (0.004, 0.49); and negatively associated with barriers in practicing UP (-0.28 (-0.41, -0.15) and perceived disease severity -0.37 (-0.62, -0.11). Conclusion: Increasing knowledge on BBP, self efficacy, perceived benefits, and susceptibility to BBP, and decreasing barriers to practicing UP can potentially improve practice of UP in FLCF.

MORTALITY FOLLOWING UNEMPLOYMENT IN CANADA, 1991-2001. *C A Mustard, A Bielecky, J Etches, R Wilkins, M Tjepkema, B C Amick, P M Smith, K J Aronson K J (Institute for Work & Health, Toronto, ON, Canada, M5G 2E9)

Objective: To describe the association between unemployment and cause-specific mortality for a cohort of working-age Canadians. Methods: A cohort study over an 11-year period of a 15% sample of the non-institutionalized population of Canada aged 30-69 at cohort inception in 1991 (888,000 men and 711,600 women). Hazard ratios for risk of death for the unemployed compared to the employed were estimated from cox proportional hazard models, for six causes of death. Hazard ratios were estimated for two consecutive five year periods and four age groups. Results: Age-adjusted relative risk of all-cause mortality over the follow-up period for persons unemployed at cohort inception was 1.37 for men (95% confidence interval (CI): 1.32-1.41) and 1.27 for women (95% CI: 1.20-1.35). The age-adjusted relative risk of mortality over the follow-up period for unemployed persons was elevated for deaths due to malignant neoplasms (men; 1.24, 95% CI: 1.18-1.31, women; 1.10, 95% CI: 1.02-1.19), circulatory diseases (men; 1.22, 95% CI: 1.14-1.30, women; 1.39, 95% CI: 1.22-1.58), respiratory diseases (men; 1.45, 95% CI: 1.21-1.74, women; 1.61, 95% CI: 1.20-2.15), accidents and violence (men; 1.94, 95% CI: 1.78-2.12, women; 1.73, 95% CI: 1.43-2.08) and all other causes of death (men; 1.59, 95% CI: 1.46-1.73, women; 1.63, 95% CI: 1.41-1.89). For both unemployed men and unemployed women, hazard ratios for all-cause mortality were equivalently elevated in two consecutive five-year follow-up periods (1991-1996 and 1997-2001). For both men and women, the hazard of death associated with unemployment attenuated with age. Conclusions: Consistent with results reported from other long-duration cohort studies, unemployed men and women in this cohort had an elevated risk of mortality for conditions associated with both traumatic causes and causes attributed to chronic disease. The persistency of an elevated mortality risk over two consecutive five year periods suggests that the exposure to unemployment in 1991 may mark persons at risk of cumulative socioeconomic hardship.

HEALTH SERVICES USAGE BY COSTA RICAN EMPLOYEES: A PRELIMINARY REPORT USING 2001 DATA. *C Marin (Escuela de Seguridad Laboral e Higiene Ambiental of Instituto Tecnológico Costa Rica, Central American Population Center of University of Costa Rica)

By agreement between National Institute of Statistics and Censuses (INEC) and Central American Population Center (CCP) data from surveys conducted regularly by INEC is offered online. Data from a 2001 household survey were used to determine the frequency of use of health services by Costa Rican workers. As collaboration between (CCP) and School of Occupational Safety and Environmental Hygiene (ESLHA) of Technological Institute of Costa Rica. From a randomly selected sample of households several health usage data was registered. In a subsample of 7332 employees' hospital usage was summarized to determine use of hospital health services during the previous four weeks. Data was processed using SPSS v13®, Excel 2007® and open source software OpenEpi (<http://www.openepi.com/>). Results.- On leave was more frequent in women ($p < 0.0001$) and 20-39 age group. There was a significant higher prevalence of hospital admission services by women but no significant differences were found in the 40-64 age group. No significant differences were evident between occupational groups in the prevalence of on leave situation or in the use of hospital services. Low usage of hospital services in relation to other populations was found. High coverage of health services by the national health system and Costa Rican universal social security system (Caja Costarricense de Seguro Social, CCSS) funded by employers, employees and government contribute to this findings.

A RANDOMIZED CONTROLLED EVALUATION OF INTERVENTIONS TO PROTECT WORKER HEALTH. *S Hogg-Johnson, L Robson, D Cole, P Subrata, B Amick, E Tompa, P Smith, D van Eerd, P Bigelow, C Mustard (Institute for Work & Health, Toronto, ON, Canada)

Background: The Ontario High Risk Firm Initiative ran from 2004 to 2008. It involved targeting high risk firms with intensive inspection of workplaces or offers of Occupational Health & Safety (OHS) consultation. We sought to evaluate the impacts of these two components. Methods: For program year 2006, manufacturing firms selected for targeted intervention were randomized into three study arms, with one to receive inspection, one to be offered OHS consultation, and one business as usual. Yearly work injury claim counts were assembled from 2002 to 2008. Generalized estimating equation models with negative binomial specification, autoregressive correlation and log firm size as offset were used to model claim counts and disability days examining year by study arm differences. To characterize the intervention, number of inspections, time spent inspecting, orders written, time spent on consultation, and products and services used were tracked. Results: 619 firms were allocated for inspection, 600 firms for offers of consultation and 934 for business as usual. Firms were very similar across study arms with respect to pre-intervention claim rates, size, age, region and branches. There were no significant study arm differences in claims counts or disability days post-intervention. 435/619 (70%) of firms intended for inspection were inspected with orders written in 37% of them. Of the 600 firms targeted for consultation, 496 were approached and 311 (63%) engaged in consultation activities. Conclusions: We observed no benefit to either component as implemented. This could have been due to problems with the method used to select firms, the interventions offered or the outcomes available for evaluation.

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SUBJECTIVE SYMPTOMS AND PHYSIOLOGICAL MEASURES OF FATIGUE IN AIR TRAFFIC CONTROLLERS. *I-F Mao, S-Y Lu, M-L Huang, M-L Chen (Department of occupational safety and Health, Chung Shan Medical University, Taichung City, Taiwan)

Air traffic controllers (ATCs) are frequently ranked as one of the most stressful jobs. Interactions between fatigue and physiological stress symptoms were measured on 102 subjects of ATCs in Taiwan. Each subject completed fatigue questionnaire and physiological measurement at pre-shift and end-shift. The study results showed that nearly 50% of the subjects after work had the weary symptom of "feel tired now", and over 40% appeared the symptom of "feel thirsty", "yawning", and "want to lie down". The prevalence rates of "feel thirsty", "yawning", and "want to lie down" among approach and en-route controllers was higher than those among aerodrome controllers, especially, the "unable to concentrate" was higher statistically. On the other hand, the physiological test showed that flicker fusion threshold of male ATCs obviously turned better after work ($p < 0.01$). The near-point tests were worse after work for all subjects. According to the results of response stick test, all ATCs performed better after work, but no significant difference. The strength of masculine index fingers obviously become better ($p < 0.01$), and the strength of feminine thumbs become worse ($p = 0.02$). However, the systolic and diastolic blood pressure decreased after work. The study indicated that the ATCs' subjective ratings showed the possibility of the existence of work-induced fatigue, but not quite correspond clearly to their physiological response. Thus, the study outcome implies the air traffic control is stressful work, and the complaints regarding excess work stress should be concerned. However, the effect of number of aircraft handled and individual age on fatigue were prominent. Keywords: Air traffic controllers, fatigue physiological examination, fatigue questionnaire

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ASSOCIATION BETWEEN EMPLOYMENT STATUS AND HAZARDOUS ALCOHOL CONSUMPTION IN CHILE. *A Castillo-Carniglia and E Ansoleaga (Doctoral Program in Public Health, University of Chile, Independencia 939, Santiago, Chile)

Several studies have shown an association between employment status and hazardous alcohol consumption. However, in Chile and Latin America, there is little evidence that has examined this relationship in an explicit manner and with appropriate methods. We investigated the association between hazardous alcohol consumption and employment status among Chilean adults. Cross-sectional study based on the Eighth Drugs General Population Survey of Chile. The total number of economically active people who completed the alcohol consumption section was 8,316 men and women between 18 and 65 years. Alcohol Use Disorders Identification Test (AUDIT) was used to define hazardous alcohol consumption. The analysis was performed with mixed-effect logistic models with two levels. There were no significant associations between hazardous alcohol consumption and employment status or occupational category when controlling for confounding. For the sector of the economy and considering the educational, health and personal services sector as a reference, the odds ratio (95% confidence interval) of hazardous alcohol consumption was 2.67 (2.01 to 3.56) in those who work in construction, 1.95 (1.30 to 2.92) in agriculture, 1.74 (1.34 to 2.26) in other services, 2.09 (1.47 to 2.97) in mining, 1.49 (1.06 to 2.11) in transport, 1.84 (1.33 to 2.54) in industry and 1.79 (1.35 to 2.37) in trade. Hazardous drinking is thus independently associated with the sector of the economy where occupational activity is carried out. New studies that analyze specific work conditions in those occupational sectors are required.

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EVALUATION OF A SMALL BUSINESS WORKSITE WELLNESS PROGRAM. *A E Anderson, R M Merrill, S M Thyrgeson (Brigham Young University, Provo, UT 84602)

Objective: To evaluate the effectiveness of a wellness program at improving health behavior and personal health. Methods: Analyses are based on 472 (71% men and 29% women) workers employed in 2009 through 2010. Data were obtained from a Personal Health Assessment (PHA). Employees also could participate in any or all of the six behavior change campaigns. Results: Two-hundred and seventy (57%) of employees completed the PHA. Of these individuals, 192 (71%) participated in the Wellness Program. Completion of the PHA and participation in the Wellness Program was significantly greater for women and younger aged employees. Participants showed significant improvement between 2009 and 2010 in frequency of exercise, consumption of whole grains, vegetables, and fruits, restful sleep, and seatbelt use. Life satisfaction and perceived health also significantly, but job satisfaction significantly decreased and there was no change in smoking or body mass index. In addition, the percentage with borderline/high blood pressure significantly decreased. Conclusions: Participation in well-structured worksite wellness programs such as the one evaluated in this study may increase health and life satisfaction for employees. This type of wellness program is an effective investment to attain and maintain health and work ability.

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WITHDRAWN

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VIOLENCE AGAINST EDUCATORS. *C Wei, S G Gerberich, N M Nachreiner, B H Alexander, A D Ryan, S J Mongin, (University of Minnesota, Minneapolis, MN 55414)

Violence is a major occupational problem; yet, the population of educators has been neglected. The objective was to identify the potential risks for physical assault (PA) and nonphysical violence (NPV), based on hours exposed. From a random sample of 26,000 licensed kindergarten through grade 12 Minnesota educators, 6,469 eligible educators were included. Data were collected, using specially designed mailed questionnaires (12-month recall). Calculated PA and NPV rates, per 100,000 working hours, used generalized linear models with Poisson distribution. Directed acyclic graphs identified confounders for multivariable analyses, adjusted for non-response and unknown eligibility. NPV rates were higher than PA rates (26.37 and 5.31). Subcategory NPV rates were: threat (34.82); sexual harassment (7.58); verbal abuse (55.48); bullying (19.62). Multivariate analyses for respective PA and NPV models revealed increased rate ratios (95% CIs) for those: not married (1.28[1.00,1.64]; 1.20[1.07,1.34]) vs. married; worked in public alternative (1.73[1.11,2.68], 1.93[1.59,2.34]), vs. public schools; worked in special education (4.39[3.13,6.16], 1.45[1.23,1.72]) and multiple activities (4.01[2.42,6.63], 1.41[1.09,1.83]), vs. classroom teaching; worked with class sizes < 10 (2.71[1.92,3.82], 1.43[1.20,1.71]), vs. 10 to < 25 students. Decreased risks for respective PA and NPV models were identified for: males (0.73[0.56,0.94], 0.85[0.76,0.94]), vs. females; those working as educators for 20-29 (0.66[0.45,0.95], 0.66[0.56,0.78]), and more than 30 years (0.55[0.35,0.86]; 0.60[0.49,0.73]), vs. < 10 years; and worked in their current school for > 20 (0.39[0.21,0.73], 0.80[0.63,1.01]) vs. < five years. Results provide a basis for further investigation and potential intervention.

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PSYCHOSOCIAL FACTORS AT WORK AND CERTIFIED SICKNESS ABSENCE FOR MENTAL HEALTH PROBLEMS: AN 8-YEAR PROSPECTIVE STUDY. C Brisson, I Leroux, R Bourbonnais, M Gilbert-Ouimet, *R Ndjaboue, C Blanchette, B Mâsse, M Vézina (Unité de recherche en santé des populations, Québec, Canada, G1S 4L8)

Introduction: Mental health problems are one of the main causes of certified sickness absence and lead to major direct cost and lost of productivity. There is evidence for the impact of the psychosocial work environment on risk of common mental health problems. However, most previous studies have used self-reported measure of mental health and did not evaluate more severe problems leading to sickness absence. Objective: To evaluate the effects of psychosocial work factors defined by the demand-control-support model on the incidence of certified sickness absence for mental health problems. Methods: This prospective study (1993-2003) included 7152 white-collar workers employed in 21 public organizations in Quebec City at baseline. Psychosocial factors were measured with validated scales. Cox regression models were used. Results: Women having high psychological demands (HR = 1.48; 95% confidence interval[CI] 1.20-1.83), those in active jobs combined with low social support from co-workers (HR = 2.79; 95% CI 1.72-4.53) and those in high strain jobs (HR = 1.62; 95% CI 1.04-2.54) had higher risk of certified absence for mental health problems compared to unexposed women. In men, a higher risk was observed among those with low job control (HR = 1.41; 95% CI 1.04-1.91), low social support (HR = 1.61; 95% CI 1.22-2.11), high strain (HR = 1.84; 95% CI 0.96-3.54), and high strain combined with low social support (HR = 1.50; 95% CI 0.94-2.39). Conclusion: These results suggest that improving the psychosocial work environment may contribute to prevent certified sickness absence for mental health problems and reduce their major economic burden.

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REPEATED EFFORT-REWARD IMBALANCE EXPOSURE, INCREASED BLOOD PRESSURE, AND HYPERTENSION INCIDENCE AMONG WHITE-COLLAR WORKERS. *M Gilbert-Ouimet, C Brisson, M Vézina, A Milot, C Blanchette (Laval University, Quebec, Canada, G1V 0A6)

CONTEXT: Cardiovascular diseases (CVD) are one of the primary causes of death and incapacity in Canada. High blood pressure (BP) is a major risk factor of CVD. Effort-reward imbalance (ERI) model proposes that workers sense a detrimental imbalance when high efforts are accompanied by low reward. Studies on ERI and CVD suffer from methodological limitations such as small sample size, office BP measurements, and cross-sectional design. OBJECTIVES: 1) To determine whether men and women with repeated ERI exposition have increased BP means and/or cumulative incidence of hypertension at the end of the 3-year follow-up. 2) To examine the potential modifying effect of age and overcommitment. METHODS: Ambulatory BP was taken each 15 minutes during a working day among 1612 white-collar workers. ERI at work was self-assessed using validated scales. BP means and cumulative incidence of hypertension were respectively modeled with analyses of covariance and log-binomial regression. RESULTS: No association was observed between repeated ERI exposition and BP among men. Among women, age had a modifying effect. Women < 45 years old exposed to ERI at both times had significantly higher BP means (122.2/78.9 mm Hg) than those unexposed (120.3/77.3 mm Hg). In women ≥ 45 years old, the cumulative incidence of hypertension was 2.73-fold (95% confidence interval: 1.24-6.00) higher among those exposed to ERI at both times. CONCLUSION: This study shows that, among women, repeated ERI exposition led to a significant age-specific increase in BP means and cumulative incidence of hypertension. Primary intervention aimed at reducing ERI may contribute to lower BP and prevent hypertension in women.

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PSYCHOSOCIAL AND ORGANIZATIONAL WORK FACTORS IN HEALTHCARE SETTING AND CAREGIVERS' MENTAL HEALTH: THE ORSOSA COHORT STUDY. *S Lamy, A Jolivet, V Ehlinger, S Caroly, F Balducci, A Sobaszek, R De Gaudemaris and T Lang (INSERM, U1027, Toulouse, FR 31300, France)

Background evidence suggests that Psychosocial and Organizational Work Factors (POWFs) are linked with caregivers' health decline. Our objectives were to identify, among various aspects of POWFs, mental health determinants of female registered nurses (RNs) and nurses' aides (NAs) working in teaching hospitals in France. The French ORSOSA study includes 4,350 caregivers within 210 Work Units randomly selected from 7 teaching hospitals with 2 data collection waves (2006 and 2008). Effects of POWFs exposure in 2006 on mental health in 2008 were analyzed with multilevel models. We used the Nursing Work Index – Extended Organization (NWI-EO) and the Effort-Reward Imbalance (ERI) Questionnaire to assess POWFs. The Center for Epidemiologic Studies - Depression Scale (CES-D) was used to assess mental health. Among the 1,425 RNs and 1,007 NAs eligible for analysis, we kept 1,237 RNs and 859 NAs. CES-D scores (mean(standard error)) were higher in the RNs (12.1(0.3)) and NAs (14.5(0.4)) groups with high POWFs. At the individual level, poor relations between workers within work units were, with ERI, the major predictor of a high CES-D score for RNs. However, among NAs, sharing values about work between workers in the unit was linked with a high CES-D score. With NWI-EO aggregated at the work unit level, the only statistically significant predictors of the CES-D score, in addition to ERI, were having poor relations between workers within units and understaffing for both RNs and NAs. Our study shows the usefulness of taking into account POWFs at both the individual and the organizational level.

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BIRTH WEIGHT, WEIGHT CHANGE, AND BLOOD PRESSURE THROUGHOUT CHILDHOOD AND ADOLESCENCE: A SCHOOL-BASED MULTIPLE COHORT STUDY. *A Chioloro, G Paradis, George Madeleine, J A Hanley, F Paccaud, and P Bovet (Institute of Social and Preventive Medicine (IUMSP), University Hospital Center and University of Lausanne, Switzerland)

We assessed the association between birth weight, weight change, and current blood pressure (BP) across the entire age-span of childhood and adolescence in large school-based cohorts in the Seychelles, an Island state in the African region. Three cohorts of children were analyzed: 1004 whose weight and BP were measured at age 5.5 and 9.1 years, 1886 at 9.1 and 12.5, and 1575 at 12.5 and 15.5, respectively. Birth and one year data were gathered from medical files. The outcome was BP at age 5.5, 9.1, 12.5 or 15.5 years, respectively. Conditional linear regression analysis was used to estimate the relative contribution of changes in weight z-score during different periods of growth on BP. The association between birth weight z-score and current BP was either null or weakly positive without adjustment for current weight and generally weakly negative upon adjustment for current weight. At all ages, current BP was strongly associated with current body weight z-score. Conditional linear regression analysis indicated that changes in body weight z-score during successive periods of growth since birth contributed substantially to current BP at all ages. The strength of the association between weight change and current BP increased throughout successive periods of growth. During childhood and adolescence, BP is more responsive to recent than earlier weight changes.

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ACTIVE AND PASSIVE TOBACCO SMOKE EXPOSURES: A CONSTRUCTION WORKPLACE HEALTH ASSESSMENT PILOT STUDY. *A J Caban-Martinez, D J Lee, T C Clarke, E P Davila, J D Clark III, M A Ocasio and L E Fleming (University of Miami, Dept. of Epidemiology, Miami, FL 33136)

Despite high smoking rates, there has been limited development of tobacco assessment and smoking cessation outreach strategies targeting the construction workforce. We report the prevalence of active and passive tobacco smoke exposure from a convenience sample of construction workers in conjunction with lunch truck visits to the site. A workplace tobacco smoke assessment was undertaken with a convenience sample of 54 workers employed at two large construction sites. A questionnaire preloaded onto handheld devices was used to record questionnaire data. Salivary and hair samples for cotinine and nicotine assays were collected (reflecting short- and long-term smoke exposure, respectively). A telephone callback survey was administered 2 weeks after the site visit to assess use of smoking cessation resources provided during the assessment. Thirty-five percent of construction workers were self-reported never smokers, 28% former smokers, and 37% current smokers. Thirty-seven percent of never smokers and 40% of former smokers had biological samples suggesting passive tobacco smoke exposure (cutoff > 3.0ng/mL for saliva and > 0.23ng/mg for hair). Among smokers, 60% reported planning to stop smoking in 30 days, 95% reviewed the smoking cessation materials 2 weeks after the site visit, and 85% shared and discussed those materials with family members. We found evidence of passive tobacco smoke among never and former smokers, as well as interest among current smokers for cessation resources. Workplace smoke cessation strategies that reduce tobacco use and exposure via innovative engagement methods (e.g. lunch truck) are needed.

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PERTUSSIS VACCINATIONS AND FEBRILE SEIZURES IN EARLY CHILDHOOD. *Y Sun, J Christensen, A P Hviid, J Li, P Vedsted, J Olsen, M Vestergaard (University of Aarhus, Denmark, 8000)

Some studies have shown an increased risk of febrile seizure after whole cell pertussis vaccination while the evidence for acellular pertussis vaccine is limited. We examined the risk for febrile seizure within 0-7 days after acellular pertussis vaccination. We conducted both a cohort study and a self-controlled case series (SCCS) study by identifying 234,902 children born in Denmark between 1 January 2003 and 31 August 2006. Vaccination information was obtained from vaccination data reported to the Danish Health Insurance Registry by general practitioners. Information on febrile seizure including in- and outpatients, was obtained from the Danish National Hospital Registry. In the cohort study, we followed children from three months of age (90 days) until the onset of febrile seizure, epilepsy, death, emigration, 18 months of age, or the end of the study period (December 31 2006), whichever occurred first. We used Cox proportional hazard regression models in the cohort study. In the SCCS study, we included 3,885 cases of febrile seizure and used conditional Poisson regression in the analysis. We found no overall increased cumulative risk of febrile seizure for up to 7 days after vaccination but children had an increased risk of febrile seizure on the day of the first and the second dose of vaccination. Being diagnosed with febrile seizure within 0-7 days of vaccination was not associated with increased risks for recurrent febrile seizure or epilepsy later in life. Vaccinated children did not show an increased risk for epilepsy.

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EVALUATING BURDEN OF ROTAVIRUS-ASSOCIATED MORTALITY IN THE EASTERN MEDITERRANEAN REGION; A CRUCIAL STEP FOR INFORMED DECISION-MAKING ON IMPLEMENTATION OF ROTAVIRUS VACCINE. *M Naghipour (Guilan University of Medical Sciences, Rasht, Iran)

Introduction: Rotavirus-attributed diarrhea is a major cause of death in young children. The World Health Organization-Eastern Mediterranean Region, with a population over 590 millions, is a diverse area in terms of socioeconomic status and health indicators. This study aimed to evaluate burden of rotavirus-associated mortality to encourage implementation of rotavirus vaccine in the region. Materials and methods: Based on rotavirus-associated mortality in prevaccination era, the effect of rotavirus vaccine to avert children deaths was calculated. Results: More than 11% of the global rotavirus deaths was estimated to occur in Eastern Mediterranean Region, claiming more than 61,000 children less than five years of age in 2004. Pakistan and Afghanistan, each with more than 15,000 deaths per year, were the countries with the highest number of rotavirus-associated mortality; follow by Iraq, Somalia, Sudan, Yemen, Egypt and Morocco. On the other hand, each of Bahrain, Kuwait and Qatar with less than 10 deaths per year were the countries with the lowest number of rotavirus-associated mortality. When the coverage of currently used vaccines was applied to a rotavirus vaccine, a minimum of 24,100 and maximum of 43,300 deaths would be averted with vaccine efficacy of 50% to 90%, respectively. Discussion: Rotavirus-associated mortality and morbidity varies considerably in the region. While in some countries reducing rotavirus-associated mortality is a great concern, in others reducing rotavirus-attributed morbidity is the main benefit of rotavirus immunization. Implementing comprehensive strategies to facilitate usage of rotavirus vaccine in the region is encouraging.

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SECONDHAND SMOKE EXPOSURE IN CHILDREN IS ASSOCIATED WITH COMMON CAROTID ARTERY INTIMA-MEDIA THICKNESS. *B Lauzon, J O'Loughlin, J Dubois, G Paradis, K Maximova, S Cengelli, A Tremblay, M Lambert (Centre de Recherche du CHUM and Sainte-Justine Hospital, University of Montreal, Montreal, QC, Canada H2W 1V1)

Objective: To investigate the association between common carotid artery intima-media thickness (cIMT) and exposure to secondhand smoke (SHS) in children. Methods: Data were available at baseline in the Quebec Adiposity and Lifestyle Investigation in Youth (QUALITY) study, an ongoing longitudinal investigation of Caucasian children aged 8-10 years at cohort inception, who had at least one obese parent. Data on exposure to parents, siblings and friends smoking were collected in interviewer-administered child, and self-report parent questionnaires. Blood cotinine was measured with a high sensitivity ELISA. cIMT was measured by ultrasound. The association between blood cotinine and cIMT was investigated in multivariable linear regression analyses controlling for age, body mass index, and child smoking status. Results: Mean (sd) cIMT (0.5803 (0.04602)) did not differ across age or sex. Overall 26%, 6% and 3% of children were exposed to parents, siblings and friends smoking, respectively. Cotinine ranged from 0.13ng/mL to 7.38ng/mL (median (IQR) = 0.18ng/mL (0.08ng/mL)). Multivariately, a 1ng/mL increase in cotinine was associated with a 0.090 mm increase in cIMT ($p = 0.034$). Conclusion: In children as young as age 8-10 years, exposure to SHS relates to cIMT, a marker of pre-clinical atherosclerosis. Given the wide range of health effects of SHS, increased public health efforts are needed to reduced exposure among children in homes and private vehicles.

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BREAST-FEEDING AND THE RISK OF PYLORIC STENOSIS. C Krogh, R J Biggar, T K Fischer, M Lindholm, *J Wohlfahrt, M Melbye (Department of Epidemiology Research Statens Serum Institut, Copenhagen, Denmark.)

Objectives: Two case-control studies have reported a protective effect of breast-feeding shortly after birth, several weeks before onset of pyloric stenosis in many cases. We therefore examined the effect of breast-feeding during the first 6 month of life, with the opportunity of accurate timing of the breast-feeding status and extensive confounder information. Design, Setting, and Patients: We performed a large population-based cohort study based on the Danish National Birth Cohort, which provided information on infants and feeding practices during the first 6 month of life. Information on pyloric stenosis diagnosis was obtained from the Danish National Patient Register. The association between breast-feeding and the risk of pyloric stenosis was evaluated by hazard ratios (HRs) estimated in a Cox regression model, adjusting for possible confounders. Results: 70,155 singleton infants were followed for 6 month during which 66 children had surgery for pyloric stenosis. Compared to fully breastfed infants, the overall HR of pyloric stenosis for infants who were not fully breast-fed was 4.42 (95% confidence interval [CI]: 2.67-7.32). Infants who were never breastfed had the same increased of pyloric stenosis with HR of 6.14 (95% CI: 2.39-15.78). Conclusion: We found that infants who were not fully breastfed had a nearly 4.5 fold increased risk of developing PS as compared to infants who were fully breastfed. The risk estimate was likely not due to recall bias, inverse causality or confounding.

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WITHDRAWN

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OVERWEIGHT VERSUS UNDERWEIGHT IN FEMALE STUDENTS IN TEHRAN, 2010. *M-R Sohrabi, A Amanollahi, A-A Kolahi (Shahid Beheshti University of Medical Sciences, Tehran, Iran)

Obesity as a major health risk factor is increasing among children in developing countries as well as underweight remains an unsolved health problem. This study aimed to evaluate the prevalence of overweight, obesity and underweight among school girls aged 9-12 years in Tehran, the capital of Iran. This cross sectional survey was conducted on a sample of 1040 girls aged 9-12 years. Among 22 districts of Tehran, five regions selected randomly. These 5 regions were representative of different socio-economic status of North, South, East, West and Central regions of Tehran. Then according to the list in the Department of Education 4 schools were selected randomly from each region. Thereafter 52 girls randomly selected using school's office list in each school. Their weight and height were measured using standardized instruments. The body mass index (BMI) of the girls calculated and compared with both World Health Organization (WHO), and the center for disease control and prevention (CDC) references. The mean age of 1040 participants was 10.6 (SD = 0.71) years. According to CDC reference, using percentiles, the prevalence of obesity was 8.7%; overweight was 16.5% and underweight was 13.6%. According to WHO reference, using Z score, the prevalence of obesity was 8.3%; overweight was 21.8%; thin 5.9% and severe thin 1.8%. Prevalence of obesity and overweight increased about one percent during past decade. While almost one in four of children have excess weight, one in six is faced with undernourishment. This is an alarm for policymaker and health professionals to pay attention to children's lifestyles. Key words: Obesity, Child, Thinness, overweight, prevalence

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RELATIONSHIP BETWEEN TELEVISION VIEWING AND CHANGE IN BODY MASS INDEX ACROSS TIME AMONG SCHOOL-AGED CHILDREN 1997-2001. *R Pabayo (University of Alberta, Edmonton, AB, Canada)

The purpose of this study was to prospectively examine the relationship between television viewing and change in body mass index (BMI) across six years among children. The sample included 5261 school-aged children drawn from Cycle 2 (1997/1998) of the Canadian National Longitudinal Study of Children and Youth (NLSCY). We converted BMI values into age- and sex-specific BMI Z-scores according to 2001 CDC growth curves. Growth curve analyses were used to determine the relationships between television viewing and changes in BMI across time while controlling for socio-demographic factors and indicators of activity-related behaviors. Results indicated that at baseline, there were no significant differences in BMI Z-score values between students who watched more than 14 hours of TV per week and those who watched less. There was a significant TV by squared value of age interaction indicating that across time, TV hours were significantly and positively associated with more accelerated growth in BMI ($\beta = 0.013$, $p = 0.03$). When analyses were stratified by sex, results showed that among boys, at baseline, there was no difference in BMI Z-score among those that watched TV more than 14 hours per week and those who did not and the interactions between TV viewing and squared value of age was significant ($\beta = 0.02$, $p = 0.02$). However, among girls, at baseline those who watched more than 14 hours of TV per week had a significantly higher BMI Z-score ($\beta = 0.23$, $p < 0.01$) in comparison to those who watched less TV. The TV viewing by squared value of age interaction was not statistically significant. This study provides evidence that children who report more television viewing are on unfavorable BMI trajectories with boys and girls showing unique patterns of change across time.

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SELF-ESTEEM SITUATION AND RELATIVE FACTOR FOR OBESE AND OVERWEIGHT CHILDREN. *L Zhou, S W Wen and G He (Center South University, Changsha, China, 410013)

To study self-esteem situation and relative factor for obese and overweight children, we carried out a cross-sectional survey of 1410 primary students from the fourth, fifth and sixth grade in Changsha, Hunan, China. We divided the sample children into normal ($n = 1084$), overweight ($n = 211$) and obesity groups ($n = 115$) according to WHO growth standards for body mass index (BMI) and assessed them by self-esteem scale (SES). The distributions of the number of children with high and low SES at different groups were compared by Chi-square analysis. Logistic regression analysis was used to assess independent risk factors of low SES with a case-control study. The SES score of children with overweight and obesity was lower than that of normal BMI [(21.9 \pm 4.1), (21.5 \pm 4.5) vs (23.0 \pm 4.2) $P = 0.000$]. The SES score of boys with obesity was lower than that of boys with normal and overweight [(21.4 \pm 5.0) vs (23.1 \pm 4.0), (22.1 \pm 4.3) $P = 0.001$]. The SES score of girls with overweight and obesity was lower than that of girls with normal BMI [(21.5 \pm 3.9), (21.5 \pm 3.5) vs (23.0 \pm 4.4) $P = 0.003$]. The proportion of low SES in obesity group was greater than that in normal and overweight groups. Multiple logistic regression analysis showed that obesity, overweight, obesity considered by grandparents, dissatisfaction with height and dissatisfaction with weight were the risk factors of low SES for children (OR = 1.45, 3.74). Satisfaction with the learning score was the protective factor of low SES (OR = 0.22). It is possible that there are differences between the obesity, overweight and normal children for SES situation. Obesity and overweight are the risk factors of low SES for children in primary school.

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THE CORRELATION BETWEEN BODY COMPOSITION AND SEX-HORMONES IN PREPUBERTY CHILDREN; PRELIMINARY STUDY. H A Lee, *W K Lee, Y J Kim, H Lee, H S Gwak, Y S Hong, H S Kim, E A Park, E H Ha, H Park (Department of Preventive Medicine, Ewha Womans University, Seoul, Korea.)

Abnormal early puberty is called precocious puberty and recently indicates at earlier age than in the past. In puberty, sex-hormones help orchestrate changes in body composition. We aimed to describe the correlation of body mass and sex-hormone in prepuberty children. We followed up subjects in Ewha Birth & Growth Cohort, which is a prospective cohort established 2001-2006. Anthropometric measurements were taken and blood samples were collected with Tanner's stage questionnaire at 8 years of age. Twenty four percent of children were classified as overweight (≥ 85 th percentile of BMI) in study subjects. In girls, estradiol concentrations were positively correlated with current weight ($r = 0.40$), body mass index ($r = 0.33$), and chest circumference ($r = 0.38$) (p value < 0.05). Estradiol was also positively correlated with body fat mass ($r = 0.31$). In boys, there were no significant correlations between testosterone or androstendione and indices of body composition. But, there was inverse correlations with birth weight for androstendione ($r = -0.31$) and testosterone ($r = -0.29$), even in marginal significance, were found. Obesity in childhood is known as one of main risk factors to precocious puberty. In this study, we observed that sex hormone concentration was positively correlated with obesity in prepuberty children. This work was supported by National Research Foundation of Korea Grant funded by the Korean Government (2010-0026225)

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THE VACCINATION COVERAGE RATE AND BARRIERS AMONG DISABLED CHILDREN IN KOREA. Y W Jeong, *H A Lee, J Min, A Shin, K h Kim, Y R Han, H Park (Department of Preventive Medicine, School of Medicine Ewha Womans University, Seoul, Korea.)

Background and objects: Children of hard-to-reach have been thought to have lower immunization rates than the general children. But, there is little research on the health of hard-to-reach children, especially disabled children. This study evaluated the vaccine coverage rate, timeliness, and barriers of vaccination among disabled children in Korea. Methods: We served 210 disabled children (male = 132) aged over 2 years from April, 2009 to March, 2010. Questionnaires were administered to estimate vaccination rate, its timeliness, barrier factors and information related to disability. Vaccination status and age at vaccination was confirmed by checking immunization card. Up-to-date (UTD) was defined as 4 DTaP, 3 HepB, 1 MMR, and 3 IPV by 2 years of age. Results: The coverage of UTD (4:3:1:3) was 70.5% and only 6.7% disabled children had received during the recommended period. Not being aware of the necessity and schedule of vaccination, child being sick during the recommended period and worried about charge of vaccination were barrier factors to timely vaccination. Moreover, low-income household, working mothers, low-education level for parents, and those who are younger among siblings were significant barrier factors to timely vaccination ($p < 0.05$). But, kinds of disability and the degree of disability were not effect on vaccination coverage rate. Conclusions: In order to improve timely vaccination coverage in disabled children, accurate information should be delivered and systematic approach with financial support should be targeted to hard-to-reach groups. Acknowledgement: This study was supported by a research grant from the Korea Centers for Disease Control and Prevention (2009-E00548-00)

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OVERWEIGHT OR OBESITY AND CHANGES IN COGNITIVE ABILITY IN CHILDHOOD: MEASUREMENTS AT 2 TIME POINTS. *S A Keim (Nationwide Children's Hospital, Columbus, OH 43205)

Poorer cognition has been observed for obese versus normal weight children. No longitudinal studies have accounted for changes in both body size and cognitive ability in childhood. The Collaborative Perinatal Project measured height, weight, and cognition (Stanford-Binet, WISC) at ages 4, 7 (27,627). Multiple linear regression was used to examine cross-sectional associations, the association between the change in BMI-for-age z-score and the change in IQ from ages 4-7, and the change in IQ for children who changed BMI categories or stayed overweight/obese compared to those who stayed normal weight. Cross-sectionally BMI was positively associated with IQ (adj β for 1-SD increment in BMI (age 4) = 1.0 (95% CI: 0.8, 1.1); age 7: 1.0 (0.9, 1.2)). A 1-SD increase in BMI was associated with a 0.4-point decrease in IQ (95% CI: -0.6, -0.2). Children who stayed normal weight (< 85th pct) had a mean 1.6-point decrease in IQ (SD = 12.2). Those who were overweight/obese (\geq 85th pct) at ages 4 and 7 experienced a 1.3-point decrease in IQ (95% CI: -1.8, -0.8) relative to normal weight. Children who started normal weight but became overweight/obese had a similar decrease (β = -1.3, -2.0, -0.7), while those who began overweight/obese but reached normal weight by age 7 were similar to those who stayed normal weight (β = -0.4, -0.9, 0.7). While overweight/obese children had the highest IQs, increasing BMI after age 4 was associated with a decrease in IQ and becoming or staying overweight/obese by age 7 was associated with a greater decrease in IQ than reaching or staying normal weight. This may be by undermining self-confidence in testing, reversible alterations in brain development, or home environment changes after age 4.

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THE ASSOCIATION BETWEEN OVERWEIGHT AND ATTENTION DEFICIT/ HYPERACTIVITY DISORDER (ADHD) IN CHILDHOOD. *M K Kim, H A Lee, E-j Kim, H Lee, Y J Kim, S Cho, E A Park, E H Ha, H Park (Department of Preventive Medicine, School of Medicine Ewha Womans University, Seoul, Korea)

In this study, we wanted to know about whether children with inattention and hyperactivity disorders had an increased risk of obesity. We examined the association overweight and obesity with ADHD in children. This study included 308 children aged between 5- and 7-years. In Korea, prevalence of ADHD disorder had have about 3-8%. According to proportion, our subjects included with ADHD patients (n = 18) and without ADHD who were population-based children (n = 290). All of the subjects completely took the enrollment and examined problem by ADHD questionnaire from their parent. Also, their birth outcomes were collected from medical records and concurrently information, weight, height, and body mass index, was obtained into anthropometric changes. We used the analysis for the association with Chi-square test and logistic regressions. As a result, on the basis of ADHD disorder, about 3% of ADHD for inattention and 2% of hyperactivity were classified. Considering about overweight, inattention was higher percentage in overweight group (7% in overweight vs. 3% in normal weight). Also, it was not significant that growing inattention aspect was increased overweight and these tendencies were similar even when we adjusted child sex and age. In the conclusion, we could find the association overweight with ADHD for inattention. Therefore, preventive strategy could be developed for childhood overweight and obesity. Further, study is needed to find other risk factors and mechanisms on ADHD development in extended sample size. This work was supported by National Research Foundation of Korea Grant funded by the Korean Government (2009-0071150)

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PREDICTORS OF SMOKING CESSATION IN ADOLESCENT SMOKERS: A SYSTEMATIC REVIEW OF LONGITUDINAL STUDIES. S Cengelli, J O'Loughlin, *B Lauzon, J Cornuz (CRCHUM, University of Montreal, Montreal, QC, Canada, H2W 1V1)

Tobacco use causes more than 5 million deaths worldwide annually. In Canada in 2009, prevalence of smoking was 13% among youth 15-19 years and 23% among those 20-24 years. Many young smokers express a desire to quit, but have difficulty doing so. Empirical reviews have concluded that smoking cessation programs in youth have limited efficacy. In order to provide a solid knowledge base for tobacco interventions, determinants of self-initiated cessation in youth need to be understood. We systematically searched PUBMED and EMBASE for longitudinal studies on determinants of self-initiated smoking cessation in youth. N = 3,807 titles and N = 787 abstracts were reviewed independently by two and three reviewers, respectively. Inclusion criteria were: published between January 1984-August 2010, youth 10-28 years, and smoking cessation of \geq 6 months. 7 articles were retained for in-depth analysis. 3 of 7 studies retained defined smoking cessation as abstinence of \geq 6 months and 4 studies as 12 months abstinence. 7 factors emerged related to quitting: few friends who smoke, no intention to smoke, higher parental education, intact nuclear family, parental disapproval of smoking, good grades, good health, high cigarette resistance self-efficacy, and older age at first use. Additional factors were significant in some studies but not others or only assessed once. The longitudinal literature on predictors of youth cessation is not well developed. The most consistent predictors of self-initiated cessation include few friends smoking and no intention to smoke in the future. Tobacco interventions should target youth as well their friends as soon as possible after smoking onset given the difficulty in quitting.

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ANTIBIOTIC SUSCEPTIBILITY PATTERNS INFLUENCE ON EMPIRIC ANTIBIOTIC PRESCRIBING FOR CHILDREN HOSPITALIZED WITH COMMUNITY ACQUIRED PNEUMONIA. *L Ambroggio, L Philip-Tabb, S S Shah (Drexel University and The Children's Hospital of Philadelphia, Philadelphia, PA 19102)

Objective: To determine if hospital reported antibiotic susceptibility is associated with physicians' prescribing practices in the treatment of pediatric community acquired pneumonia (CAP). Methods: A multi-level, random intercept, logistic regression was used to explain the influence of hospital-level pneumococcal penicillin non-susceptibility patterns on individual-level antibiotic prescription. The primary outcome was the receipt of penicillin alone within 24 hours of hospitalization. This data was obtained from the Pediatric Health Information System. The primary exposure of interest was the proportion of non-susceptible pneumococcal isolates reported by each hospital, classified as susceptible, intermediate or resistant as defined by the Clinical Laboratory Standards Institute. An isolate was considered non-susceptible if it was classified as intermediate or resistant. Results: 5,033 children diagnosed with CAP from 33 hospitals were eligible for this study. The range of non-susceptible pneumococcal isolates was 29%-70% and for the resistant category, 0%-60%. There was no significant association between penicillin prescribing practices with pneumococcal penicillin non-susceptibility patterns. High levels of pneumococcal resistant patterns were statistically associated with less frequent penicillin prescribing (odds ratio = 0.17). Conclusion: Hospitals with higher levels of penicillin-resistant *S. pneumoniae* were less likely to prescribe penicillin as empiric therapy for CAP. Changing the cut-off points for antibiotic resistance to match clinical outcomes may prove to be a potent way of encouraging narrow spectrum antibiotic findings.

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TRAJECTORIES OF WEIGHT STATUS AND DEPRESSION DURING PUBERTY. *M Sato, K Suzuki, T Tanaka, N Kondo, A Nagai, Z Yamagata (University of Yamanashi, Chuo, Japan)

Weight status and depression are reportedly associated during puberty. However, examination at 2 time points in a cohort study did not clarify this association. Further, many studies suggest that this association is sex dependent. In this study, we identified trajectories of weight status at 6 time points during puberty and examined the effect of weight on depression, taking into account sex. The height and weight of 10-year-old children (N = 1026) from the Kosshu Project, a representative sample of rural youth, were evaluated annually over 6 years. Obesity was defined using the international cut-off points. The presence of depression symptoms was assessed at 15 years of age. Proc traj (SAS ®) was used to categorize the participants of both sexes into 5 groups based on weight status trajectories: 4 of the 5 groups included overweight children, while the other included normal-weight children. Of the 4 overweight groups, 3 included children who remained overweight (high, middle, low), while those in the fourth group attained normal weight. The association between depression symptoms and weight status was assessed using multiple logistic regression analysis. Depression symptoms were found in 17% boys and 33% girls. In boys, there was no significant association between weight status and depression. However, in girls, the low-overweight group had a higher risk of depression than the normal-weight group (odds ratio: 2.5; 95% confidence interval, 1.2-4.8), even though this association was not significant in the middle- and high-overweight groups. A high degree of obesity increases the risk of depression; our results indicate that pubescent girls with holding low-degree obesity have a higher risk of depression.

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DIET, NOT ORAL HYGIENE, IS ASSOCIATED WITH LOCATION OF DENTAL EROSION IN PEDIATRIC GASTROESOPHAGEAL REFLUX. *Y Wild, P Rechmann, E Vittinghoff, B Rechmann, and MB Heyman (University of California-San Francisco, San Francisco, CA, 94143)

Children with gastroesophageal reflux (GER) have increased dental erosion. We studied the role of dietary diet and oral hygiene in dental erosion location and tooth surface in children. Seventy-nine subjects - 59 with and 20 without GER symptoms - completed a questionnaire on diet and oral hygiene. Teeth were examined for dental erosion, erosion location, and affected tooth surface. Fisher's exact test analyzed group contingency tables. Kruskal-Wallis analysis was used for non-parametric correlation of diet and oral hygiene in relation to the eroded tooth position and surface. No beverage (juice, sports drinks, lemonade, soda, milk, water and chocolate) correlated with GER symptoms and erosion location or surface. However, the time of beverage consumption was important. Orange juice with meals was associated with GER symptoms ($p = .01$) and increased anterior erosion ($p = .02$). Conversely, milk other than with meals was associated with GER symptoms ($p = .03$) and decreased overall ($p = .02$), posterior teeth ($p = .04$) and occlusal ($p = .004$) erosion. Citrus/sour candy was associated with GER symptoms ($p = .03$) and increased erosion ($p = .06$), specifically upper teeth ($p = .06$) and occlusal surfaces ($p = .03$). Chocolate was associated with GER symptoms ($p = .03$) and anterior teeth ($p = .02$) and occlusal surface ($p = .01$) erosion. Hygiene was not associated with erosion and GER symptoms. In conclusion, beverages and oral hygiene were unrelated to GER symptoms and erosion. In contrast, time of orange juice or milk intake and citrus/sour candy or chocolate was related to GER symptoms and erosion. Harmful or protective dietary effects on GER-associated dental erosion require further study.

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PREDICTORS OF "MATERNAL SENSITIVITY". *P N Banerjee, L L Davidson (Columbia University Medical Center, New York, NY)

Research has shown high maternal "sensitivity", defined as providing a nurturing and stimulating environment, in which a mother promptly and appropriately responds to her child's initiatives, advances cognitive development, in both typically developing and delayed children. Though understanding factors which influence maternal sensitivity is essential to designing interventions to improve it, few studies have studied predictors of sensitivity. Hypothesized predictors include infant (e.g. birth weight) as well as maternal (e.g. demographics) characteristics. Thus, this study aims to examine whether infant characteristics, including birth weight and gender, and/or maternal characteristics including depression, alcohol use, breastfeeding, perception of infant's health status and demographic variables (age, race, education, marital status, income), predict maternal sensitivity. Maternal sensitivity was measured using the NCAST Parent-Child Interaction standardized assessment tool. Using data from the Early Childhood Longitudinal Study-Birth cohort (ECLS-B), a nationally representative sample of 10,688 infants followed through 48 months; variable relationships were first examined through correlation coefficients and univariate regression analyses. To examine whether predictors are statistically significant, stepwise multiple regression analyses will be used. Preliminary analyses using data for 9-month-old infants showed maternal sensitivity was correlated with infants' birth weight ($r = .03$, $p < .001$), mothers' depression ($r = -.04$, $p < .001$), mothers' income ($r = .08$, $p < .001$), and mothers' age ($r = .34$, $p < .05$). Further understanding of the role of predictors of maternal sensitivity may lead to innovative interventions with at-risk infants.

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METABOLIC SYNDROME AND C-REACTIVE PROTEIN: IS THERE A TRUE ASSOCIATION? *J Chotalia, K Theall (Louisiana State University School of Public Health, New Orleans, LA 70112)

Research has shown that metabolic syndrome is associated with serum levels of C-reactive protein (CRP). High levels of CRP are found in mild to moderate inflammation, infection and cardiovascular events. Obesity is also associated with high levels of CRP. The objective of this study was to examine the relationship between the metabolic syndrome (MS) and its components with CRP, independent of obesity. Data was used from 1999-2006 US National Health and Nutritional Examination Survey for 8486 youths (12-20 years) with equal subjects of both genders. Metabolic syndrome (MS) was defined as presence of 3 or more risk factors among following: waist circumference, high serum triglyceride, low serum HDL, high blood pressure, high fasting glucose levels. Due to lack of universally accepted definition of MS in youths, we considered subjects at risk with levels greater than the 90th percentile for all MS risk factors except for HDL where less than 10th percentile was considered at risk for their age and gender groups. Multivariate linear regression (MLR) models were used to examine the association with adjustments for age, gender, race, healthy eating index, education, poverty level. We observed that each component of MS was associated significantly with higher level of CRP in bivariate analysis. Overall, we found the prevalence of MS 4.47%. In MLR models, CRP was significantly associated with MS, age, female sex, African American race. When we adjusted for obesity independently from MS, the relationship between CRP and MS was no longer significant. In conclusion, obesity is the major driver in components of MS for its association with CRP. Due to strong coexistence of these components, each component was significantly associated with high levels of CRP.

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ADHERENCE IN PHARMACOTHERAPY TRIALS AMONG METHAMPHETAMINE-DEPENDENT MEN WHO HAVE SEX WITH MEN (MSM). *G M Santos, M Das, D Santos, P Chu, E Vittinghoff, G Colfax (San Francisco Department of Public Health; University of California San Francisco, CA 94102)

Low medication adherence is associated with methamphetamine (meth) use and is a major barrier to evaluating the efficacy of pharmacologic HIV prevention interventions. We analyzed predictors of adherence in pharmacologic trials of medications to reduce meth use among 90 MSM at high risk for acquiring or transmitting HIV. MSM were enrolled in two randomized double-blind placebo-controlled trials. We monitored adherence with medication event monitoring systems (MEMS) for 12-weeks. A multiple stepwise linear regression analysis (backward selection) modelled baseline behavioral and demographic predictors of percent adherence by MEMS, while controlling for active drug treatment (mirtazapine and bupropion) and excluding those taken off medication per protocol. Percent adherence is approximately normally distributed by q-norm plot and Shapiro-Wilk test for normality (p-value = 0.1). Mean adherence is 57.4% (\pm 27.4). Adherence was lower among MSM with HIV serodiscordant anal sex partners (-16.6%; p = 0.02) and MSM reporting crack use in the past month (-16.7%; p = 0.03). Adherence was higher among older MSM (8.4% per 10 year age increase; p = 0.01) and MSM with an income of at least \$30,000 (19%; p = 0.02). We conclude that among actively-using, meth-dependent MSM enrolled in pharmacologic trials, medication adherence was moderate. Our data suggest that in this population, subgroups including persons having high-risk sexual behaviors and those using multiple substances should be considered for additional support to optimize adherence. Targeting adherence interventions to address these factors is important in evaluating the efficacy of HIV prevention interventions.

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VARIATION OVER TIME IN THE ASSOCIATION BETWEEN POLYPHARMACY AND MORTALITY IN THE OLDER POPULATION. K Richardson, * A Ananou, L Lafortune, C Brayne, F E Matthews, and MRC Cognitive Function and Ageing Study (Department of Public Health and Primary Care, School of Clinical Medicine, Cambridge University, Cambridge, CB1 8RN, UK)

In the older population multimorbidity is common and 'best practice' may invite the prescription of multiple medications. Here the association between polypharmacy, defined as the concurrent use of 5 or more medications, and mortality was examined in 12,423 participants aged 65 years and over representative of the older population of England and Wales. Self-reported medication use, disability and health conditions were collected at baseline in 1991-93. The cohort was followed for 18 years with full mortality notification. Adjusted for age, baseline institutionalisation, smoking, disability and health conditions, Cox proportional hazards regression was used to investigate polypharmacy and mortality, stratified by sex. Various methods for modelling the time-varying effect of polypharmacy are presented. A strong independent association between polypharmacy and mortality existed in the short-term (first 2 years) for both men and women. This association remained, although attenuated, in the medium-long term (2-18 years of follow-up) for women, but became non-significant in the longer term for men. It remains unclear whether polypharmacy is a marker for poor health or is an independent risk factor for mortality. However, polypharmacy strongly predicts adverse outcomes, and so multiple medication use should be carefully monitored in the older population.

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NON-STEROIDAL ANTI-INFLAMMATORY DRUG USE AND LEVELS OF ESTROGENS AND ANDROGENS IN MEN. *M A Gates, S A Hall, G R Chiu, V Kupelian, G A Wittert, C L Link, A B Araujo, J B McKinlay (New England Research Institutes, Watertown, MA 02472)

Previous studies suggest that regular use of non-steroidal anti-inflammatory drugs (NSAIDs) may lower estrogen levels in women. One potential mechanism for this association – decreased aromatase activity due to cyclooxygenase inhibition – would also be expected to influence hormone levels and possibly the risk of hormone-sensitive cancers in men; however, no prior studies have assessed NSAID/hormone associations in men. We examined the association between use of prescription (Rx) and over-the-counter (OTC) NSAIDs and levels of estrogens, androgens, and the testosterone:estradiol ratio among 1,774 men in the Boston Area Community Health Survey. At baseline (2002-05) participants provided a blood sample as close to waking as possible and interviewers assessed use of analgesics during the preceding 4 weeks by direct observation of medication labels and participant self-report. Testosterone and estradiol were measured by competitive electrochemiluminescence immunoassay and liquid chromatography-tandem mass spectrometry, respectively. We calculated adjusted geometric mean hormone levels for each category of NSAID use and the percent difference in levels for users vs. non-users. There was no significant association between Rx or OTC NSAID use and any hormone examined after adjustment for age, body mass index, and other potential confounders. For example, geometric mean testosterone levels were 400 ng/dL in non-users, 377 ng/dL in Rx NSAID users, and 410 ng/dL in users of OTC NSAIDs only, while the corresponding levels for estradiol were 21.8, 19.1, and 21.8 pg/mL. These results do not support an association between NSAID use and estrogen or androgen levels in men. Supported by Award Number U01 DK56842 from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), National Institutes of Health (NIH). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIDDK or the NIH.

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NON-STEROIDAL ANTI-INFLAMMATORY DRUG USE AND LOWER URINARY TRACT SYMPTOMS: RESULTS FROM THE BOSTON AREA COMMUNITY HEALTH SURVEY. *M A Gates, S A Hall, G R Chiu, V Kupelian, M P FitzGerald, C L Link, J B McKinlay (New England Research Institutes, Watertown, MA 02472)

There is evidence for a role of inflammation in the etiology of lower urinary tract symptoms (LUTS), raising the possibility that use of non-steroidal anti-inflammatory drugs (NSAIDs) may inhibit the development or progression of LUTS. We examined the association between use of prescription and over-the-counter (OTC) NSAIDs and LUTS among 1,974 men and 2,661 women in the Boston Area Community Health Survey. We excluded individuals with established urologic disease or conditions that might influence bladder function. Interviewers assessed use of analgesics during the past 4 weeks by direct observation of medication labels and participant self-report, and we assessed urologic symptoms using the American Urological Association Symptom Index. We used multivariable-adjusted logistic regression to estimate odds ratios (OR) and 95% confidence intervals (CI) for LUTS, voiding symptoms, storage symptoms, and nocturia. There was no clear association between use of prescription or OTC NSAIDs (compared to no NSAID use) and overall LUTS, voiding symptoms, or nocturia in men or women. However, OTC NSAID use was positively associated with storage symptoms in women (OR = 1.37, 95% CI: 1.03, 1.83), and there was a positive association between OTC NSAID use and overall LUTS among women with a history of arthritis (OR = 2.09, 95% CI: 1.20, 3.64). These results do not provide strong support for an association between NSAIDs and LUTS. However, the associations between OTC NSAID use and certain urologic symptoms, particularly among women with arthritis, and the potential mechanisms involved should be evaluated in future studies. Supported by Award Numbers R21 DK082652 and U01 DK56842 from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), National Institutes of Health (NIH). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIDDK or the NIH.

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ARE COMMONLY-USED ANTIHYPERTENSIVES ASSOCIATED WITH LOWER URINARY TRACT SYMPTOMS? *S A Hall, G R Chiu, D W Kaufman, G A Wittert, C L Link, J B McKinlay (New England Research Institutes, Watertown, MA 02472)

We examined differences in lower urinary tract symptom (LUTS) prevalence among users of 5 common antihypertensives (AHTs) compared to non-users, adjusted for risk factors. Data were collected during 2002-2005 from 5,503 Boston, MA residents aged 30-79. To avoid confounding by indication, this analysis was restricted to those with an AHT indication or who were current users (N = 1865). Storage, voiding, and nocturia symptoms were assessed using the American Urological Association Symptom Index. Associations of angiotensin-converting enzyme inhibitors, beta blockers, calcium channel blockers (CCBs), loop and thiazide diuretics with the 3 groups of LUTS were estimated using adjusted odds ratios (ORs) and 95% confidence intervals (CIs) from multivariate logistic regression (referent group = untreated hypertension). Overlap in use was accounted for by creating monotherapy and combination therapy exposure categories. Among women, monotherapy with CCBs was associated with increased prevalence of nocturia (OR = 2.65, 95% CI: 1.04-6.74) and voiding symptoms (OR = 3.84, 95% CI: 1.24-11.87) compared to those with untreated hypertension; this result was confined to women aged < 55. Among men of all ages, positive associations were observed for thiazides and voiding symptoms (monotherapy OR = 2.90, 95% CI: 1.17-7.19), and for loop diuretics and nocturia (combination therapy OR = 2.55, 95% CI: 1.26-5.14). Results are consistent with the hypothesis that certain AHTs may aggravate urologic symptoms. The presence of new or worsening LUTS among AHT users suggests review of medications and consideration of a change in class. Supported by Award Numbers R21DK082652 and DK 56842 from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (NIH). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIDDK or the NIH.

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DO STATINS IMPROVE UROLOGIC SYMPTOMS? RESULTS FROM THE BOSTON AREA COMMUNITY HEALTH SURVEY. *S A Hall, G R Chiu, W D Steers, C L Link, and J B McKinlay (New England Research Institutes, Watertown, MA 02472)

It has been hypothesized that commonly-used statin drugs may ameliorate bothersome lower urinary tract symptoms (LUTS) through anti-inflammatory or other pathways. We used data from a longitudinal cohort study of urologic symptoms conducted in Boston, MA residents aged 30-79 at baseline (T1, 2002-2005); follow-up data were collected 2006-2010 (T2). Our objective was to examine whether statin use resulted in a clinically meaningful improvement in American Urologic Association Symptom Index score (AUA-SI), considering the two data collection time points. Because of the association between cardiac disease and LUTS, subjects were included in the analysis if they reported a history of provider-diagnosed high cholesterol or statin use (to avoid confounding by indication), and if they had baseline AUA-SI scores ≥ 3 (thus eligible to remit) (N = 674). Multivariate logistic regression was used to model odds ratios (ORs) and 95% confidence intervals (CIs) for a clinically meaningful improvement in AUA-SI (a decrement of ≥ 3) among current statin users vs. past/never users. There were 350 current users of statins at T2; 53.1% of these were users at T1. In adjusted models, men currently using statins were significantly more likely to have clinically-relevant AUA-SI improvement at T2 compared to past/never users (adjusted OR = 2.40, 95% CI: 1.24, 4.63). We observed no associations among women. Our results provide longitudinal evidence that statins may reduce the occurrence of LUTS among men. The dissimilar findings observed among women suggest that any protective effect from statins likely involves the prostate or other male-specific pathways. Supported by Award Numbers R21DK082652 and DK 56842 from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (NIH). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIDDK or the NIH.

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INCREASING PREVALENCE OF ANTIDIABETIC MEDICATION USE IN THE PRECONCEPTION PERIOD, 2001-2008 *J M Lawrence, V Y Chiu, T C Cheetham (Kaiser Permanente Southern California [KPSC], Pasadena CA 91101)

With the increasing incidence of type 1 diabetes mellitus (DM) and the declining age for type 2 DM diagnosis, more females may develop DM before or during their reproductive years. Using pharmacy records and infant birth certificates, we examined the prevalence of antidiabetic medication use in the 120 days before last menstrual period (LMP) by 165,327 women (mean age 29.5 \pm 6.0 yrs; 51% Hispanic, 12% Asian, 10% Black) giving birth from 2001-2008 in a KPSC hospital who had prescription coverage ≥ 6 months before their LMP. Since metformin is used to treat conditions associated with insulin resistance (i.e., polycystic ovarian syndrome, pre-diabetes, obesity) as well as DM, we created a metformin only group. Of the 165,327 women, 1.15% were using antidiabetic drugs: 0.33% used insulin \pm other DM meds, 0.22% other oral DM meds \pm metformin and 0.60% metformin only. Use of any antidiabetic drugs was associated with demographics (increasing age, race/ethnicity, education) and almost tripled from 2001 to 2008 (0.58% to 1.68%) with a yearly increase of 16% (odds ratio = 1.16, 95% CI 1.13-1.18) after adjusting for demographics and repeated pregnancies. The increase was greatest for women using oral agents only; from 0.34% in 2001 to 1.28% in 2008. Most of this increase was metformin only (0.14% to 1.02%) versus other drugs (0.20% to 0.26%). The increase in insulin use (0.24% to 0.40%) was modest. Only 40% of metformin users used antidiabetic drugs during their 2nd or 3rd trimesters compared to 95% of women on other oral agents. The dramatic rise in childbearing women's use of drugs to treat diabetes or insulin resistance suggests that an increasing volume of high risk women will be in need of preconception care.

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ANTIPSYCHOTICS AND RISK OF STROKE AMONG ELDERLY AND NON-ELDERLY VETERANS: A CASE-CASE TIME CONTROL ANALYSIS. *S Wang, D Dore, V Mor, M Maclure, C Linkletter, S Buka (Brown University, Providence, RI 02912)

Time dependent effects of antipsychotics on stroke risk and potential modification of risk by age have not been well investigated. A case-case-time-control design can be used to evaluate short term effects while adjusting for both unmeasured time-invariant confounders and exposure-time trends. We used encounter data from the Veteran's Health Administration. Veterans aged 50-90 years with inpatient hospitalizations for ischemic stroke between 2002 and 2007 were included. For every stroke case, the "current" period was defined as 1 to 30 days before hospitalization and the "reference" period as 91 to 120 days before hospitalization. Exposure during the current period was compared to exposure during the reference period within cases. Concurrent person-time sampled from future-cases was used to estimate exposure-time trends. Adjusted estimates of the effect of antipsychotic exposure on risk of stroke were obtained by dividing exposure odds among cases by exposure odds among future-cases. Over the year prior to the stroke event, the probability of exposure to antipsychotics increased. After adjusting for exposure-time trends, odds of stroke among 70-90 yr olds were 1.7, 95% CI (1.2, 2.2) times higher when exposed to antipsychotics than when unexposed. Among 50-70 year old veterans, there were no elevations in risk associated with antipsychotic use, OR 1.1, 95% CI (.08, 1.5). Among elderly patients already at high risk, exposure to antipsychotics may be a proximal trigger for stroke. Non-elderly adults may not have accumulated sufficient risk factors for exposure to antipsychotics to trigger a stroke. Elevation in risk of stroke among the elderly is apparent after brief exposure to antipsychotics.

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PSYCHOTROPIC MEDICATION IN DEMENTIA CAREGIVING. *E L Grace, R S Allen, J DeCoster, and L D Burgio (University of Michigan School of Public Health, Ann Arbor, MI, 48104)

Despite their modest efficacy, psychotropic medications are often prescribed to treat behavioral symptoms of dementia. This has come under substantial debate following FDA warnings concerning antipsychotic use in the elderly with dementia. In order to make informed decisions regarding appropriate therapy for dementia patients, it is important to understand the determinants of psychotropic medication use. Although much is known about medication use among institutionalized dementia patients, little is known about dementia patients living in the community. The aim of this study was to identify predictors of anxiolytic, antipsychotic, and antidepressant use among a sample of community-dwelling Alzheimer's patients. Data came from the baseline assessment of 598 participants in the Resources for Enhancing Alzheimer's Caregiver Health II trial. Logistic regression analyses were fit separately for each medication. Increases in vigilance and care recipient pain were associated with greater use of anxiolytics whereas increased caregiver confidence was associated with decreased use. Care recipient cognitive impairment and larger social networks were associated with increased use of antipsychotics. Perceived positive aspects of caregiving were associated with decreased use. Higher levels of care recipient cognitive status, greater functional impairment, being a non-spousal caregiver, and having high levels of dementia knowledge were associated with increased use of antidepressants. Problematic behaviors were not significant predictors for any medication. Providing mental health services to caregivers may be a tangible way to decrease psychotropic drug use among community-dwelling dementia patients while also improving caregiver quality of life.

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TREATMENT WITH ANTIPSYCHOTICS AND RISK OF MYOCARDIAL INFARCTION: A CASE-CASE TIME CONTROL STUDY. *S Wang, V Mor, M Maclure, D Dore, C Linkletter, S Buka (Brown University, Providence, RI 02912)

Recent studies have linked antipsychotic exposure to thrombotic outcomes such as ischemic stroke and venous thromboembolism. However, there has been little investigation of risk of myocardial infarction (MI) related to antipsychotic treatment. We evaluated antipsychotic exposure as a potential trigger for MI using a case-case time control design. Veterans aged 50 to 90 years with hospitalizations for MI between 2002 and 2007 were identified using data from the Veteran's Health Administration (VHA). For each MI case, the "current" period was defined as 1 to 30 days before the hospitalization and the "reference" period as 91 to 120 days before the hospitalization. Exposure-time trends were addressed by sampling calendar time matched control periods from cases which had not yet occurred (i.e. future cases). Among veterans aged 50-90 years, the odds of MI when exposed to antipsychotics were 1.5, 95% CI (1.3, 1.7) times greater than the odds when unexposed. Stratified estimates show age related increases in risk. Among patients over 80, the risk of MI doubled when exposed to antipsychotics, OR 2.1, 95% CI (1.5, 2.9). Antipsychotic exposure may have thrombotic effects. Elevation in risk is of MI is detectable after brief exposure to antipsychotics; risk increases with age.

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EFFECT OF CUMULATIVE ANTIPSYCHOTIC DOSAGE ON THE RISK OF TYPE II DIABETES AMONG QUEBEC WELFARE RECIPIENTS: A COHORT STUDY. *A Naidu, E Latimer, R Tamblin and A Kelome (McGill University, Montréal, QC, Canada)

To compare the risks of developing type II diabetes after initiation of different antipsychotic drugs, we constructed a cohort of 34,899 adult welfare recipients in Quebec who filled at least one prescription for an antipsychotic drug between 1993 and 2004 inclusive. Data came from the Régie de l'assurance maladie du Québec (RAMQ). We also considered a subset of the cohort who used only one antipsychotic drug during the study period ($n = 20,526$). Standardized antipsychotic dosage was measured across 6 antipsychotic drug groups: clozapine, olanzapine, quetiapine, risperidone, low-potency typical drugs and other typical drugs using World Health Organization (WHO) standardized data. Cox proportional hazard models were used to estimate the risk of diabetes after antipsychotic exposure, adjusting for variables abstracted from the RAMQ data: age at study entry, sex, obesity before drug initiation, schizophrenia and entry year. Risk of diabetes associated with one more standard monthly dose was significantly higher for: clozapine (Risk Ratio (RR) 1.13 (95% Confidence Interval (CI): 1.04, 1.24)); olanzapine (1.09 (1.04, 1.14)) and low potency typicals (1.08 (1.03, 1.13)). We also assessed the risk associated with ever use of an antipsychotic drug. Consistent with many prior studies, clozapine, olanzapine and low potency typical drugs pose a higher risk for diabetes than other antipsychotic drugs. We also found, extending earlier results, that this risk increases with dosage.

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TRENDS IN ANTI-INFECTIVE DRUGS USE DURING PREGNANCY IN CANADA. *F Santos, O SHEEHY, S Perreault, E Ferreira, A Bérard (Faculty of Pharmacy, University of Montreal, Montreal, QC, Canada)

Development of knowledge in understanding the use of antibiotics during pregnancy has been limited by difficulties in testing medications in pregnant women. Overuse of broad spectra antibiotics is associated with development and spread of bacterial resistance, a problem that is faced as a significant threat to the public health. In this study, we describe trends in prescription of general and broad spectrum anti-infective drugs during pregnancy. We used the Quebec Pregnancy Registry to analyse trends for prescriptions of oral anti-infectives dispensed during pregnancy for the five-year period comprised between January 1998 and December 2002. Descriptive statistics were used to summarize the characteristics of the study population. Annual trends for anti-infective prescriptions were analyzed using the Cochran-Armitage test. The use of anti-infective drugs and broad spectrum agents during pregnancy decreased from 1998 to 2002 ($p \leq 0.05$ for trends). The classes that showed increasing trend for use were: macrolides, quinolones, tetracyclines, urinary anti-infective drugs and antimycotics. Use of penicillins and sulfonamides decreased. Azithromycin showed a remarkable increase in its use: 0.04% of all anti-infective prescriptions in 1998, compared to 10.16% in 2002. Decrease of broad-spectrum anti-infective drugs use may have been caused by a positive impact of data issue from evidence in everyday life clinical practice. More data are needed to evaluate the impact of the knowledge transfer from evidence-base studies on prescription's trends during pregnancy.

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DISPROPORTIONALITY ANALYSIS FOR PHARMACOVIGILANCE OF MEDICAL DEVICE RELATED ADVERSE EVENTS REPORTED TO THE FDA. H J Duggirala, *N D Herz, D A Caños, R Sullivan, Richard SchAAF, E Pinnow, D Marinac-Dabic (Center for Devices and Radiological Health, Food and Drug Administration, Silver Spring, MD 20993)

Data mining has the potential to clarify the many complex interdependent factors (e.g., concomitant products and/or diseases) that can play a role in the development of adverse events. Traditional methods, such as manually reviewing individual reports, may not be able to detect these complex relationships. The application of computerized algorithms offers the opportunity to analyze these large databases in a timely and consistent manner. We explored the feasibility of using disproportionality analysis for early detection of a known lead fracture signal associated with the use of Sprint Fidelis leads. Using Multi-item Gamma Poisson Shrinker methodology, we analyzed the relative reporting rates of the top device problems by lead brand name. The EB05 score for inappropriate shock in Fidelis leads in March 2006, 9 months prior to FDA notification of the problem, was 47.6. This is almost six times the accepted safety threshold. The use of data mining suggests that the potential risk of the device could have been detected earlier had this methodology been used. This analysis would have generated signals for which further investigations and active surveillance could have been done. Disproportionality analysis is particularly suited for large, government, pharmacovigilance databases, and has been underutilized in medical device data thus far. This methodology has significant potential in the pharmacovigilance of medical devices and should be further explored.

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INCREASING USE OF CEPHALOSPORINS AND MACROLIDES FOR FIRST-LINE TREATMENT OF OTITIS MEDIA AMONG CHILDREN, 2005-2007. *L Sirkus, V Pate, and M A Brookhart (University of North Carolina, Chapel Hill, NC, 27599)

The American Academy of Pediatrics (AAP) recommends amoxicillin as the first-line antibiotic therapy for otitis media when therapy is indicated. We examined rates of adherence to the AAP guideline among a very large population of commercially insured children. Using MarketScan administrative claims data, we identified 2,564,081 children aged 3 months – < 18 years with an outpatient diagnosis of otitis media between 2005-2007. Diagnoses without another visit for otitis media in the previous 90 days were considered new illness episodes. Pharmacy claims within 7 days of diagnosis were searched for antibiotic prescriptions. We analyzed proportions of antibiotic use by class of antibiotic and year. Over the three year period, prescriptions for antibiotics to treat otitis media decreased from 62.1% to 51.8%. Macrolides and cephalosporins represented 34.3% of all antibiotic prescribing. Cephalosporin prescriptions increased by 9.7% and macrolide prescriptions increased by 4.0%. Although the practice of antibiotic prescribing appears to be decreasing, we document an increasing use of cephalosporins and macrolides for first-line treatment of otitis media. This practice may contribute to excess healthcare costs and could lead to the development and transmission of antibiotic-resistant infections.

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A POPULATION-LEVEL STUDY OF METHADONE MAINTENANCE TREATMENT WITHDRAWAL PATTERNS: WHAT IS PREDICTIVE OF SUCCESS? B Nosyk, E Evans, H Sun, D C Marsh, M D Anglin A H Anis (UCLA Integrated Substance Abuse Programs, Los Angeles, CA 90025)

Background: There is little empirical evidence to support clinical decision-making on the rate of methadone dose tapering to achieve abstinence from opioid dependence. We aimed to identify determinants of sustained success in methadone dose tapering in a population-level study in British Columbia (BC), Canada. Methods: Individuals prescribed methadone for opioid dependence in BC from 1996-2006 were identified in a provincial drug dispensation database. Completed treatment episodes were selected if the dose was decreasing over the episode's final 4 weeks. We defined a sustained successful taper as having a daily dose < 5mg per day in the final week and no treatment re-entry, opioid-related hospitalization or mortality within 18 months following episode completion. Generalized linear mixed regression with log link was used to identify determinants of sustained success. Results: From 32,656 treatment episodes, 4,917 met study inclusion criteria and 646 were sustained successful tapers. The odds of sustained success were independent of the week of taper initiation, but were lower with a median weekly decrease in dose greater than 4% (Odds Ratio:0.73; 95%CI:0.60,0.87). Those receiving higher maximum daily doses, indicative of higher levels of opioid use prior to treatment entry, had lower odds of sustained success in tapering. Conclusions: Sustained success following methadone dose tapering was facilitated by slower tapering than widely recommended (5% per week) in clinical guidelines.

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INCONSISTENT RESULTS FROM PHARMACOEPIDEMIOLOGIC STUDIES ON DROSPIRENONE-ASSOCIATED VENOUS THROMBOEMBOLISM: RANDOM INCONSISTENCY OR SYSTEMATIC DIFFERENCES? *B Gerstman (San Jose State University, San Jose, CA)

Most oral contraceptives in common use today are a combination of ethinyl estradiol and a variety of different synthetic progestins. Thromboembolism is a well-recognized adverse effect of combination oral contraceptive use. While most studies on hormonal contraceptive-associated thromboembolism point to a risk gradient associated with the estrogen dose of the formulation, differences associated with various types and doses of the progestin components remain unclear. This session will focus on controversies associated with oral contraceptive formulations that use the synthetic progestin drospirenone (DRSP). Studies on the issue have been completed by four independent research groups. Two studies have shown no difference in risk in DRSP-containing contraceptive users compared to levonorgestrel-containing formulation: Seeger et al. (*Obstet & Gynecol*, 2007;10:587-93) yielded an incidence rate ratio estimate of 0.9 (95% CI: 0.5-1.6), while Dinger et al. (*Contraception* 2007; 75: 344-54) yielded a hazard ratio estimate of 1.0 (95% CI: 0.6-1.8). Two other studies have yielded positive results: Lidegaard et al. (*BMJ* 2009;339:b2890) estimated a rate ratio of 1.64 (95% CI: 1.27-2.10), while van Hylckama Vlieg et al. (*BMJ* 2009;339:b2921) estimated an odds ratio of 1.7 (95% CI: 0.7 to 2.2). A precision-based test of heterogeneity of the effect measure produced a chi-square statistics of 5.55 with 3 df, $P = 0.136$. The summary relative risk based on all four studies using a fixed-effects model was 1.44 (95% CI 1.18-1.76). Using a random-effects model (DerSimonian-Laird), the summary relative risk was 1.33 (95% CI: 0.97-1.82). The presentation will also discuss systematic sources for differences in results, including differences in case ascertainment methods, methods to control confounding, study imprecision/power, prevalence of contributory factors, and control of time-dependencies associated with patterns of use.

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COMPARISON OF DRUG RISK FACTORS FOR INSTITUTIONALIZATION AND DEATH IN THE COMMUNITY-DWELLING ELDERLY POPULATION OF QUEBEC. *S G Beland, T Ducruet, C Tannenbaum, M Preville, Y Moride (Université de Montréal, Montreal, QC Canada)

In pharmacoepidemiology, disease scores derived from prescription drugs recorded in administrative health databases are frequently used to predict health outcomes and to control for confounding. Existing scores have not been developed specifically for the elderly population and considered only death as outcome. Hence they may not be adequate for studies conducted in this sub-population since institutionalization (IT) should also be considered as important outcome. Objective: To compare drug risk factors associated with IT and death in a community-dwelling elderly population. Methods: A nested case-control analysis was conducted in a cohort of 87 389 non-demented elderly identified through the health care databases of Quebec (RAMQ) (2000-2009). IT was identified through the location of service in the medical services database. Death was ascertained through absence of medical services and prescription drugs during a 3-month period. Drug exposure was ascertained through dispensing in a time window of 3 months prior to the event. Results: During the follow-up, 2180 subjects were institutionalized and 27 182 subjects died. Drugs significantly associated with both IT and death were: anticoagulants (Odds ratio (OR): 1.22/1.10), anti-diabetic drugs (OR: 1.25/1.19), antipsychotics (OR: 2.65/1.75) and urinary incontinence drugs (1.56/1.85). The following drugs were protective: antibiotics (OR: 0.13/0.28), statins (OR: 0.41/0.36) and diuretics (OR: 0.52/0.97). Associations differ for IT and death for benzodiazepines, antidepressants and osteoporosis drugs. Conclusion: For some drugs, associations with IT and death differ. From these results, it is apparent that two distinct prediction scores should be developed.

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STATINS AND RISK OF ACUTE MYOCARDIAL INFARCTION IN PATIENTS WITH RHEUMATOID ARTHRITIS: A POPULATION-BASED STUDY. *M A De Vera, D Lacaille, M Abrahamowicz, J Kopec, H Choi (University of Montreal/CHU, Montreal, QC, Canada)

Given their lipid lowering and anti-inflammatory properties, statins are postulated to have dual cardioprotective and anti-inflammatory benefits in rheumatoid arthritis (RA). Yet data on statin effectiveness on clinical cardiovascular endpoints among RA patients are lacking. Thus, our objective was to quantify the impact of statin initiation on risk of acute myocardial infarction (AMI) in RA patients. We conducted a longitudinal study of statin initiators and non-initiators in a population-based cohort of RA patients followed from May 1996 to March 2006 using data from the British Columbia Ministry of Health. Non-fatal and fatal AMI outcomes were ascertained using hospitalization and Vital Statistics data. We applied propensity score methods to adjust for differences between statin initiators and non-initiators, and used Cox's proportional hazards models to evaluate the association between statin initiation and risk of AMI. The final propensity score model yielded a c-statistic of 0.87, and matching on propensity score resulted in a cohort of 3,104 statin initiators and 3,104 individually matched non-initiators. During 15,271 person-years of follow-up in the propensity-score matched cohort, we identified 261 AMI events (incidence rates, 1.5 and 2.1 per 100 person-years in initiators and non-initiators, respectively). After adjusting for confounding by indication, the hazard ratio (HR) for AMI for statin initiators compared to non-initiators was 0.69 (95% CI, 0.54-0.90). Additional adjustments including the propensity score (HR, 0.68; 95% CI, 0.53-0.88) or unbalanced covariates (HR, 0.68; 95% CI, 0.52-0.88) did not materially change results. These population-based data indicate that statin use among RA patients is associated with a 31% lower risk of AMI. Findings provide evidence for a postulated cardioprotective role of statins in patients with RA.

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UTILIZATION OF ATOMOXETINE AND OTHER PHARMACOTHERAPY IN YOUTHS WITH ATTENTION DEFICIT/HYPERACTIVITY DISORDER IN MEDICAID PATIENTS IN 29 US STATES. *S Linden, C Knox and A Winterstein (University of Florida, Gainesville, FL 32610)

In 2005, the FDA mandated a block box warning for atomoxetine (Strattera®) for an increased risk of suicidal ideation in children and adolescents treated for attention-deficit/hyperactivity disorder (ADHD). Antidepressants and antiepileptic drugs (AEDs) are also associated with a possible increased risk of suicide and suicide ideation. In addition, Antidepressants and AEDs are more prevalent among patients diagnosed with ADHD. This study aimed to describe the utilization of atomoxetine before and after the added black box warning in comparison to Central Nervous System (CNS) stimulants to treat ADHD and assess the distribution of other known risk factors for suicide and suicidal ideation. This cross-sectional and longitudinal study analyzed data of a cohort of Center of Medicare and Medicaid Services (CMS) beneficiaries from 29 states. ADHD drug use was analyzed stratified by atomoxetine and CNS stimulants. The analyses describe overall prescriptions filled for ADHD treatment over five years between 2002 and 2006. Inclusion criteria were Medicaid eligibility, at least one diagnosis of ADHD, recurrence of an ADHD diagnosis at least every 12 month, at least 5 years old and less than 18 years. ADHD diagnosis was determined by the International Classification of Diseases, Ninth Revision (ICD-9), clinical modification (CM) and drug utilization was determined by National Drug Code (NDC). A new-user design was used with at least six month of continuous Medicaid eligibility prior to the first ADHD diagnosis. The overall utilization of pharmacotherapy increases constantly about three percent per year. In contrast, atomoxetine utilization increased from 2002 to a peak utilization in 2005 before the utilization dropped significantly in 2006 after the labeling change.

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MATERNAL PREDICTORS OF PRETERM BIRTH: AN ANALYSIS OF US BIRTH DATA. *E Eworuke, J AC Delaney (University of Florida, Gainesville, Florida FL 32610)

Previous studies have shown that demographic factors offer modest predictive ability for preterm births. Development of better predictive models using birth certificate data and assessment of these models in different clinical preterm birth categories has been proposed. To develop a more accurate predictive model and to assess predictive ability across the clinical preterm birth categories, spontaneous ($n = 942656$) and premature rupture of membrane (PROM) ($n = 31335$) births were identified in 2004 United States birth certificate data for 40 states. Prematurity was defined as less than 37 weeks in both cohorts. A parsimonious logistic model was developed in the spontaneous cohort and applied to the PROM cohort. Age, marital status, race, education and county population as covariates in the model yielded area under curve (AUC) results (0.588; 95% confidence interval [CI]: 0.586-0.589) that were comparable to Courtney et. al (2008) (0.605). Eight (alcohol and tobacco use, prenatal care utilization, chronic and gestational hypertension, plurality, weight gain, previous preterm birth) additional variables increased AUC to 0.788; 95% CI: 0.787-0.789 (spontaneous) and 0.806; 95% CI: 0.804-0.809 (PROM). Modest sensitivity (22.20%) was achieved at a cut-off point of 0.8-1.0 in the PROM with a positive predictive value of 88.80%. Improvement in AUC suggests that modifiable factors obtained from birth certificates may permit prediction with reasonable PPVs. Predictive ability varied by clinical category suggesting that additional risk factors may be involved.

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THE ASSOCIATION BETWEEN RELATIONSHIP DYNAMICS AND CONTRACEPTIVE METHOD TYPE. L Huber, T Alkhazraji (University of North Carolina, Charlotte, NC 28223)

Annually, 3 million pregnancies in the US are classified as unintended with many occurring to women who use some type of contraceptive. Current research on contraceptive use has underscored the importance of investigating relationship dynamics. The objective of this study was to examine how these dynamics influence the type of contraceptive method used. Women were invited to complete a short, self-administered survey while waiting for clinic appointments in 2009. Complete information on key variables was available for 220 women. Logistic regression was used to obtain odds ratios (ORs) and 95% confidence intervals (CIs) to model the association between relationship dynamics (i.e. support, happiness, and communication) and contraceptive method type (i.e. non-coital dependent vs. coital dependent). Women who reported having very supportive partners or being very happy in their relationships had increased odds of using non-coital dependent methods after adjustment for smoking (OR = 1.35; 95% CI: 0.71-2.58 and OR = 1.17; 95% CI: 0.63-2.18, respectively). After adjustment for smoking, women who indicated that they frequently communicated with their partners about issues that mattered to them had decreased odds of using non-coital dependent methods (OR = 0.80; 95% CI: 0.43-1.49). While the findings of this small, exploratory study were not statistically significant, further investigation of the relationship dynamics-contraceptive method type association are warranted. If these dynamics are found to impact the type of contraceptive a woman chooses to use, health-care professionals may be able to use this information to provide tailored reproductive counseling. By doing so, the consistent use of effective contraceptive methods may improve and lead to a decrease in unintended pregnancies.

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ENVIRONMENTAL CORRELATES OF LOW BIRTH WEIGHT RACIAL/ETHNIC DISPARITIES IN CALIFORNIA. *C Mair, P Gruenewald (University of California Berkeley, Berkeley CA 94704)

Rates of low birth weight (LBW) births among African American mothers are 6 times greater than among Hispanic or white mothers, significantly contributing to health disparities in the United States. Individual-level risk factors, such as substance use and maternal health status, only partially explain racial/ethnic and geographic LBW disparities. A large presence of alcohol outlets in neighborhoods may make alcohol more accessible to pregnant women or may lead to harmful environments marked by characteristics such as high crime rates and concentrated poverty. No studies to date have assessed associations between LBW and environmental predictors over space and time within racial/ethnic groups. We use data from 1600+ zip codes across the entire state of California from 1999-2008 to evaluate specific contributions of neighborhood social and economic conditions to LBW disparities. We examine associations between LBW and environmental characteristics such as alcohol outlets, crime rates and concentrated poverty. Recently-developed Bayesian space-time models controlling for spatial misalignment allow us to use zip code data for longitudinal analysis despite frequent changes in these geographic units while accounting for spatial autocorrelation in LBW. We find that LBW disparities vary by zip code and across years in California. Indicators of drug markets and density of alcohol outlets are associated with LBW. The strength of these associations, and the specific predictors of LBW, vary between African American, Hispanic and white mothers. This analysis furthers the development of theories explaining racial/ethnic LBW birth disparities and aids in the identification of specific zip codes with disproportionately high LBW disparities.

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IN UTERO EXPOSURE TO MATERNAL TOBACCO SMOKE AND SUBSEQUENT METABOLIC SYNDROME-RELATED OUTCOMES AMONG WOMEN IN THE MOBA COHORT. *L A Cupul-Uicab, R Skjaerven, K Haug, M P Longnecker (Epidemiology Branch, National Institute of Environmental Health Sciences, NIH/DHHS/USA, Research Triangle Park, NC 27709)

Children exposed to tobacco smoke in utero have an increased risk of developing a metabolic syndrome-type profile; whether the increased risk holds during adulthood remains unclear. The authors evaluated the association of in utero exposure to tobacco smoke with subsequent obesity (body mass index [BMI] ≥ 30 kg/m²), hypertension, type-2 (T2DM), and gestational diabetes mellitus (GDM) in adult women from the Norwegian Mother and Child Cohort Study (MoBa), which enrolled pregnant women in Norway from 1999-2008. Information on in utero exposure to tobacco smoke (yes vs. no), demographics, and other factors were obtained by a self-completed questionnaire at enrollment. The outcomes were ascertained from the Norwegian Medical Birth Registry and the questionnaire. 74,023 women had complete data for logistic models. After adjusting for age, education, and smoking, the odds ratio (OR) for obesity was 1.53 (95% confidence interval [CI], 1.45-1.61) among women exposed to in utero tobacco smoke compared with non-exposed. After adjusting for age, education, smoking, and BMI, the OR for hypertension was 1.68 (CI, 1.19-2.39), for T2DM was 1.14 (CI, 0.79-1.65), and for GDM was 1.28 (CI, 1.07-1.53) among exposed women compared to non-exposed. The adjusted OR for in utero exposure to tobacco smoke and obesity among women who did not smoke as adults was 1.75 (CI, 1.64-1.87). Although unmeasured confounding is a possible explanation for the associations identified in this and other studies, our data provide support for an association between in utero exposure to tobacco smoke and metabolic syndrome-related outcomes in adult offspring.

MATERNAL AGE AND THE RISK FOR BIRTH DEFECTS OF UNKNOWN ETIOLOGY: A POPULATION-BASED STUDY, 1997–2005. *S Gill, C Broussard, O Devine, R Fisk Green, S Rasmussen, J Reefhuis (Centers for Disease Control and Prevention, Atlanta, GA 30333)

Birth defects affect 3% of births in the United States and are one of the leading causes of infant mortality. Both younger (< 20 years) and older (\geq 35 years) maternal age, representing 10.2% and 14.3% of annual live births, respectively, may pose increased risks for certain birth defects. To assess the association between maternal age at delivery and the risk for birth defects of unknown etiology, data were obtained from the National Birth Defects Prevention Study, a case-control study of risk factors for major birth defects involving standardized telephone interviews with mothers across 10 states. Age was stratified into 6 categories: < 20, 20-24, 25-29, 30-34, 35-39, and \geq 40 years. Participants were excluded if there was illicit drug use, diabetes, or use of assisted reproductive technology or clomiphene citrate. Odds ratios (OR) and 95% confidence intervals (CI) were estimated for birth defects with at least 3 birth defect cases per age category. The 25-29 year group was the referent. For maternal age < 20 years, associations with amniotic band sequence (OR: 3.2; CI: 2.0-4.9), colonic atresia/stenosis (OR: 7.1; CI: 2.5-25.5) and gastroschisis (OR: 7.1; CI: 5.5-9.1) were observed. For the \geq 40 age group, associations with any heart defect (OR: 1.5; CI: 1.2-2.0), craniosynostosis (OR: 2.2; CI: 1.4-3.4), encephalocele (OR: 2.8; CI: 1.0-6.4), omphalocele (OR: 3.0; CI: 1.3-5.9), and hypospadias (OR: 2.1; CI: 1.3-3.2) were observed. Younger and older maternal ages are associated with certain birth defects. Elucidating risk factors unique to women at either extreme of maternal age may offer prevention opportunities for specific birth defects.

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LIMITED PRENATAL CARE AND INCREASED RISK OF POOR BREASTFEEDING OUTCOMES. *K Chaput, H Kehler, S McDonald, S Tough (University of Calgary, Calgary, AB, Canada)

Women who do not receive regular prenatal care may have increased risk of poor outcomes, including breastfeeding. Factors such as socioeconomic status and sub-optimal mental health may add to the risk of poor outcomes. Does limited prenatal care lead to decreased odds of initiating and/or an increased risk of early cessation of breastfeeding? A cohort of 1578 mother-infant pairs was recruited in Calgary from 05/2008 to 02/2010. Questionnaires were administered during early and late pregnancy and 4 months postpartum. Associations between limited prenatal care and breastfeeding outcomes were analyzed using multivariable logistic regression, and assessed for confounding and modification by poor mental health. Limited prenatal care was defined as no prenatal care or prenatal care only from walk-in clinics. Breastfeeding outcomes were initiation and continuation at 4 months postpartum. A positive screen for depression and/or anxiety on either or both antenatal surveys constituted poor mental health. Breastfeeding was initiated by 98% of women. At 4 months postpartum 17% had stopped breastfeeding. Limited prenatal care was reported by 11% of women. Among those with limited prenatal care, those with poor mental health had significantly higher odds of never breastfeeding (OR: 4.0, $p = 0.02$) whereas those with limited prenatal care who did not have poor mental health were as likely to initiate breastfeeding as those who received adequate prenatal care (OR: 1.01, $p = 0.99$). Women who get limited prenatal care are a vulnerable group and poor mental health exacerbates the risk of poor breastfeeding outcomes. Screening processes and mental health support for women with poor prenatal care at delivery or in walk-in practices are necessary to improve breastfeeding outcomes.

EPIDEMIOLOGY OF CHOANAL ATRESIA: THE NATIONAL BIRTH DEFECTS PREVENTION STUDY. *V Kancherla, P A Romitti, T L Burns, J C Carey, A M Siega-Riz, C M Druschel, A Lin, L Sun, and the National Birth Defects Prevention Study (NBDPS). (University of Iowa, Iowa City, IA 52242)

Choanal atresia (CA) is a birth defect characterized by an occlusion in the posterior nasal passage. CA is the leading cause of nasal surgery in newborns, but its etiology is unknown. NBDPS data were used to examine associations between selected maternal exposures and CA in their offspring. Ninety case and 6703 control mothers with deliveries from 1997-2005 provided telephone interview reports of selected pre-pregnancy (one year prior to conception) and periconceptional (one month prior through three months after conception) exposures. Potential confounders were examined and adjusted odds ratios (aORs) and 95% confidence intervals (CIs) were estimated. For all CA cases combined, the odds of CA associated with maternal pre-pregnancy intake in the highest quartile ($>$ 75th percentile) relative to intake in the intermediate quartiles (26-75th percentile) were significantly elevated for zinc (aOR = 2.1; 95%CI = 1.2,3.9) and vitamin B-12 (aOR = 2.4; 95%CI = 1.4,4.3); odds were also elevated for periconceptional use relative to no use of anti-infective urinary tract medications (aOR = 3.3; 95%CI = 1.3,8.4). For isolated CA cases (without additional major defects), elevated odds were found for maternal pre-pregnancy intake of \geq 3 cups of coffee per day (aOR = 2.9; 95%CI = 1.3,6.4) and periconceptional passive smoking (aOR = 2.3; 95%CI = 1.0,5.3) relative to no exposures, but reduced odds were found for pre-pregnancy intake in the lowest quartile (\leq 25th percentile) for pantothenic acid (aOR = 0.4; 95%CI = 0.2,0.9) and vitamin A (aOR = 0.3; 95%CI = 0.1,0.8) relative to intake in the intermediate quartiles. Associations identified between maternal health behaviors and CA need to be further investigated.

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THE CHANGING EPIDEMIOLOGY OF PRETERM TWINS AND TRIPLETS IN CANADA, 2003-2008. *K L Bassil, P S Shah, K J Barrington, A Harrison, O P Da Silva, S K Lee and the Canadian Neonatal Network (University of Toronto, Toronto, ON, Canada M5G 1X6)

The overall rate of multiple births is gradually increasing, however, recent evidence suggests that the trends differ for twins and triplets. More than half of twins and almost all triplets are preterm, increasing their risk of major morbidity and death. Temporal trends in the rates of twins and triplets were assessed for infants with gestational age (GA) < 33 weeks who were admitted to participating neonatal intensive care units (NICUs) in the Canadian Neonatal Network between 2003 and 2008. Neonatal outcomes were evaluated using logistic regression. Overall, the proportion of twin births increased from 26.1 to 28.0 per 100 admissions between 2003 and 2008 (7% increase, $p = 0.02$). In contrast, the proportion of triplet births decreased from 5.0 to 3.3 per 100 admissions (34% reduction, $p = 0.04$). When evaluated by maternal age group (< 25, 25-34 and \geq 35 years) these trends were significant in mothers \geq 35 years of age. Neonatal outcomes improved for preterm twins (mortality, survival without any major morbidity, severe neurological injury, severe retinopathy of prematurity, chronic lung disease; p -values for all < 0.01). Similar improvements were observed for triplets, but the sample size was insufficient to reach statistical significance. There has been an increase in the rate of admission of preterm twins of < 33 weeks gestational age to Canadian NICUs, and a striking decrease in the rate of admission of preterm triplets, between 2003 and 2008. These trends have occurred in mothers \geq 35 years of age, suggesting a possible role of changing practices of assisted reproductive technologies and fetal reduction. Neonatal outcomes improved significantly for preterm twins during this time period.

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CENTRAL ADIPOSITY AND OTHER ANTHROPOMETRIC FACTORS IN RELATION TO RISK OF MACROSOMIA IN U.S. BLACK WOMEN. *S Li, L Rosenberg, J R Palmer, G S Phillips, L J Heffner, L A Wise (Slone Epidemiology Center, Boston, MA 02215)

Previous studies have consistently identified maternal obesity and gestational weight gain as risk factors for macrosomia or large-for-gestational-age birth, but little is known about the effects of central adiposity and body fat distribution. We assessed the association between prepregnancy adiposity (both central and overall) and risk of macrosomia in a large cohort of African-American women in the United States. Using self-reported data from the Black Women's Health Study (BWHS), we examined the risk of macrosomia in relation to prepregnancy waist circumference, prepregnancy waist-to-hip ratio, prepregnancy BMI, and gestational weight gain. BWHS participants ages 21 to 44 years reported 6,687 full-term singleton births (gestational age > 37 weeks) during 1995–2003. We compared mothers of 691 infants weighing ≥ 4000 g with mothers of 5,996 infants weighing < 4000g. Generalized estimating equation models accounting for more than one birth per mother were used to estimate multivariable odds ratios (OR) and 95% confidence intervals (CI). Risk of macrosomia was associated with large waist circumference (OR = 1.58 [1.07-2.32], ≥ 35.0 inches relative to < 27.0 inches) even after control for BMI. Macrosomia risk was also associated with high BMI (OR = 1.74 [1.25-2.41], for BMI ≥ 35.0 vs. 18.5-24.9 kg/m²). In addition, risk of macrosomia was associated with gestational weight gain above the amount recommended by the Institute of Medicine and the association was present in each category of BMI. Our data suggest that prepregnancy obesity (both central and overall) and gestational weight gain are independent risk factors for macrosomia among African-American women.

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RELATIONSHIP OF SELECTED BACTERIAL VAGINOSIS (BV)-ASSOCIATED BACTERIA TO BV POSITIVITY AMONG URBAN WOMEN EARLY IN PREGNANCY. *D B Nelson, E Komaroff, I Nachamkin, L Dibble, V Armendariz, C Liu, D Fredricks. (Temple University, Philadelphia, PA 19112)

Reports link Bacterial Vaginosis (BV) to spontaneous preterm birth (SPTB); however, many BV positive pregnant women deliver at term thus interest has focused on the assessment of specific BV-associated vaginal bacteria. We examined the prevalence and level of eight BV-associated bacteria among pregnant women to determine the relationship between bacterial levels and BV. 139 pregnant women with documented singleton pregnancies less than 16 weeks gestation and contributing vaginal swabs were included. One swab was used for qPCR assays to measure: *Leptotrichia/Sneathia* spp., *Megasphaera*-like spp., *Gardnerella vaginalis*, *Mobiluncus* spp., *Atopobium* spp. and Bacterial Vaginosis-Associated Bacterium (BVAB) 1, 2 and 3. The second swab identified BV by Gram stain using Nugent criteria. 72% of women had BV, and 17% had intermediate flora. Among BV positive women, the vast majority had detectable levels of *Atopobium* spp. (95%) and *Gardnerella vaginalis* (96%) with only 27% of BV negative women with detectable levels of *Megasphaera*-like spp. Mean/median levels of *Gardnerella vaginalis* (7.59/8.02 vs. 4.77/4.51; $p < 0.001$) and *Atopobium* spp. (6.89/7.36 vs. 3.34/2.69; $p < 0.001$) were significantly higher among BV positive women. *Atopobium* spp. and *Gardnerella* were highly correlated with each other (Spearman correlation coefficient = 0.839, $p < 0.001$) and *Megasphaera*-like species were most correlated with Nugent score (Spearman correlation coefficient = 0.699; $p < 0.001$). Individual receiver operator characteristic curves were created and levels of *Megasphaera*-like spp. continued to be highly predictive of BV (area under the curve (AUC) = 0.814; p -value < 0.001) with BVAB1 levels also predictive (AUC = 0.907; p -value < 0.001). These findings highlight several novel BV-associated bacteria which should be studied to assess their role in adverse reproductive health outcomes, including SPTB.

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EFFECT OF REPRODUCTIVE HISTORY ON SYMPTOMS OF MENOPAUSE. *D B Nelson, MD Sammel, F Patterson, H Lin, C R Gracia, E W Freeman (Temple University, Philadelphia PA 19112)

The aim of this analysis was to examine the relationship between prior reproductive history and the occurrence of menopausal symptoms. A cohort of premenopausal women were recruited in Philadelphia, PA and followed for 14 years. 291 premenopausal women meeting study eligibility criteria and contributing reproductive health history and infertility information completed ongoing assessments of the occurrence and severity of several menopausal symptoms. Reproductive history included the number of pregnancies, live births, preterm deliveries and miscarriages. Trying to get pregnant for more than one year was used to create an infertility index. The occurrence of severe hot flashes, vaginal dryness or decreased libido were evaluated. Women scoring positive on the infertility index were significantly more likely to report severe decreased libido, Odds Ratio (OR) = 1.86, 95% Confidence Interval (CI): 1.05-3.31, and were over twice as likely to report severe vaginal dryness (OR = 2.79, 95% CI: 1.19-6.94) in the multivariable models. None of the other reproductive history indices were related to report of severe hot flashes, vaginal dryness or decreased libido. The race-specific models continued to find a significant, increased risk of severe vaginal dryness (OR = 2.79, 95% CI: 1.22-6.36) and decreased libido (OR = 1.87, 95% CI: 1.04-3.34) among Caucasian women scoring positive on the infertility index; however the relationship did not remain significant among African-American women. In conclusion, severe vaginal dryness and decreased libido are common and important considerations of the menopausal transition and the experience of infertility may influence the report of severe vaginal dryness and decreased libido particularly among Caucasian women.

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SECULAR TRENDS IN TRIAL OF LABOR AND ASSOCIATED NEONATAL MORTALITY AND MORBIDITY IN THE UNITED STATES, 1995-2002. *S W Wen, Y Guo, R-h Xie, J Dy, M Walker (Ottawa Hospital Research Institute, Ottawa, ON Canada K1H 8L6)

An increasing proportion of elective repeated cesarean sections were performed where a trial of labor in a uterus with a previous scar was not attempted. This study aimed to assess how reduced use of trial of labor has impacted on neonatal outcomes. Pregnant women with one previous cesarean delivery and a singleton live birth of the index pregnancy were abstracted from the 1995-2002 birth registration data of the United States. Adjusted odds ratios for adverse neonatal outcomes of trial of labor were estimated by multiple logistic regression models, in overall study subjects and in the two periods with high and low rates of trial of labor. A total of 1,833,407 eligible subjects were included in the analysis. Rate of trial of labor after one previous cesarean section dropped from 38.5% in 1995 to 15.0% in 2002. A trial of labor after one cesarean section was associated with increased risks of adverse neonatal outcomes, and this risk was even more pronounced in low risk women and in the most recent study years. We concluded that the reduced use of trial of labor after one cesarean delivery in recent years has actually resulted in increased risk of adverse neonatal outcomes associated with a trial of labor.

THE ASSOCIATION OF MILD, MODERATE, AND BINGE PRENATAL ALCOHOL USE AND CHILD NEUROPSYCHOLOGICAL OUTCOMES: A META-ANALYSIS. *A L Flak, S Su, J Bertrand, C H Denny, U S Kesmodel, M E Cogswell (Centers for Disease Control and Prevention, Atlanta, GA)

The associations between light, moderate, and binge prenatal alcohol exposure and child neuropsychological outcomes are unclear. Given recent estimates that in the United States 54% of women of child-bearing age consume alcohol and 49% of pregnancies are unintended, this knowledge has the potential for substantial public health impact. We conducted a systematic review and meta-analysis to evaluate evidence for an association between mild, moderate, and binge prenatal alcohol exposure and child neuropsychological outcomes. From 1,312 articles identified through systematic searches in Medline, EMBASE, and PsycINFO we identified 29 articles that met our inclusion criteria and included cohort data on at least one of seven domains: academic performance, attention, behavior, cognition, language development, memory, and motor skills. We completed sensitivity analyses based on study quality and assessed publication bias. A random effects meta-analysis on data from six studies (N = 8,258) suggests prenatal binge exposure is associated with lower child cognition scores (Cohen's D = 0.18, p < 0.01). These studies showed no evidence of between-study heterogeneity ($I^2 = 0\%$) or publication bias (Egger's Test p = 0.33). The association remained after controlling for data quality, but may be due to chance. We did not find any significant associations between mild or moderate prenatal alcohol exposure and child neuropsychological outcomes. Variations in child ages and exposure timing may have masked true associations. Education on alcohol should highlight the potential risks of drinking during pregnancy, particularly binge drinking.

MATERNAL PERICONCEPTIONAL EXPOSURE TO CIGARETTE SMOKING AND LIMB DEFICIENCIES. *K M Caspers, P A Romitti, L Bayman, S Lin, R Olney, M M Werler, L B Holmes, and the National Birth Defects Prevention Study (NBDPS) (The University of Iowa, Iowa City, IA 52242)

Limb deficiencies (LDs) are characterized by failure of a portion or an entire limb to develop during organogenesis or as a result of vascular disruption. Several prenatal exposures have been examined as risk factors for LDs; however, current knowledge on cigarette smoking is inconclusive. Data from the NBDPS were used to examine associations between LDs and maternal interview reports of periconceptional exposure (one month prior through three months of pregnancy) to smoking for 718 LD and 6703 unaffected control infants born from 1997-2005. Adjusted odds ratios (aORs) and 95% confidence intervals (CIs) were calculated for any LD and subtypes. Covariates included infant sex and gestational age, maternal race and education, any alcohol exposure, multivitamin and vitamin A intake, folic acid intake, vasoactive drug use, gravidity, and chorionic villus sampling. aORs were elevated for any active or passive smoking and preaxial LDs (n = 164, aOR = 1.5, CI = 1.0, 2.1); active smoking only and intercalary (n = 40, aOR = 2.5, CI = 1.2, 4.9) and amelia (n = 15, aOR = 3.5, CI = 1.2, 10.4) LDs; passive smoking exposure at home only and preaxial (n = 164, aOR = 2.0, CI = 1.3, 3.0), intercalary (n = 40, aOR = 3.7, 1.8, 7.4), and amelia (n = 15, aOR = 3.7, CI = 1.1, 12.3) LDs; and for passive exposure at work only and amelia (n = 15, aOR = 3.3, CI = 1.1, 10.4). Examination of combined exposure to active+passive smoking produced elevated odds for preaxial (n = 164, aOR = 1.7, CI = 1.1, 2.8), intercalary (n = 40, aOR = 3.5, CI = 1.6, 7.3), and amelia (n = 15, aOR = 5.3, CI = 1.5, 19.2) LDs. Maternal exposure to active or passive smoking may increase risk of specific LD subtypes, although replication of these findings is needed.

* = Presenter; S = The work was completed while the presenter was a student

PRECONCEPTION CARDIOVASCULAR RISK FACTORS AND PREGNANCY OUTCOME. *E W Harville, J S A Viikari, O T Raitakari (Tulane University, New Orleans, LA, 70112)

Pregnancy-related cardiovascular conditions such as gestational hypertension and diabetes are associated with both poorer pregnancy outcomes and cardiovascular disease later in life. Little is known about the effect of preconception cardiovascular risk on pregnancy. Data from the Cardiovascular Risk in Young Finns Study were linked with birth registry data for 1292 women. Age-standardized levels of total cholesterol, high-density lipoprotein cholesterol (HDL-c), low-density lipoprotein cholesterol (LDL-c), triglycerides, blood pressure, insulin, and glucose from the study visit prior to pregnancy were examined as predictors of gestational age, birthweight, gestational hypertension (GH), pre-eclampsia (PE), and gestational diabetes (GDM), using linear and logistic regression with adjustment for age, body mass index, smoking, socioeconomic status, and parity. The number of risk factors above the 90th percentile was summed, and logistic models used to predict preterm birth and low birthweight. Total cholesterol was associated with PE (adjusted odds ratio 1.86, 95% confidence interval 1.00-3.46) and GDM (aOR 1.51, 95% CI 0.93-2.47), as were triglycerides (aOR for PE 1.84, 95% CI 1.23-2.75; for GDM, 1.78, 1.22-2.56). After removal of those with pregnancy complications, the associations between lipids and gestational age and birthweight were attenuated, while those between blood pressure and these outcomes remained. Women who score high on the summary variable were more likely to give birth preterm (aOR 3.4, 95% CI, 1.2-9.5). Preconception lipids predict pre-eclampsia, which partially accounts for the relationship between these factors and gestational age. Preconception blood pressure independently predicts gestational age and birthweight.

PSYCHOSOCIAL STRESS IN PREGNANCY AND RISK OF ABNORMAL GLUCOSE TOLERANCE IN HISPANIC WOMEN. *M Silveira, P Pekow, G Markenson, L Chasan-Taber (University of Massachusetts, Amherst, MA, 01003)

Prior studies are sparse but suggest a positive association between psychosocial stress and type 2 diabetes. However, the association between stress and glucose disturbances during pregnancy has not been evaluated. We evaluated this relationship among 1,936 Hispanic prenatal care patients (predominantly Puerto Rican) in the Latina GDM Study (2000-2003; n = 1006) and Proyecto Buena Salud (2004-2010; n = 930), two prospective cohort studies conducted in Massachusetts. Cohen's Perceived Stress Scale (PSS-4) was administered in early (mean = 14 wks gestation) and mid (mean = 26 wks gestation) pregnancy. Abnormal glucose tolerance (AGT) was defined as a positive screen (> 135 mg/dl) on the 1-hr oral glucose tolerance test. Mean (SD) perceived stress scores were 6.1(3.2) for early pregnancy and 5.7(3.1) for mid pregnancy (range 0-16). A total of 214 (11%) of women were diagnosed with AGT. Increasing age (Odds Ratio (OR) = 5.2, 95% Confidence Interval (CI) 2.8-9.4 for > 35 vs. < 24 yrs; p-trend < .0001), education (OR = 2.0, 95% CI 1.4-3.0 for post high school vs < high school; p-trend = 0.001), and body mass index (BMI) (OR = 2.6, 95% CI 1.8-3.7 for obese vs. normal; p-trend < .0001) were positively associated with AGT risk. In unadjusted analyses, women in the highest quartile of stress during mid pregnancy were not at significantly increased risk for AGT as compared to women in the lowest quartile (OR = 1.4, 95% CI 0.8-2.3). However, the association was strengthened after adjusting for age and BMI (OR = 1.6, 95% CI 0.96-2.8). There was no association between early pregnancy stress and AGT (OR = 1.0, 95% CI 0.6-1.7). In this high risk cohort of pregnant Hispanic women, psychosocial stress in pregnancy was not significantly associated with AGT.

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PATHWAYS FOR WOMEN'S INFORMATION LEVELS REGARDING PRENATAL AND POSTNATAL HEALTH AND POSTPARTUM DEPRESSION. *S Youash, M K Campbell, W R Avison, D Penava, B Xie (The University of Western Ontario, London, ON, Canada N6A5C1)

It has been established that some health education needs of women during the perinatal period are unmet, and information-seeking is a common behaviour during this time. Seeking healthcare information can increase an individual's health knowledge and improve self-care capabilities. Despite recognition that information may influence health behaviours, there is limited research on the explicit relationship between informational support and the development of postpartum depression (PPD). Data for primiparous and multiparous subjects was analyzed from the 2006 Maternity Experiences Survey developed by Statistics Canada and the Public Health Agency of Canada. The first objective examines pathways of women's pre- and postnatal health information. The second objective assesses the influence of information levels on PPD development and its associated predictors. A Multiple Indicators Multiple Causes model was designed for each sample with the Edinburgh Postnatal Depression Scale (EPDS) as the outcome measure. For primiparous subjects, the model exhibited a moderate fit (Root-Mean-Square Error of Approximation [RMSEA] < 0.1) while the multiparous model fits less adequately. Income and perceived level of prenatal and postnatal social support were significant predictors of information levels for both samples ($p < 0.0001$ for all). Increased information levels on 'postnatal concerns', 'negative feelings' and 'labour/birth experience' topics were significantly associated with a decrease in EPDS scores for the primiparous sample while increased information levels on 'medical concerns' and 'negative feelings' topics were significantly associated with a decrease in EPDS scores for the multiparous sample ($p < 0.0001$ for all)

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EDUCATIONAL INEQUALITIES IN SMALL FOR GESTATIONAL AGE BIRTH, QUÉBEC, 1981-2007: INFLUENCE OF OUTCOME MISCLASSIFICATION. N Auger, *A Park, F Roncarolo, S Harper, and R Platt (Institut national de santé publique du Québec, Montréal, QC, Canada H2P 1E2)

Education is a determinant of small-for-gestational-age (SGA) birth, but studies are limited by misclassification of SGA birth at preterm gestational ages (< 37 weeks), because SGA reference percentiles are based on the population of born infants and not all fetuses-at-risk. We sought to evaluate how various corrections for misclassification of preterm SGA status influence relative and absolute educational inequalities in SGA over time. We analyzed 2,204,056 singleton live births from 25-43 completed gestational weeks for five periods (1981-1986, 1987-1991, 1992-1996, 1997-2001, 2002-2007). We estimated relative risks, prevalence percentage differences, and 95% confidence intervals for the relationship between maternal education and four corrected SGA indicators, adjusted for maternal age, marital status, birthplace, language at home, parity, and sex. We calculated Relative Indexes of Inequality (RII) and the Slope Indexes of Inequality (SII) to describe relative and absolute differences, respectively, between the most and least educated mothers. SGA decreased over time and was more common in less educated mothers. Education was more strongly associated with SGA among preterm than term births. Correction for preterm SGA misclassification led to lower RIIs and higher SIIs in all study periods. Relative and absolute inequalities for term SGA and corrected preterm SGA persisted over time. In summary, educational inequalities are influenced by misclassification of preterm SGA, though overall patterns indicate that inequalities persist over time even without correction. Correction for misclassification should be considered when evaluating risk factors for SGA.

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BETAINE LEVELS FROM DIETARY INTAKE IN PRE-MARRIAGE YOUNG COUPLES IN A REMOTE AREA IN CHINA. *Hn Xie, Y Wu, R Xie, S W Wen, M Walker (OMNI Research Group, Department of Obstetrics & Gynecology, University of Ottawa, Faculty of Medicine, Ottawa, Canada, K1H 8L6)

Objective: To examine betaine levels from dietary intake in pre-marriage young couples in a remote area in China. Methods: This study was carried out in Tongdao, Hunan, China from October 2009 to February 2010. Young couples who were taking pre-marriage medical examination and plan to have a baby soon (within 6 months). Demography data were collected, and a food-frequency questionnaire (FFQ) was used to assess betaine levels from dietary intake. Comparison betaine levels from dietary intake among different demography were performed by analysis of ANOVA. We used multiple linear regression and adjusted for age, education, income, occupation, BMI, chronic diseases, supplementations and smoking to identify determinants of dietary betaine intake in pre-marriage couples. Results: A total of 648 subjects (324 young couples) were included in the final analysis. Daily betaine intake was 109 ± 23 mg/d in female and 111 ± 26 mg/d in male. Determinants of dietary betaine intake was education and income ($P < 0.001$). This study showed that participants who were higher educational level and wealthier consumed more higher betaine intake. Conclusions: The betaine levels from dietary intake in our study sample were much lower than other studies. Its levels are increased with the education and income levels.

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PREGNANCY AND STDs IN THE ADOLESCENT OFFSPRING OF TEENAGE MOTHERS. *N De Genna and M Cornelius (University of Pittsburgh, Pittsburgh, PA 15213)

Offspring of teenage mothers are more likely to become pregnant during adolescence, suggesting they are having more unprotected sex than other adolescents. We examined the prevalence and correlates of pregnancy and sexually transmitted disease (STD) in 100 adolescent offspring of teenage mothers (47 male, 53 female). Pregnant teenagers (12-18 years old) were recruited for an epidemiological study from a hospital prenatal clinic. The teenage mothers and their children were seen at birth and when the children were 6, 10, 14, and 16 years old. Assessments included measures of maternal and child substance use, mental health, and sexual health. Between ages 16-18 (Mean age = 17.99, SD = 1.3), 100 offspring (72% African-American, 28% White) provided a urine sample that was assayed for Chlamydia, gonorrhea, and trichomonas vaginalis (TV) using nucleic acid amplification tests. Twelve percent of the offspring had been pregnant or gotten someone pregnant, and 11% tested positive for a STD (8% TV, 4% Chlamydia, 0% gonorrhea). Correlates of teen pregnancy were lower maternal age at first sex, female child, child depression at age 14, and early child substance use. Correlates of STDs were older maternal age at first sex, older maternal age at birth, female child, and lower quality home environment during childhood. Younger maternal age at first sex and female offspring were significant predictors in the final logistic regression equations for teenage pregnancy and any STD. This is the first study to examine STDs in the offspring of teenage mothers. The results suggest that a significant proportion is at risk for teenage pregnancy and STDs, especially TV. Identifying risk factors for early pregnancy and STDs can help inform prevention efforts in this population.

GESTATIONAL AGE-SPECIFIC EFFECTS OF LABOUR INDUCTION ON MODE OF DELIVERY AND SEVERE MATERNAL MORBIDITY. *S Liu, K S Joseph, J A Hutcheon, S Bartholomew, J A León, M Walker, M S Kramer and R M Liston (Public Health Agency of Canada, Ottawa, ON, Canada)

Objective: To examine the gestational age-specific effects of labour induction on cesarean delivery and severe maternal morbidity. Methods: We used information from the Canadian Institute of Health Information to carry out a population-based study of low risk women who delivered between 2003 and 2009 in Canada (excluding Quebec). Low-risk women were those delivering singletons, at 36-42 weeks' gestation, with no history of a previous cesarean or medical/pregnancy complications. Using a pregnancies-at-risk approach, the week-specific risks of severe maternal morbidity following induction were contrasted with risks among ongoing pregnancies. Logistic regression was used to adjust for relevant confounders. Results: The effect of labour induction on cesarean delivery was modified by gestational age; induction was protective at 37 weeks (adjusted odds ratio [aOR] 0.90; 95% CI 0.87-0.94), not significant at 39 weeks (aOR 1.01; 95% CI 0.98-1.03) and a risk factor at 41 weeks (aOR 1.16; 95% CI 1.13-1.18). Induction was associated with higher overall severe maternal morbidity at 37 (aOR 1.68, 95% CI 1.49-1.89) and 39 weeks (aOR 1.40; 95% CI 1.28-1.52) but not 41 weeks gestation (aOR 1.05; 95% CI 0.96-1.14). The risk of thromboembolism given induction was increased at 37 weeks (aOR 4.88; 95% CI 3.59-6.64), and at 38 weeks (aOR 8.39; 95% CI 6.83-10.3) but not 41 weeks (aOR 1.19; 95% CI 0.68-2.08). Conclusions: Labour induction at earlier term gestations is associated with increased severe maternal morbidity. Further study is required to assess if this is due to residual confounding by maternal complications of pregnancy.

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PREVALENCE AND MATERNAL COMPLICATIONS ASSOCIATED WITH PLACENTA ACCRETA IN THE REPUBLIC OF IRELAND, 2005-2008. *K Upson, R Silver, R Greene, J Lutomski, M Lydon-Rochelle (National Perinatal Epidemiology Centre, Cork, Ireland)

Placenta accreta, defined by abnormal adherence/invasion of the placenta to the uterus, is an increasingly common cause of life-threatening hemorrhage. Despite the recent rise of a known risk factor, cesarean deliveries, there is a paucity of population-based data on the prevalence of placenta accreta and its impact on maternal health. Using hospital discharge data collected by the Hospital In-Patient Enquiry Scheme from 2005-2008, we conducted a population-based retrospective cohort study of maternal deliveries in Ireland. We compared maternal morbidity in deliveries with and without placenta accreta, estimating unadjusted relative risk (RR) and 95% confidence intervals (CI). To address potential bias, we repeated analyses using deliveries with placenta previa for comparison given its shared risk factors and pathophysiology with placenta accreta. Placenta accreta prevalence over the 4-year period was 110 cases per 258,022 deliveries (4.3/10,000). Placenta accreta was strongly associated with an increased risk of hysterectomy (RR 203.6, 95%CI 132.8-3121.6), intensive care unit (ICU) admission (RR 79.0, 95%CI 53.9-115.7), transfusion (RR 44.2, 95%CI 36.2-54.1), abdominal organ injury (RR 30.3, 95%CI 17.3-53.4) and hemorrhage (RR 12.3, 95%CI 10.4-14.6). The associations persisted when comparing to deliveries with placenta previa: hysterectomy (RR 25.4, 95%CI 14.0-45.9), ICU admission (RR 8.2, 95%CI 4.9-13.7), transfusion (RR 3.6, 95%CI 2.8-4.6), abdominal organ injury (RR 10.8, 95%CI 4.8-24.3) and hemorrhage (RR 3.4, 95%CI 2.7-4.3). These new findings highlight the impact of placenta accreta on maternal health at delivery and the need for interventions to reduce its occurrence.

ECLAMPSIA IN CANADA: A POPULATION-BASED COHORT STUDY BETWEEN 2003 AND 2008. *S Liu, K S Joseph, R M Liston, S Bartholomew, M Walker, J A León, R S Kirby, R Sauve, M S Kramer (Public Health Agency of Canada, Ottawa, ON, Canada)

Objectives: To assess trend in incidence of, identify risk factors for, and examine associations of eclampsia with maternal and neonatal mortality and severe morbidity. Methods: We conducted a population-based cohort study of all women and their newborns delivered in Canada (excluding Quebec) from 2003 to 2008. The data were obtained from the Discharge Abstract Database of the Canadian Institute for Health Information. We used logistic regression analysis to examine risk factors for and effects of eclampsia on gestational age, cesarean delivery, obstetric embolism, maternal death, and fetal growth, birth asphyxia, intubation, admission to ICU and neonatal death. Results: The incidence of eclampsia declined dramatically from 12.4 per 10,000 pregnancies in 2003 to 6.1 per 10,000 in 2008. Among singleton pregnancies, maternal heart disease [adjusted odds ratio (aOR) 4.8; 95% confidence interval (CI) 2.9-7.3], anemia (aOR 2.6; 95% CI 2.1-3.3), nulliparity, teen pregnancy, diabetes and urinary tract infection all significantly increased the risk of eclampsia. Eclampsia was associated with increased risks of maternal death (aOR 33.1; 95% CI 11.8-92.7), requiring assisted ventilation, adult respiratory distress syndrome, acute renal failure, cardiac arrest/failure, obstetric shock, embolism, very early delivery, and cesarean delivery. However, eclampsia was associated with few neonatal morbidities except for small-for-gestational-age birth, birth asphyxia and admission to ICU. Conclusion: Despite reduced rates and improved perinatal care and management of women with eclampsia, the condition remains strongly associated with serious adverse consequences, especially for the mother.

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HEPATITIS C SEROPREVALENCE AMONG HIV-INFECTED CHILDBEARING WOMEN IN NEW YORK STATE IN 2006. *L Ghazaryan, C Flanagan, T Sullivan, W Pulver, M Parker, L Smith, A Carrascal (AIDS Institute, New York State Department of Health, Albany, NY 12237)

Background: In the US, the prevalence of hepatitis C virus (HCV) among HIV-infected pregnant women varies from 5 to 50%. We assessed the maternal HCV seroprevalence and qualitative HCV RNA in the infants of HIV-infected women delivering in NYS in 2006. Methods: In this retrospective cohort study of HIV-exposed infants born in NYS, leftover infant plasma from HIV diagnostic testing specimens was tested for HCV after identifiers were removed. The earliest specimen was tested for the presence of HCV antibodies using HCV enzyme immunoassay with confirmation as needed by recombinant immunoblot assay. A second specimen collected when the infant was ≥ 2 months old was tested for HCV qualitative RNA. Multiple logistic regression was used to identify factors associated with HCV seropositivity. Results: In a final sample of 553 (93.6% of 591) live birth events with HIV exposure, 21 or 3.8% (95% CI 2.2, 5.4) of tested infant specimens had HCV antibodies indicative of maternal HCV seropositivity. Maternal age at delivery of ≥ 35 years, Hispanic ethnicity, white race and injection drug use (IDU) were significantly associated with HCV seropositivity in multivariate analysis. No cases of HCV vertical transmission were identified among HCV exposed infant specimens. Conclusions: This statewide population-based study of HIV-infected childbearing women shows HCV seroprevalence of 3.8%. Maternal age of ≥ 35 years and IDU are the strongest predictors of HCV seropositivity. Although no viral transmission was documented, more comprehensive longitudinal testing would be required to conclude that HCV transmission did not occur.

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INFERTILITY AND ADVERSE PREGNANCY OUTCOMES: A SYSTEMATIC REVIEW. *C Messerlian, L Maclagan, R Platt, R Gagnon, S L Tan, O Basso (McGill University, Montreal, QC, Canada)

In recent years, increasing attention has been paid to infertility as a risk factor for adverse pregnancy outcome in babies born after assisted reproductive technology (ART). Various reports suggest that infertile couples conceiving spontaneously after a long time to pregnancy (TTP) are at increased risk of preterm birth, birth weight deficits, etc. While there are several published reviews on the outcome of babies born after ART, the risks associated with low fecundity have not been summarized. We conducted a systematic review of published literature to assess whether a long TTP (> 12 months) increases the risk of obstetrical and neonatal outcomes, irrespective of ART. Two independent reviewers searched major databases, including Embase and Medline, screened abstracts, reviewed sourced papers, and abstracted relevant data from articles. In addition, we conducted hand searches of key journals in the field, as well as citation searches of key articles. The Newcastle-Ottawa Scale (NOS) was used to assess quality of observational studies for selected citations. Results from 10 sourced articles indicate that a long TTP is associated with a potentially increased risk of preterm birth, with adjusted Odds Ratios ranging from 1.1 to 1.7 among women with a TTP > 12 months compared to a TTP < 12 months. A long TTP, however, may only be an indicator of underlying problems, and couples with a long waiting time will be heterogeneous in their risk. More specific knowledge about what drives the risk among infertile patients is essential for providing the best informed care. We will thus focus on studies that examine risk as a function of specific causes of infertility and present a narrative summary of results by study design, participants, TTP and outcomes.

WITHDRAWN

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PATTERNS OF GESTATIONAL WEIGHT GAIN AMONG LATINA WOMEN. *A Tovar, K Chui, L Chasan-Taber, A Must (Tufts University, Medford, MA)

Excessive gestational weight gain is an important predictor of adverse outcomes for mother and infant. Methods commonly used to assess gestational weight gain assume linearity of weight gain, or do not account for differential length of gestation, assumptions that are often not correct as they may disregard patterns of weight gain. We assessed weight gain patterns among 881 Latina women in a prospective cohort in Massachusetts. Pre-pregnancy weight and up to 15 measured weights in pregnancy were abstracted from medical records. Group-based mixture modeling analyses (SAS PROC TRAJ) were conducted to identify 5 weight gain categories. We compared the changes in trimester-specific weekly weight gains within and between the 5 categories using a mixed-effects broken stick model (subject's auto-correlation treated as random effect.) Group sizes (% of total sample) and average trimester-specific weekly weight gains (lbs/week) in ascending order of pre-pregnancy weight were: I: 24.5%, 0.19, 1.11, 0.88; II: 30.6%, 0.26, 1.17, 0.99; III: 23.2%, 0.51, 1.09, 0.73; IV: 14.1%, 0.56, 0.89, 0.44; V: 7.6%, 0.59, 0.75, 0.56. Weight gains were higher in the third trimester for women with lower pre-pregnancy weight (Groups I, II) while gains tended to be consistent across trimesters for women with higher pre-pregnancy weight (Groups IV, V). Weight gain categories differed significantly by age group and household income but not by other covariates. Older (ages 35-40) and higher income (> \$30K) women were more likely to be in Group I, while younger (ages 25-29) and lower income (< \$15K) women were more likely to be in Groups IV and V. Our approach overcomes limitations of commonly used methods to assess gestational weight gain. Whether these patterns predict pregnancy outcomes should be explored.

SUBOPTIMAL MATERNAL THYROID FUNCTION AND RISK OF INCREASED BIRTH WEIGHT. *P Factor-Litvak, X Liu, K Kezios, H Yu, P Cirillio, B Cohn (Columbia University, New York, NY 10032)

Suboptimal maternal thyroid function may be associated with deficits in neurodevelopmental outcomes in children. This may be mediated by decreased birth weight adjusted for gestational age (GA). We examined the associations between free thyroxine (FT4), thyroid stimulating hormone (TSH), both measured during the second trimester of pregnancy, and birth weight adjusted for GA and other covariates in a sample of 600 mother-infant pairs from the longitudinal Child Health and Development Studies. Linear regression analyses were used to model birth weight adjusted for GA, and other covariates. Mean concentrations of FT4 and TSH were 1.26 ng/dl (standard deviation (SD) 0.21) and 1.53 mIU/L (SD 1.16), respectively. Mean birth weight was 3388 (SD 493) grams and mean length of gestation was 282 (+ 13) days. A one unit decrease in FT4 was associated with an adjusted 139 gram increase (95% confidence interval (CI) -42, 390) in birth weight adjusted for GA. The lowest 5th percentile of FT4 was associated with an adjusted 179 gram increase (95% CI 11, 447) in birth weight. A one unit increase in TSH (square root transformation) was associated with an adjusted 25 gram increase (95% CI -68, 118) in birth weight; the upper 5th percentile of TSH was associated with an adjusted 165 gram increase (95% CI -15, 345) in birth weight. Stronger associations were found in boys compared to girls. Contrary to our original hypothesis sub-optimal levels of second trimester maternal thyroid function are associated with increases in birth weight, adjusted for GA. These findings are particularly relevant for screening pregnant women and for following the offspring for possible sequelae of increased birth weight, such as childhood obesity.

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CONCORDANCE BETWEEN PRECONCEPTIONAL AND PERICONCEPTIONAL VITAMIN/FOLIC ACID SUPPLEMENTATION AND THE JOINT SOGC-MOTHERISK CLINICAL GUIDELINES. *A A Richard-Tremblay, O Sheehy, F Audibert, E Ferreira, A Bérard (University Of Montréal, Montréal, QC, Canada H3C 3J7)

Background: Folic acid deficiency during embryogenesis is known to be an environmental risk factor for neural tube defects (NTD). In 2007, the Society of Obstetricians and Gynaecologists of Canada (SOGC)-MOTHERISK introduced new guidelines aimed at reducing the occurrence and recurrence of NTDs among women at intermediate to high risk (obese, diabetics, family history of NTD). The objective of this study is to identify predictors of adequate folic acid supplementation in women of childbearing age. Methods: From May to July 2010, pregnant women attending the outpatient clinic at CHU Ste-Justine were recruited during the second trimester of pregnancy. Data on socio-demographic factors, lifestyles, and folic acid supplementation before and during pregnancy were recorded using a self-administrated questionnaire. Statistical analysis was performed using t-tests for continuous variable and Chi-square tests for categorical variables. Results: Women with postsecondary education (68% vs. 38%, $p < 0.0001$), women in a stable relationship (64% vs. 19%, $p < 0.0001$), and women with a family income greater than 60 000\$ (compared to women with a family income $< 40\ 000\$$ (72% vs. 42%, $p < 0.001$)) were more likely to have folic acid supplementation before conception compared to others. Conclusions: Women with a higher socio-demographic status were more likely to have had folic acid supplementation preconceptionally than others.

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THE SYDNEY STILLBIRTH STUDY: A CASE-CONTROL STUDY OF RISK FACTORS FOR LATE PREGNANCY STILLBIRTH. *A Gordon, C H Raynes-Greenow, D Bond, R Jones, W R Rawlinson, J M Morris, H E Jeffery (University of Sydney, Sydney, Australia)

Background: The proportion of stillbirths classified as unexplained increases near term, often despite more investigations. There is a need to identify new or emerging risk factors for stillbirth and to collect detailed information on risk factors which are poorly collected on a population basis. Method: Population-based matched case control study of pregnant women ≥ 32 weeks gestation booked into tertiary maternity hospitals in metropolitan Sydney. Data collection is performed at a semi-structured interview based on PSANZ perinatal mortality guideline clinical history. Interviews are generally performed within 1 week of recruitment to minimise recall bias and women are blinded to the specific study hypotheses. Odds ratios (OR) were calculated for a priori specified risk factors. Results: Data is completed on 71 cases and 130 controls. Mean gestation was 36 weeks. There were no significant differences between cases and controls for BMI (mean 24), maternal age (mean 33), pre-pregnancy weight (mean 65 kg), primigravid status (33%) or previous miscarriage (24%). Significantly more cases were identified as having fetal growth restriction during pregnancy (OR 11.1 95% CI 1.4-89) as well as being small for gestational age at birth (OR 2.9 95% CI 1.2 -7.2). Antibiotic treatment for a proven UTI was significantly more common in cases (OR 2.5 95% CI 1.1 -5.9). Conclusions: Interview data provides detailed information on known and potential risk factors for stillbirth. Identification and management of growth restriction in late pregnancy remains a significant opportunity for prevention. UTI in late pregnancy may not be benign.

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SELF-REPORTED ANTIDEPRESSANTS USE AND SPONTANEOUS ABORTION. *R L Chan, M L Jonsson Funk, D A Savitz, K E Hartmann. (University of North Carolina, Chapel Hill, Chapel Hill, NC 27599)

Between 14% and 23% of pregnant women experience depressive symptoms and untreated maternal depression has been associated with negative pregnancy outcomes such as preterm birth or small-for-gestational-age deliveries. Despite its potential benefits, antidepressant use during pregnancy has generated concern due to a possible association with adverse pregnancy outcomes. We examined the association between antidepressant use during pregnancy and spontaneous abortion (SAB) in 4,536 women who were recruited from 4 U.S. metropolitan areas between 2000 and 2008. Data were collected through telephone interviews, early gestation ultrasound assessments, and medical records abstractions. Discrete-time continuation ratio logistic survival models were used to model week-specific probability of SAB associated with any antidepressant use and use of serotonin reuptake inhibitors (SSRI). Approximately 6% of cohort reported taking antidepressants during pregnancy, with majority (82.3%) prescribed SSRIs. SABs were identified in 546 (12%) pregnancies. After controlling for maternal age, race, education, body mass index, smoking, alcohol use, gravidity, and nausea and vomiting, women who took an antidepressant had an increased risk for SAB [Odds ratio (OR) = 1.54, 95% confidence interval (CI): 1.1, 2.2], compared to women who did not use antidepressants during pregnancy. Women who used SSRIs during pregnancy also had an increased risk for SAB (OR: 1.67, 95%CI: 1.1, 2.5) compared to non-users. Lack of information on depression precluded controlling for confounding by indication. Further evidence on this issue is needed to guide clinical decisions about depression treatment in pregnant women.

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THE SYDNEY STILLBIRTH STUDY: WHAT IS IMPORTANT WHEN ASSESSING MATERNAL PERCEPTION OF FETAL MOVEMENTS, QUALITY VS QUANTITY? *A Gordon, CH Raynes-Greenow, D Bond, R Jones, J M Morris, H E Jeffery (University of Sydney, Sydney, Australia)

Background: Decreased fetal movements (DFM) are a common cause for maternal concern and are associated with poor pregnancy outcomes. Randomised trials of movement counting however show no reduction in stillbirth and there are no universally agreed definitions. Most previous studies have focused on the number of movements and there is minimal qualitative data. Method: Population-based matched case control study of pregnant women ≥ 32 weeks gestation booked into tertiary maternity hospitals in metropolitan Sydney. Quantitative and qualitative data on maternal perception of fetal movement are collected during face-to-face interviews. Standardised questions regarding fetal movement are transcribed and independently coded. Contingency tables were used for the quantitative data and qualitative data was thematically analysed. Results: Data is completed on 71 cases and 130 controls. Cases were significantly more likely to report a decrease in the perception of fetal movement as pregnancy progressed (Odds ratio (OR) 6.4 95% CI 2.20). Controls were more likely to report an increase (OR 2.2 95% CI 1.2,3.9). Active and passive themes were identified from the qualitative data. Passive themes were more commonly identified in the cases and demonstrate several potential "alert words". 59% of women were not given any specific information regarding fetal movements. Conclusions: Identification of compromised babies using description of fetal movements needs to be further explored. Advice from health professionals regarding fetal movements is not routine.

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DEFINING NORMAL: QUALITATIVE DESCRIPTIONS OF FETAL MOVEMENT IN A NORMAL HEALTHY PREGNANT POPULATION. *C H Raynes-Greenow, A Gordon, Q Li, D Bond, R Jones, J Hyett, R Ogle. (The University of Sydney, Australia)

Background: Fetal movement counting is commonly performed by pregnant women and 4-15% of pregnant women will have a concern regarding fetal movement that is sufficient for them to contact their care provider. Controversy exists over the utility of routine fetal movement counting with no universal definitions or alarm limits. No study to date has investigated fetal movements using qualitative data. **Aims:** To describe maternal perception of fetal movement using qualitative methods, and to determine whether these descriptions change with gestation in healthy pregnancies. **Methods:** Using a cross-sectional design we surveyed normal healthy pregnant women attending their usual antenatal clinic. Eligible women were > 18 yrs old, > 1 = 28 weeks gestation, singleton pregnancy and their self-assessed English was sufficient to complete the self-administered questionnaire. **Results:** 152 pregnant women participated in the study, with 68% (100/152) describing a recognisable pattern of movement. 72% (107/152) reported a change in strength of movement with the majority reporting an increase in strength and/or frequency as pregnancy progressed. Consistent with the lack of evidence 17% (26/152) were not asked about fetal movements in the routine antenatal appointment, and 32% (47/152) were given no advice. There were qualitative differences between fetal movement descriptions by gestation. A clear description of normal movement was evident with common themes identified. **Conclusion:** This is the first prospective study to describe fetal movement patterns in healthy late pregnancies using qualitative methods. This has the potential to be an additional clinical screening tool in routine antenatal care.

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SLEEP DISTURBANCES IN A CANADIAN POPULATION WITH ASTHMA OR CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD). *A Des Cormiers, L P Boulet. (Université Laval, Québec, QC, Canada G1V 4G5.)

Rationale: Asthma and chronic obstructive pulmonary disease (COPD) may be associated with sleep disturbances. **Objective:** To compare the self-reported prevalence of sleep duration and quality in patients with asthma or COPD in the Canadian population. **Design:** This cross-sectional survey was done using the Canadian Community Health Survey Cycle 1.1 (2000-2001). Ninety-eight percent of the Canadian population was represented by a sample of 133,000 persons, aged 12 or older. **Results:** A higher frequency of difficulty falling or staying asleep most of the time was observed in subjects reporting a diagnosis of asthma (A: 19.1%), or COPD (30.9%) compared with the general population (GP: 12.8%). Less patients with these conditions reported finding their sleep "refreshing" most of the time (A: 50.7%; COPD: 45.1%) compared to those without these ailments (GP: 62.3%). A difference was also observed in regard to the difficulty to stay awake most of the time during the day (A: 8.3%; COPD: 11.0%; GP: 5.7%) and on the report of chronic fatigue (A: 1.7%; COPD: 5.2%; GP: 0.8%). The prevalence of asthma with chronic fatigue is higher than the prevalence of asthma without chronic fatigue in obese subjects (17.9% vs 7.7%), and particularly in morbidly obese subjects (53.7% vs 17.5%). Logistic regression has been used to explore the relationships between sleep disturbance and respiratory diseases. After adjusting for age, sex, and BMI, respiratory diseases were still associated with a higher risk of disturbed sleep. **Conclusion:** Canadians with asthma and COPD report more sleep disturbances and chronic fatigue than people without respiratory disease.

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PULMONARY FUNCTION IN ADULTS WITH RECENT AND FORMER ASTHMA AND THE IMPACT OF SEX AND ATOPY. *Y Chen, D Rennie, P Pahwa, and J Dosman (University of Ottawa, Ottawa, ON, Canada K1H 8M5)

We sought to examine the associations of pulmonary function with recent and former asthma and their variations between men and women and between atopic and non-atopic individuals. A cross-sectional study of 1614 adults aged 18 years or over was conducted in a rural Saskatchewan community in 2003. Atopy, height, weight, waist circumference (WC) and pulmonary function were measured. Participants with ever asthma were those who reported a history of asthma diagnosed by a physician during lifetime. Participants who had former asthma were those who reported having asthma diagnosed by a physician 12 months ago. Participants who had recent asthma were those who reported having asthma during the last 12 months. Men had higher values of forced vital capacity (FVC) and forced expiratory volume in one second (FEV1) compared with women, but FEV1/FVC ratio showed no significant difference between sexes. Atopic status was not related to pulmonary function and the average values of the pulmonary function testing variables were almost the same for non-atopic and atopic individuals. Individuals with ever, recent or former asthma had significant lower values of FEV1 and FEV1/FVC ratio than those who reported having no asthma, and the associations tended to be stronger in men than in women. The interaction between atopy and asthma was not statistically significant. Adults who reported having recent asthma or former asthma had reduced pulmonary function, which was significantly modified by sex but not by atopic status. There is a possibility that airway remodeling in asthma results in reduced pulmonary function and risk factors for irreversible airway obstruction need further investigation.

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UNCONVENTIONAL SMOKING CESSATION AIDS: A META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS. *M Tahiri, S Mottillo, L Joseph, L Pilote, and M J Eisenberg (Divisions of Cardiology and Clinical Epidemiology, Jewish General Hospital/ McGill University, Montreal, QC, Canada)

Background: Unconventional smoking cessation aids, including acupuncture, electronic (E)-cigarettes, hypnotherapy, and rapid smoking are increasingly being used as an alternative to pharmacological and behavioral interventions for smoking cessation. Randomized controlled trials (RCTs) investigating these unconventional aids have reported widely varying estimates of their efficacy. **Objective:** To carry out a meta-analysis to determine the efficacy of unconventional smoking cessation aids and to compare these aids to one another. **Methods:** We systematically searched the Cochrane Library, EMBASE, Medline, and PsycINFO databases through June 2010 for RCTs investigating acupuncture, E-cigarette, hypnotherapy, and rapid smoking for smoking cessation. We only included RCTs that reported cessation outcomes as point prevalence or continuous abstinence at 6 or 12 months. We used random-effect modeling for our meta-analysis. **Results:** A total of 14 RCTs were identified, of which 6 investigated acupuncture (823 patients), 4 investigated hypnosis (273 patients), and 4 investigated rapid smoking (99 patients). No RCTs investigating E-cigarettes met our inclusion criteria. The estimated mean treatment effects were acupuncture (odds ratio (OR) = 3.53; 95% confidence interval (CI) = 1.03, 12.07), hypnotherapy (OR = 4.55; 95% CI = 0.98, 21.01), and rapid smoking (OR = 4.26; 95% CI = 1.26, 14.38). **Conclusion:** Acupuncture and rapid smoking substantially increase the odds of smoking cessation. Although hypnosis may aid in smoking cessation, there is insufficient evidence to draw strong conclusions regarding its efficacy. RCTs on E-cigarettes are needed to evaluate their efficacy.

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OBESITY AND INCIDENCE OF SARCOIDOSIS IN THE BLACK WOMEN'S HEALTH STUDY. *Y C Cozier, J S Berman, J R Palmer, D A Boggs, L Rosenberg (Slone Epidemiology Center, Boston, MA 02215)

The prevalence of overweight and obesity is disproportionately high among U.S. black women. Sarcoidosis is a systemic granulomatous disorder of unknown etiology which occurs more frequently and most severely among U.S. black women. The relation of obesity, which induces chronic inflammation, to incidence of sarcoidosis has not been studied. We prospectively assessed the association between body size and incidence of sarcoidosis among 58,333 participants in the Black Women's Health Study, a follow-up of African-American women aged 21-69 years at entry in 1995. Data on incident sarcoidosis, weight at age 18, current weight, height, and other potential risk factors were assessed at baseline and updated in biennial postal questionnaires. During 683,161 person-years of follow-up from 1995 through 2009, 448 cases of sarcoidosis were reported. Diagnoses were confirmed in 96% of cases for whom medical records or physician checklists were obtained. Cox proportional hazard models with adjustment for age, education, geography, smoking, and physical activity were used to estimate incidence rate ratios (IRR) and 95% confidence intervals (95% CI). The IRR was 1.87 (95%CI: 1.29-2.71) for body mass index (BMI) at age 18 ≥ 30 kg/m² relative to BMI at age 18 < 25 kg/m², with control for baseline BMI. The IRR for baseline BMI ≥ 30 relative to < 25 was 1.48 (95%CI: 1.17-1.86), with control for BMI at 18. Waist circumference and waist-to-hip ratio were not associated with the risk of sarcoidosis. Our results suggest that obesity, a condition associated with chronic inflammation, may increase the risk of sarcoidosis among U.S. black women, particularly among those whose obesity was established in early adulthood.

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IDENTIFICATION OF WHEEZING PHENOTYPES IN EARLY CHILDHOOD USING LATENT CLASS ANALYSIS AND RECURSIVE PARTITIONING. *R E Gangnon, V P Rajamanickam, D Lu, E L Anderson, C J Tisler, D J Jackson, J E Gern, R F Lemanske (University of Wisconsin, Madison, WI 53726)

To objectively identify common patterns of wheezing or wheezing phenotypes during early childhood, we used data from 278 children enrolled in a longitudinal birth cohort, the Childhood Origins of Asthma (COAST) study. Wheezing during the past year was assessed annually through age six years in the COAST study. Latent class analysis (implemented in the R package *poLCA*) was used to estimate phenotypes based on observed patterns of wheezing. Recursive partitioning (implemented in the R package *rpart*) was used to obtain clinically intuitive and practically useful phenotypes that approximate the identified latent classes. Three wheezing phenotypes were identified based on the number of years of wheezing between birth and age 6 years (*whz1-6*), the presence of wheezing in the first year of life (*whz1*) and the number of years of wheezing between the child's third birthday and age 6 years (*whz4-6*): (1) never or isolated wheezing (68% of children): *whz1-6* ≤ 1 ; (2) transient early wheezing (13% of children): *whz1-6* ≥ 2 , *whz1* = 1, *whz4-6* ≤ 1 ; and (3) persistent late wheezing (18% of children): *whz1-6* ≥ 2 , *whz1* = 0 or *whz1-6* ≥ 2 , *whz1* = 0, *whz4-6* ≥ 2 . There was excellent agreement between these clinical phenotypes and the estimated latent classes ($\kappa = 0.83$, 95% confidence interval 0.73-0.92). Using latent class analysis and recursive partitioning, we have objectively identified three early childhood wheezing phenotypes, without constraining the number and/or nature of the phenotypes, while making unique, non-probabilistic phenotype assignments for all children.

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FACTORS ASSOCIATED WITH UNASSISTED SMOKING CESSATION. *S Edwards, S Bondy, L Zawertailo, P McDonald (University of Toronto, Toronto, ON, Canada M5T 3M7O)

Background: Many population studies demonstrate that most former smokers quit without any form of pharmaceutical or behavioural assistance. Few studies have examined the characteristics of these quitters versus those seeking or requiring direct intervention. This study compared the baseline characteristics of smokers in the Ontario Tobacco Survey (OTS) who reported quitting without assistance (unassisted) to those who reported using at least one pharmaceutical or non-pharmaceutical quit aid (assisted). Methods: The OTS is a population-representative panel study of adult smokers recruited from 2005 through 2008 and followed up semi-annually for at least 2 years. Data on 235 smokers who had quit for at least 1 month (153 unassisted; 82 assisted) were obtained from the baseline and six month follow-up. Weighted frequencies were calculated for baseline characteristics including: smoking history, attitudes and beliefs about smoking, quit attempts and intentions and demographic characteristics. Differences were assessed using Chi-square tests for categorical variables and t-tests for continuous variables. Results: Relative to quitters using assistance, unassisted quitters were more likely to have been daily smokers ($p < 0.0001$) but less likely to perceive themselves addicted ($p = 0.01$) or in poor health ($p = 0.04$). They were more likely to have set a firm date ($p = 0.03$) and were more confident in their ability to quit ($p = 0.001$). Conclusions: Smokers quitting through assistance were distinctive from unassisted quitters in terms of smoking behaviors, attitudes and beliefs which has implications for research on cessation based largely in assisted settings. Studying smokers who are able to quit unaided could reveal novel strategies to encourage unaided quit attempts.

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INFLUENZA VACCINE USE IN MCMASTER UNIVERSITY STUDENTS BETWEEN 2007 AND 2010. *E Goodall, L Banh, S Barnes, S Carruthers, M Loeb, E Pullenayegum, M Smieja (McMaster University Hamilton, ON, Canada)

Vaccination is an effective way to reduce the risk of contracting influenza, and is universally recommended to children (> 6 months) and to all adults in Ontario. Within the context of a pandemic, university-aged students may be particularly susceptible to respiratory outbreaks. Assessing the intent to get vaccinated and the actual uptake will provide important information for public health procedures for future pandemics. We assessed the intent to seek vaccination, and the actual uptake of seasonal flu vaccine over four flu seasons, and the intent to seek H1N1 vaccination in McMaster University students. During the 2007/8, 2008/9, 2009/10 flu seasons, single and serial cross-sectional surveys were self-administered by undergraduate students via classroom visits and survey stations across campus. Cohorts of students were followed during 2009/10 and 2010/11. Intent to seek seasonal flu vaccination was similar in autumn 2007/8 and 2008/9 with reported rates of 24.4% and 19.9%, respectively. In 2009/10, intent to seek H1N1 vaccination was higher (40.5%) ($p < 0.05$) and remained elevated in 2010/11 (36.7%) ($p < 0.001$). Interestingly, follow-through was equally low across all influenza seasons at 12.5% to 23.5% ($p = 0.34$). Uptake was greater for H1N1 (23.5%) but this was not statistically significant. Despite the Ontario Universal Influenza Immunization Program, interest and uptake regarding vaccination remain low among university students. Interest and uptake were higher during the pandemic influenza season of 2009/10 and remained elevated in 2010/11, but additional strategies are needed to improve interest and uptake for vaccination.

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POSTPARTUM DEPRESSION, AN INDEPENDENT RISK FACTOR FOR WHEEZE IN PRE-SCHOOL GIRLS. *M Alton, S Tough, Pr Mandhane, A Kozyrskyj (University of Alberta, Edmonton, AB, Canada T6G2J3)

Postpartum depression is a serious health concern, affecting over 10% of child-bearing women. A growing body of evidence links maternal stress with poor child health outcomes, including asthma. We sought to discover whether postpartum depression has an effect on the development of wheeze in preschool children, independent of prenatal stress. Data were obtained from the Community Perinatal Care trial. This included information regarding postpartum depression, prenatal distress and other pre/postnatal exposures, and child wheeze at age 3 from 791 women and their children in Calgary. Logistic regression analysis was performed to investigate the association (odds ratio [OR], 95% confidence interval [CI]) between postpartum depression and wheeze at age 3. Models were adjusted for the following asthma risk factors: distress in pregnancy, maternal smoking, preterm birth and duration of exclusive breastfeeding. An a priori decision was made to stratify analyses by sex because of differences in stress response between boys and girls. 54 women experienced postpartum depression. Postpartum depression (OR: 4.68, 95% CI: 1.20-18.3) and severe distress in pregnancy (OR: 4.41, 95% CI: 1.15-16.9) were significant univariate determinants of wheeze in girls. When adjusted for prenatal distress, maternal smoking and other asthma risk factors, postpartum depression remained a significant predictor of wheeze in girls (OR: 4.77, 95% CI: 1.13-20.1). Our findings reveal that postpartum depression may be a risk factor for wheeze in girls. Health initiatives targeting maternal depression may reduce the risk of respiratory conditions in children.

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PATTERNS OF LUNG FUNCTION DECLINE IN ADULTS PREDICT MORBIDITY AND MORTALITY. *P Baughman, J L Marott, P Lange, E Hnizdo (National Institute for Occupational Safety and Health, Division of Respiratory Disease Studies, Morgantown, WV 26505)

Background: Increased lung function decline is associated with increased risk of chronic obstructive pulmonary disease (COPD) morbidity and mortality and all-cause mortality, but these associations are not fully explored in long-term patterns of lung function decline or in younger individuals. Methods: Risks of morbidity and mortality were estimated for temporal patterns of decline in forced expiratory volume in one second (FEV_1) and for age at lung function decline in the Copenhagen City Heart Study, 1976–2003. Using Cox regression, risks associated with temporal patterns of decline were studied by estimating the rate of decline over two time periods to identify patterns of early, late, or persistent excessive decline in individuals present throughout the study. Cox models were stratified by baseline age (≤ 45 and > 45 years) to examine the effect of age on risk associated with excessive decline. Models were adjusted for baseline age, height-adjusted baseline level of lung function ($FEV_1/Height^3$), height, asthma, and respiratory symptoms. Hazard ratios and 95% confidence intervals (CI) estimated risk by gender and for never smokers. Results: For COPD morbidity, hazard ratios (CI) for persistent excessive decline were 6.48 (2.70–15.54) for males and 3.56 (1.71–7.40) for females. In an overall analysis, for individuals 45 years of age or younger, hazard ratios (CI) were 2.09 (1.18–3.70) for males and 5.76 (3.41–9.74) for females. Conclusions: A persistent pattern of lung function decline and increased lung function decline in individuals 45 years or younger were significant predictors for increased future respiratory morbidity and mortality.

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ASTHMA PREVALENCE IN SCHOOL CHILDREN: EXTENSIVE GEOGRAPHIC VARIATION WITHIN A STATE. * S H Weiss, (UMDNJ-NJ Medical School, Newark, NJ 07107)

National surveys have had insufficient power to examine local variation in asthma prevalence (AP). Administrative database analyses (eg, Emergency Dept or Hospital Discharge records) primarily reflect acute asthma exacerbation or severe disease. New Jersey (NJ) state law enables children with signed doctors' orders to carry inhalers in school. NJ schools are required to have nurses, who are uniquely positioned to know how many students have asthma. In 2001, 2004, 2005, 2007 & 2010, a state-wide community health organization sent a survey to school nurses, including a query as to how many students had asthma. Data were linked with annual school-level data from the National Center for Education Statistic's Common Core of Data & Private School Universe Surveys, & US Census data. 3009 responses were received. 2469 had asthma data, representing 1609 (1316 public) schools with 49% of all NJ students & enumerating 68,848 children with asthma. SAS & Geographic Information Software (GIS) were used. There was limited AP variation by mean grade. AP in public vs private schools were similar. AP in public school children ranged ~2-fold in the 21 counties, from 7.6% to 13.1% with spatial clustering (Moran's Global I $p < .01$; Moran's Local I identified specific counties). Surprisingly, AP tended to be higher in southern, non-urban regions. AP in municipalities & in school districts ranged over a 100-fold span, with several significant local clusters. Population density did not correlate with AP. School-level AP positively correlated with Black race, & negatively with Asian race & socioeconomic status. Low AP clusters were identified in some upper-class municipalities & high AP clusters in some urban areas. The causes underlying the unexpectedly wide & extensive AP variation merit further epidemiologic investigation.

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THE ASSOCIATION BETWEEN OBSTRUCTIVE SLEEP APNEA AND PERIODONTAL DISEASE: A PRELIMINARY STUDY *E R Cho, W H Seo, R J T, J J Ryu, H Kim, S J Kim, J H Kim, C Shin (Institute of Human Genomic Study, College of Medicine, Korea University, Republic of Korea)

Obstructive sleep apnea (OSA) is a common disorder characterized by repeated disruptions in breathing during sleep. Based on the fact that mouth breathing is a common characteristic among OSA patients, the objective of this study was to assess the hypothesis that OSA may influence the onset and progression of periodontal disease. The study recruited total 403 participants (235 men and 168 women, aged 40-76 years) in 2009 and 2010 as part of Korean Genome and Epidemiology Study (KoGES), and they underwent standard polysomnography (PSG), clinical periodontal examination, and health screening examinations. Periodontitis, defined as presence of at least four teeth with one or more interproximal sites with probing pocket depth (PPD) ≥ 3 mm and clinical attachment level (CAL) ≥ 4 mm, was associated with OSA (AHI ≥ 5) by logistic regression analysis. Results show that 23.6% of participants had snoring, 13.4% had mouth breathing in sleep, and 46.2% had OSA. The prevalence of periodontitis was determined from 5.96% and 28.54% of participants who fit PPD and CAL criteria, respectively. OSA was positively associated with PPD (Odds Ratio (OR) = 3.58, 95% Confidence Interval(CI):1.36-9.46) and CAL (OR = 1.75, 95% CI:1.07-2.87) in a dose-response manner. Additionally, OSA was positively associated with PPD (OR = 7.80, 95% CI:1.51-40.23) and CAL (OR = 2.17, 95% CI:1.15-4.11) in ≥ 55 age group, whereas no association was observed in the < 55 age group. We conclude that OSA influences the incidence and progression of periodontal disease. Treatment of OSA may reduce prevalence and progression of periodontal disease.

THE EFFECTS OF SMOKING CESSATION AND PHYSICAL EXERCISE ON DECLINE IN PULMONARY FUNCTION: A 10-YEAR FOLLOW-UP STUDY AMONG MALE SMOKERS. *S Kim, H Kim, and C Shin (Institute of Human Genomic Study, Korea University, Ansan-si, Gyeonggi-do, 425-707, Republic of Korea)

Common resolutions that people make for healthy lives, such as smoking cessation and exercising, are often linked to improvement in lung functioning, but little is known about their long-term benefits on smokers. To examine whether quit-smoking status and regular exercise decrease lung impairment, we performed a prospective cohort study of 826 participants (249 continuous smokers and 577 ex-smokers at a 10-year follow-up time) who have normal lung function and are free of chronic obstructive pulmonary disease at baseline. Smoking and exercise statuses were determined by biennial interview questionnaires, and accordingly, regular exercise was defined as ≥ 4 times/week for 30 minutes. The association between lifestyle factors and pulmonary function were investigated by analysis of variance, with age, height, and pulmonary function values at baseline as covariates. In comparison to continuous smokers, people who quit smoking for more than 10-year had a significantly slower decline in the forced expiratory volume in 1 second (FEV1) (30.11ml/year in continuous smokers and 23.11ml/yr in ex-smokers; $p = 0.001$). Similar trend was evident in the rate of forced expiratory volume in 1 second to the forced vital capacity (FEV1/FVC) ($p = 0.008$). Additionally, ex-smokers who exercise regularly for 10-year showed significantly less decline of the values (30.37mL/yr for FEV1 and 0.35%/yr for FEV1/FVC), as compared to continuing smokers who do not exercise (22.32mL/yr and 0.24%/yr, respectively; $p < 0.01$ for all comparisons). Our results suggest that long period of smoking cessation and regular exercise work favorably in lung functioning.

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OVERLAP IN USE OF DIFFERENT TYPES OF TOBACCO AMONG ACTIVE DUTY MILITARY PERSONNEL. K L R Olmsted, R M Bray, *C Reyes Guzman, J Williams, H Kruger (RTI International, Washington, DC)

Objective: To describe the prevalence and overlapping combinations in past year cigarette use, smokeless tobacco use, and cigar use in the active duty U.S. military. Methods: Data for these analyses were taken from the 2008 Department of Defense Survey of Health Related Behaviors among Active Duty Military Personnel. A total of 28,546 service members participated, for a response rate of 70.6%. Results: Analyses showed 52.2% of active duty service members used one or more forms of tobacco in the past year. Cigarette use (alone or in combination with other tobacco types) had the highest prevalence (40.1%). Cigarette use only was most prevalent (18.6%); other combinations were much lower, ranging from 2% to 8%. Multinomial regression modeling showed that Army personnel, those aged 21 to 34, males, whites, and those with less than a college degree were at higher risk of using one or more types of tobacco concurrently. Conclusions: Over half of service members are placing themselves at increased risk of tobacco-related illness and disease by using more than one type of tobacco. Further research is needed to better understand the levels of use and the motivations and reasons for use of multiple types of tobacco.

SOCIAL AND ENVIRONMENTAL DETERMINANTS OF CHILDHOOD ASTHMA: A GIS APPROACH. *S Magzamen, S A Gale, M Richards, J D Radke, I B Tager (University of Wisconsin, Madison, WI)

Asthma is the most common chronic disease of childhood, affecting approximately seven percent of children in the United States. Evidence has indicated that the social environment and physical environment contribute to asthma prevalence as well as asthma-related morbidity. We implemented a geographic information system to determine the ecological level influences on asthma diagnosis and emergency department use in a school-based cohort of adolescent students in Oakland, CA. Over a two-year period, 4,017 students completed a brief, in-class asthma survey and provided residential addresses that were able to be geocoded. Social factors were derived from Census 2000 variables from students' census tract; environmental exposures were calculated from distance to non-residential land use designations, toxic release inventory (TRI) sites, and major roadways in the area. Controlling for individual level variables, students diagnosed with asthma who resided in the 1st and 2nd quartiles of distance to general industrial areas were significantly more likely to report emergency department visits (OR: 1.84, 95% CI: 1.01, 3.36; OR: 1.76, 95% CI: 1.05, 2.94, respectively); elevated and non-significant effects were found for asthma diagnosis. With regard to social factors, increases in percent of census tract residents who were currently married was associated significantly to decreased odds of diagnosed asthma (OR: 0.98, 95% CI: 0.96, 0.99). Increases in percent of census tract residents with household income less than \$25,000 was significantly associated with odds of asthma diagnosis (OR: 1.03, 95% CI: 1.01, 1.05). When social factors were included in the model, environmental factors were no longer significantly related to outcomes.

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IMMUNE MARKERS IN BREAST MILK AND THE OCCURRENCE OF ASTHMA SYMPTOMS AT AGES 6 AND 12 MONTHS: A LONGITUDINAL STUDY. *N Soto-Ramírez, W Karmaus, H Zhang, J Liu, and D Billings (University of South Carolina, Columbia, SC 29208)

We conducted a prospective study to determine whether different proteins in breast milk whey and maternal blood serum are linked to the development of asthma symptoms in children. We recruited pregnant women from Columbia and Charleston, SC and collected breast milk 2 to 4 weeks after delivery. The concentrations of IL-1 β , IL-4, IL-5, IL-6, IL-8, IL-10, IL-12, IL-13, IP-10, eotaxin, and IFN- γ in serum and whey were assayed using bio-plex multiplex kits (Bio-Rad Laboratories, Inc.). Asthma symptoms were prospectively ascertained at 6 and 12 months by telephone interviews. We used log-linear models to estimate the effect of whey and serum immune markers on asthma symptoms at 6 and 12 months. Generalized estimating equations were used to analyze repeated asthma symptoms at 6 and 12 months. 185 women provided maternal blood ($n = 164$) and/or breast milk samples ($n = 117$). High levels of IL-13 in serum (odds ratio (OR) = 2.39, 95% confidence interval (CI) = 1.25, 4.55) and whey (OR = 3.46, 95% CI = 1.75, 6.84) were associated with increased risk of child's asthma symptoms at age 6 months while IL-13 in whey was related to increased risk at 12 months (OR = 2.19, 95% CI = 1.06, 4.52). Repeated measurement models identified an increased risk of IL-13 in both maternal blood (OR = 1.98, 95% CI = 1.21, 3.26) and breast milk (OR = 2.61, 95% CI = 1.65, 4.12) on offspring asthma symptoms from ages 6 to 12 months. The increased risk for asthma-like symptoms in infants may have been programmed during gestation, suggesting that breast milk immune markers may not be the primary culprits.

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INCOME RELATED INEQUALITIES IN HEALTH SERVICES UTILIZATION IN BRAZIL: ANALYSIS OF THE 1998, 2003, AND 2008 NATIONAL HOUSEHOLD SAMPLE SURVEYS.
*L P Garcia, M Stivali, L R Santana (Institute for Applied Economic Research, Brazil)

Brazil has one of the most unequal income distributions in the world. However, there are few opportunities to quantify income related inequalities in health at country level. Data from the National Household Sample Surveys conducted in 1998, 2003, and 2008, which had a health supplement were used to estimate the magnitude of health inequalities measured for healthcare services utilization (clinical breast examination, mammogram, pap smear, medical consultation, hospitalization) in the 12 months preceding the interview. The sample was divided in five groups, by quintiles of monthly household income per capita. Prevalence ratios (PR) were calculated having the bottom income group as the reference. Concentration indices (CI) were also calculated. Among healthcare services utilization variables, all related to women's health showed concentration in favor of the rich. In 2003, having a mammogram showed the highest concentration favoring the rich (PR: 2.87; CI: 0.203), whereas in 2008, the highest concentration was found for clinical breast examination (PR: 2.72; CI: 0.206), with a significant decrease in these concentrations from 2003-2008. In 1998, 2003, and 2008, hospitalization was concentrated among the poorer (CI: -0.067; -0.037; 0.033), whereas medical consultation was concentrated among the richer (CI: 0.054; 0.055; 0.042). Both variables showed reduction in this concentration from 1998-2008. Overall, the health situation among the poorer is considerably worse than among the richer. The health care system must have a role in minimizing those inequalities.

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EFFECT OF SOCIOECONOMIC STATUS ON SELF-REPORTED SLEEP QUALITY IN ADULTS. *E Vogtmann and G McGwin Jr. (University of Alabama at Birmingham, Birmingham, AL 35294)

Previous research investigating the association between socioeconomic status (SES) and sleep quality in the United States has been limited to the effects of education and income. Therefore, we evaluated the association between various objective and subjective measures of SES and poor sleep quality among adults in the United States. Participants from the 2006 wave of the Health and Retirement Study (HRS) who responded to all questions pertaining to sleep quality were included in this study. The HRS obtained multiple self-assessed and interviewer-assessed measures of SES, including income, education, employment status, food security and safety. After adjustment for demographic factors, education, income, being in poverty, unemployed, temporarily laid off, or disabled, renting one's home, living in an unsafe neighborhood or mobile home, not having food or prescription drug security, having Medicaid, not having health insurance or private insurance, were all associated with poor sleep quality. The SES measures of being temporarily laid off (Odds Ratio (OR) = 3.33), being disabled (OR = 2.74) and lack of prescription drug security (OR = 2.52) had the strongest independent associations with poor sleep quality. Multiple measures of SES other than income and education were found to be independently associated with poor sleep quality and reflect stressors which disrupt sleep. It is possible that stress mediates the relationship between SES and sleep; however, it is also possible that stress is an outcome of poor sleep. Additional research to understand these relationships is warranted.

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SOCIOECONOMIC INEQUALITIES IN INFANT AND CHILD MORTALITY IN BRAZIL: 1993-2008. *L P Garcia, L R Santana (Institute for Applied Economic Research, Brazil)

In Brazil, infant and child mortality present a downward trend. Few studies have investigated the temporal trends in the inequalities of infant and child deaths, at individual level, according to socioeconomic status. The objective is to investigate the temporal trends of the magnitude of inequalities in infant and child deaths, between groups defined by maternal education and household income per capita in the period of 1993-2008 in Brazil. Microdata from the Brazilian National Household Sample Surveys were used. The concentration index (CI) was calculated for infant and child deaths, according to maternal education and household income per capita. 95% confidence intervals (95%CI) were also calculated. During the period of 2003-2008, there was a reduction in inequalities in infant and child mortality, at individual level, and according to maternal education and household income per capita. In 2008, the CI for child deaths among children whose mothers had less education (CI: -0.16021; 95%CI: -0.08749; -0.23293) was higher than for infant deaths (CI: 0.03522; 95%CI: 0.10972; -0.03928). The CI according to income had greater variability, but also demonstrated a lower concentration of deaths at the end of the period. In 1993, the CI for infant deaths according to income was -0.14307 (95%CI: -0.23607; -0.05007), while in 2008 it was 0.13521 (95%CI: -0.01338; 0.28380). These reductions in socioeconomic inequalities can reflect positive and equitable trends in the proximal and distal determinants of child health that result from overall economic growth and public policies for equity. The measurement of inequalities in health is important for monitoring the population health situation.

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INCOME INEQUALITY AND SELF-RATED HEALTH: ECOLOGICAL RESULTS FROM THE 2005 / 2009 ARGENTINE NATIONAL RISK FACTOR SURVEYS. * F De Maio, B Linetzy, D Ferrante (DePaul University, Chicago IL 60614)

Background: This study seeks to determine how the strength of the relationship between income inequality and self-rated health changes over the span of four years, and whether this relationship is influenced by the sensitivity of the inequality indicator to different parts of the income spectrum. Methods: Ecological analysis of data from the 2005 and 2009 National Risk Factor Surveys. Income inequality was operationalised at the provincial level with the Gini coefficient and the Generalized Entropy (GE) index. Population health was defined as the percentage of adults with poor/fair self-rated health by province, adjusted for age. Results: Cross-sectional analysis indicates a positive and significant relationship between income inequality (Gini coefficient) and poor self-rated health ($r = 0.58, p < 0.01$). Using the GE index, a gradient pattern emerges in the correlation coefficients, and the r values increase as the GE index becomes more and more sensitive to inequalities at the top of the distribution. The relationships between 2005 inequality and 2009 health outcomes displays a similar pattern, but with generally smaller correlation coefficients. When the GE index is particularly sensitive to inequalities at the bottom of the distribution, inequality is no longer correlated with health. Conclusion: The association between income inequality and self-rated health is highly sensitive to the choice of inequality indicator. These results suggest that further advances in the inequality and health literature may be made by developing new theoretical models to account for how inequalities in different parts of the income spectrum influence population health in different ways.

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TRENDS IN SOCIOECONOMIC VARIATION IN SELF-RATED HEALTH AND HEALTHCARE UTILIZATION IN JAPAN, 1986-2007. *N Kondo, Z Yamagata, and K Shibuya (University of Yamanashi, Chuo-shi, Yamanashi, 409-3815, Japan)

Income inequality in Japan has increased since the 1980s, coinciding with many changes in healthcare services and work environment due to the repeated macroeconomic hardships since the late 1990s. This reports on the first study of the long-term trends in the variations of the prevalence of self-rated poor health and healthcare utilization (ie, having annual health checkups) across income levels and occupations among Japanese aged 30-59, during the last three decades. We used the data of the 1986-2007 Comprehensive Survey of Living Conditions (CSLC), a nationally representative survey that is held every three years. Average annual sample size was 174,216. We used the relative index of inequality (RII) that virtually represented the relative prevalence rate ratio of the bottom vs. top socioeconomic positions, accounting for the differences in sample size across the positions strata. We ranked occupation as manager/professional, clerk, manual worker, and those not working. We found a sharply increasing socioeconomic inequality in the % of those not having health checkups in the past year. Its RII for bottom vs. top household income quintiles increased from 2.6 to 5.3 in men and 1.4 to 2.1 in women during the study period, while occupational inequality in having health checkups have specifically widened after 1998, when Japan experienced its worst-ever economic conditions. In contrast, income inequality in poor self-rated health has been gradually decreased. A major potential study limitation was the misclassification of occupations. Our findings await further study, which should examine the linkages between detailed changes in policy, healthcare systems, work environment, and the inequality patterns observed.

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A FAMILY-BASED STUDY OF THE NATURE OF SOCIOECONOMIC INEQUALITY IN PRETERM BIRTH AND SMALL FOR GESTATIONAL AGE IN DENMARK AROUND THE TURN OF THE MILLENNIUM. *L H Mortensen (University of Copenhagen, Denmark)

A large body of literature has reported associations between parental socioeconomic position (SEP) and adverse pregnancy outcomes even in affluent egalitarian welfare states. It is unclear if this is interpretable as a causal effect of SEP. This study seeks to explore the nature of this relationship by examining women who change SEP between pregnancies and women who are siblings but are different in terms of SEP. Data consists of 471,215 live born singletons born in Denmark 1997-2007, who has at least one sibling or one first cousin. We examined maternal educational attainment and household income in relation to preterm birth and small for gestational age (SGA) using Cox regression with gestational age as underlying time. After adjustment for parental education, age and parity, household income was not related to the outcomes in cohort analyses, within mothers who were siblings or children who were siblings. Maternal education was associated with preterm birth only in the cohort analyses, where the least educated women had the highest risk. This suggests that factors that originate in the mother's early life, for example shared genes or early life environment, explain the association. Maternal education was inversely associated with SGA in cohort analyses and within mothers who were siblings, but not between children who are siblings. This suggests that the association was explained by factors that were persistent over the mother's pregnancies, but not shared between the mother's siblings. In conclusion, the association between maternal education and the outcomes cannot be interpreted as a causal effect. The association is likely caused by factors established in childhood or young adult hood.

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EXPLORING SOCIOECONOMIC GRADIENTS IN TRAUMATIC DENTAL INJURY AMONG CHILDREN IN QUEBEC. *P Da Rosa, B Nicolau, M A Lambert, J O'Loughlin, A Tremblay, and M-C Rousseau. (McGill University, Montreal, QC, Canada CA H3A 2A7)

Although traumatic injuries to the teeth impact children's social, emotional wellbeing, and require expensive treatment, few studies have addressed their determinants. *Objective:* We aimed to investigate whether a socioeconomic gradient is present in traumatic dental injury (TDI) among children in Quebec. *Methods:* We conducted a cross-sectional study on 597 children aged 8-10 years from the baseline visit of the QUebec Adipose and Lifestyle Investigation in Youth (QUALITY) Cohort, an ongoing longitudinal study on the natural history of obesity in the province of Quebec, Canada. Data on (i) individual socioeconomic status (family income, parents' level of education) were obtained through questionnaires completed by their parents; (ii) TDI to the permanent incisors was assessed by oral clinical exam. Logistic regression estimated odds ratios (OR) and 95% confidence intervals (CI) for presence of TDI in relation to socioeconomic status after adjusting for individuals risk factors (e.g., anatomical features of the mouth). *Results:* The prevalence of TDI was 12.9%, and did not differ between boys (14.7%) and girls (12.7%) ($P = 0.18$). TDI was more likely among children in the higher quartile of income as compared to the lower quartile (OR = 2.7, 95% CI: 1.3-5.9), but was not related to the parents' education level. *Conclusion:* The prevalence of TDI in this population was similar to that from other studies. The association between TDI and high income may reflect differences in access to sports and recreational activities. Further research is needed to better understand the determinants of TDI and ultimately provide a basis for prevention.

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RACIAL DISCRIMINATION, RACIAL/ETHNIC SEGREGATION AND HEALTH BEHAVIORS IN CARDIA. *L Borrell, C Kiefe, A Diez-Roux, D Williams, P Gordon-Larsen (Lehman College, Bronx, NY 10468)

We investigate the association between racial discrimination and health behaviors before and after controlling for individual- and neighborhood-level characteristics; and whether this association varies by racial/ethnic segregation in the participant's neighborhood in CARDIA, a longitudinal study of cardiovascular risk. African Americans (AA, $n = 1165$) and whites (W, $n = 1314$) reported smoking status, alcohol consumption and physical activity at Year 20 (2005-2006), when mean age was 40 years. Discrimination, collected in 7 domains (at work, at school, etc) was categorized combining Years 7/15 as: None; < 3 domains both years (limited); > 3 domains once only (moderate); and ≥ 3 domains twice (high). Using 2000 US Census, we calculated indices of dissimilarity and isolation to measure segregation and categorized it into tertiles. Most AA report experiencing discrimination (89.1%), as did 40% of W. Discrimination was associated negatively with black isolation in AA but positively in W. After adjustment for selected characteristics including segregation, AA experiencing moderate or high discrimination were more physically active than those reporting no discrimination. This was also true for W reporting limited discrimination. We found significant positive associations for smoking and alcohol consumption in AA and smoking in W. We observed no interactions between discrimination and segregation measures in AA or W for any outcome. Racial discrimination may impact individuals' adoption of healthy and unhealthy behaviors independent of racial/ethnic segregation. These behaviors may help individuals buffer or reduce the stress of discrimination.

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DIFFERENTIAL FINANCIAL HARDSHIP DUE TO AGE, GENDER, AND RACE/ETHNICITY. *R Tucker-Seeley; F M Yang (Dana-Farber Cancer Institute, Boston, MA 02215)

Measures of financial hardship have been proffered as better indicators of economic well-being than traditional measures of socioeconomic status (SES). However, research on latent factor structure and measurement bias in items assessing financial hardship is relatively scant. As such, the purpose of this study was to determine the factor structure of items measuring perceived financial hardship in the Health and Retirement Study (HRS) and to determine measurement bias across socio-demographic groups (i.e. race/ethnicity, gender, and age). The participants were HRS subjects who completed an additional psychosocial survey (N = 3,074). The single factor financial hardship latent factor (chi-squared = 154, degrees of freedom = 54, Comparative Fit Index = 0.99, Root Mean Square Error of Approximation = 0.02) was determined using confirmatory factor analysis on 12 items in the HRS. The multiple indicator-multiple causes (MIMIC) model was used to determine measurement bias in the items due to socio-demographic characteristics. Compared to Whites, Blacks were more likely to endorse items of ongoing financial strain (Odds Ratio (OR) = 2.08, 95% Confidence Interval (CI) = 1.37, 3.16), while Latinos were less likely to endorse having no insurance (OR = 0.45, 95% CI = 0.26, 0.77); and older individuals, compared to younger age groups in the HRS, were more likely to endorse having moved to a worse residence/neighborhood (OR = 2.39, 95% CI = 1.55, 3.67) and being unemployed after actively looking for work longer than 3 months (OR = 2.74, 95% CI = 2.16, 3.48). Prior to adjusting for measurement bias, financial hardship was underestimated with increasing age by 0.6%; and underestimated for Blacks (16%) and overestimated for Latinos (19%) compared to Whites. Lastly, no significant measurement bias was found for gender.

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SOCIODEMOGRAPHIC DISPARITIES IN BMI AMONG YOUNG ADULTS: FINDINGS FROM THE FLASH COHORT.

*A Nazmi, S Roy, K J McGaughy, H Smith, K Jankovitz, A Y McDermott. (California Polytechnic State University, San Luis Obispo, CA 93407)

Sociodemographic disparities in body mass index (BMI) are widely described in adults, with population studies indicating poorer blacks and Hispanics at highest risk for obesity and differential patterns by sex. Data from diverse young adult samples, however, have not been well examined. We used cross-sectional data from the Cal Poly FLASH Longitudinal College Health Study to assess associations between BMI and sex, race/ethnicity, and family income among students attending a California public university. Linear regression models for BMI included age, sex, race/ethnicity, family income, physical activity, smoking, and alcohol intake. 1324 individuals (55% female; 69% white, 17% Hispanic, and 14% Asian) had complete data, representing 34% of the freshman class. Mean (SD) age of the sample was 18.2 y (0.4). Mean (SD) BMI (kg/m²) in men and women was 22.8 (3.4) and 21.9 (3.0), respectively (p < 0.0001). In white, Hispanic, and Asian men, mean (SD) BMI values were 22.8 (3.2), 22.9 (3.6), and 22.3 kg/m² (3.5), respectively (p = 0.3). In women, corresponding values were 21.9 (2.7), 22.6 (4.0), and 20.8 kg/m² (2.5) (p = 0.0001). There were no associations between family income and BMI in either men (p = 0.7) or women (p = 0.8). In fully adjusted models, Hispanic ethnicity (relative to white) emerged as the only sociodemographic risk factor for elevated BMI among women (0.86; 95% CI 0.12, 1.50) whereas Asian ethnicity was protective (-1.04; 95% CI -1.76, -0.32). There were no associations in men. Targeted intervention strategies tailored to different sociodemographic groups, especially sex and ethnicity, should be used to supplement higher-level policy approaches to curbing the obesity epidemic.

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CHANGE IN LOCAL AREA EMPLOYMENT RATES AND GEOGRAPHIC INEQUALITIES IN MORTALITY IN ENGLAND. *M Riva, S Curtis, R Hudson, P Norman (Durham University, Durham, United Kingdom)

This ecological study examines change in local area employment rates since 1981 in England in relation to mortality today. Time series data on employment rates, drawn from the Decennial Population Census and the Labour Force Survey, were used to measure 'relative change' (ratio of local employment rates to the national employment rate; indicates how, at any time, local employment rates compare to the national average) and 'absolute change' (ratio of local employment rates to the 1981 local employment rate; indicates how labour markets have changed locally since 1981). We used latent class growth models to group areas with similar trajectories of change since 1981 on these two indicators. For these group of areas, data on all-cause mortality for 2001-2006 (n = 18,974 deaths), drawn from the Longitudinal Study (n = 462,497), were used to calculate directly standardized death rates (SDRs) (and 95% confidence intervals [CI]) per 100,000 people for all age and premature (< 70 years) mortality. We accounted for migration between areas that might contribute to health inequalities. In areas where relative employment levels are continuously high compared to the national average, premature deaths were lower (SDRs: 288; 95%CI: 259, 317) than in areas with persistently low relative employment levels (SDRs = 454; 95%CI: 415, 492). Where absolute employment rates consistently improved or stayed stable compared to 1981 levels, premature mortality was significantly lower (SDRs = 312; 95%CI: 285, 340) than in areas characterized by decreasing employment levels (SDRs = 418; 95%CI: 373, 464). Relative change in employment position of areas over time seems more predictive of mortality than absolute change in local area conditions.

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NEIGHBORHOOD DEPRIVATION AND CHANGE IN BODY MASS INDEX AMONG ADULTS WITH TYPE 2 DIABETES.

*P Stoddard, B Laraia, M Warton, N Adler, A Karter (University of California, San Francisco, San Francisco, CA 94118)

To examine the association between neighborhood deprivation and change in body mass index (BMI) among adults with type 2 diabetes, we used data from the DISTANCE study, an ethnically stratified, random sample of adults with diabetes in a managed care setting. The analytic sample included 13609 adults. We examined the association between a neighborhood deprivation index in quartiles and BMI change, based on clinical measures, over a three-year period. We estimated multilevel logistic regression models of loss or gain of > 7% of baseline BMI versus a stable BMI, adjusting for sociodemographic and health-related characteristics at baseline and follow-up. On average, there was little change in BMI (-0.12 units); however, more than 15% either lost or gained > 7% of baseline BMI at follow-up. Adults in the second (odds ratio (OR) 1.17, 95% confidence interval (CI) 1.01-1.36) and fourth (most deprived) (OR 1.28, 95% CI 1.09-1.51) quartiles were more likely to gain > 7% of baseline BMI compared to those in the least deprived quartile. Those in the most deprived quartile were also more likely to lose > 7% of baseline BMI relative to those in the least deprived quartile (OR 1.21, 95% CI 1.03-1.41). Living in more deprived neighborhoods may not be conducive to self-care practices required to avoid weight gain among some residents with diabetes. Interventions that incorporate improvement of residential environments may be more effective for weight control than those targeting individuals alone. More research is needed to determine if weight loss associated with neighborhood deprivation among adults with diabetes is intentional or unintentional, e.g. due to metabolic processes linked to poor diabetes control.

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ARTHRITIS HAS A MAJOR IMPACT ON THE DAILY LIVES OF CANADIANS BOTH YOUNG AND OLD. *E M Badley, S O'Donnell, M Canizares, on behalf of the Survey for Living with Chronic Diseases in Canada (SLCDC) Working Group. (Toronto Western Research Institute, Toronto, ON, Canada M5T 2S8;)

Arthritis is one of the most common chronic conditions affecting 16% of Canadians aged 15+ years[^] and yet its population impact is not well understood. This study describes the impact of arthritis on Canadians in terms of their physical and mental health, activities of daily living (ADL) and work life. Data from the SLCDC, a follow-up survey of Canadians aged 20+ years (78% response rate: n = 4565) reporting arthritis in the 2008 Canadian Community Health Survey was weighted to be representative of the Canadian population. Bootstrap methods were used to calculate confidence intervals (CI) around prevalence estimates. Of individuals with arthritis, 11% were 20-44 years, and 46% 45-64 years; 63% were women. Poor/fair general health was reported by 30%, poor/fair mental health by 12%, and quite a bit/extreme stress in life by 21%. The majority (61%) reported joint pain always/often, and 38% reported fatigue always/often; 64% said arthritis limited getting a good night's sleep. Most (74%) reported at least one restriction in ADL. There was no appreciable age gradient in the proportion experiencing ADL restrictions (p = 0.5), but more males reported restrictions (p = 0.03). 43% of those aged 20-64 were currently not working, 64% of whom had not worked since their arthritis diagnosis. Arthritis affects more women than men, and a high proportion of younger and middle-aged adults. There is major impact in terms of joint pain with restriction in ADL at all ages, as well as affect on employment. [^]Life with Arthritis in Canada: A personal and public health challenge www.pha-c.ca.aspc.gc.ca

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SOCIAL INEQUALITIES THROUGHOUT THE LIFE-COURSE AND ADULT SUBSTANCE USE BEHAVIORS. L Bowes, M Melchior (Epidémiologie des déterminants professionnels et sociaux de la santé/ Epidemiology of occupational and social determinants of health, Inserm, CESP, France)

Background: Social inequalities in patterns of substance use are well-documented. Socioeconomic status (SES) in childhood is prospectively associated with alcohol and tobacco dependence in adulthood over and above the effects of adult SES (Poulton, Caspi et al. 2002; Melchior, Moffitt et al. 2007). The cumulative impact of lifelong socioeconomic disadvantage from childhood to adulthood may be particularly damaging to health (Melchior, Berkman, Kawachi et al., 2006). Aim: This study examines the influence of life-course continuity and change in SES on adult substance use. Methods: 1,101 individuals (41% male) reported on their use of tobacco, cannabis, alcohol and other drug use in 2009 (mean age 28.9 years). Parents reported on family income in 1989 and 2002. Study participants reported on occupational and educational status in 2009, in addition to use of tobacco, cannabis and alcohol. Results: Socioeconomic inequalities in adult substance use were observed; smoking, cannabis abuse and poly-substance use were all higher among adults with greater socioeconomic disadvantage. No socioeconomic inequalities were observed with respect to alcohol abuse. Downward intergenerational social mobility was associated with tobacco, cannabis and polysubstance use, even when controlling for the effects of lifelong socioeconomic disadvantage, gender, age, family risk factors (parental substance use, psychopathology, unemployment and divorce) and individual risk factors (childhood externalizing and internalizing problems). Individuals who experienced upward intergenerational mobility did not differ significantly in their substance use from individuals who experienced lifelong high socioeconomic status. Conclusions: When investigating the relationship between social inequalities and substance use, it is important to take into account the role of intergenerational social mobility. Individuals who experience downward social mobility may be at particularly high risk of substance misuse.

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RESIDENTIAL SEGREGATION AND GLYCEMIC CONTROL AMONG OLDER DIABETICS. *K White, Q Wu, E Tchetgen Tchetgen, M Mujahid, T Osypuk, M Glymour (University of South Carolina Arnold School of Public Health, Columbia, SC 29208)

Residential segregation predicts higher morbidity and mortality. No prior work has examined the association between segregation and management of chronic disease, which may be a key mediator of the segregation-mortality association. We used the Health and Retirement Survey 2003 Diabetes Mail-Out supplement to investigate the association between segregation and glycemic control among diabetics aged 50+ in the US. The diabetes supplement included a self-administered HbA1c fingerstick kit. Metropolitan area-level segregation in 2002 was operationalized as the index of dissimilarity (range 0.23 to 0.84). We used linear regression with robust standard errors to estimate the association between segregation and HbA1c, adjusting for individual- (sociodemographic, clinical, and access to care) and neighborhood-level (poverty) covariates. Interactions between race/ethnicity and segregation were tested. A 0.1 unit increase in dissimilarity was associated with an increase in HbA1c of 0.14 (95% Confidence Interval: 0.00, 0.28). Stratified models suggested this association was primarily observed for blacks, but the interaction was not statistically significant (p = 0.12). Our findings suggest that residence in segregated areas may present specific challenges in managing and controlling diabetes among blacks. Identifying specific neighborhood-level mediators may further elucidate factors contributing to optimal conditions for glycemic control.

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A PREDICTIVE MODEL TO HELP IDENTIFY INTIMATE PARTNER VIOLENCE AMONG OLDER WOMEN BASED ON PHONE CALLS AND DIAGNOSES. *A Eaton, T L Temkin, B H Fireman, D Amaral, R Bhargava, (Kaiser Permanente Northern California, Berkeley, CA)

Background: Intimate Partner Violence (IPV) is a significant health problem but goes largely undiagnosed, undisclosed, and clinically undocumented. Purpose: To use electronic medical records of diagnoses and telephone advice calls to develop a predictive model that identifies clinical profiles of women 45 to 64 years old at high risk for undisclosed IPV. Methods: A case control study was conducted in women 45 to 64 years old enrolled at Kaiser Permanente Northern California (KPNC) in 2005-2006 using symptoms reported by telephone and clinical diagnosis from electronic medical records. 518 cases were identified using ICD9 codes for IPV and were each matched with 5 controls. A predictive model was developed to identify those with IPV. Results: The predictors most highly associated with IPV were history of remote IPV (Odds Ratio (OR) = 12.9), calls for psychiatric problems (OR = 3.0), skin injuries (OR = 2.7) and sexually transmitted diseases (OR = 2.1). Clinical diagnoses of anxiety (OR = 1.9), psychiatric problems other than anxiety/depression (OR = 1.7), head, neck and face injuries (OR = 1.6), and headache (OR = 1.4) as well as calls for chest pain (OR = 1.7), musculoskeletal injury (OR = 1.6) were also significantly associated with IPV. This profile differs from that found in a younger population where issues associated with childbearing play a considerable role. Conclusions: Diagnosed IPV was associated with a clinical profile based on both telephone call data and clinical diagnoses. Profiles determined from these combined sources can potentially be used to improve diagnosis of IPV among older women in clinical settings by prompting focused clinical inquiry.

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PREVALENCE AND RISK FACTORS FOR INTIMATE PARTNER VIOLENCE IN THE WEST BANK AND GAZA STRIP *C J Clark, M M Haj-Yahia (University of Minnesota, Minneapolis, MN 55455)

Large studies of intimate partner violence (IPV) in the Middle East are rare. This study examines the prevalence and demographic, relationship, and socio-political risk and protective factors for IPV victimization in the West Bank and Gaza Strip using data from a nationally representative cross-sectional survey (response rate = 99%; n = 3509 currently married women). The Revised Conflict Tactics Scales was used to measure psychological, physical, and sexual IPV in 2005. Demographic predictors included: the respondent's and her husband's age, education, and employment; family size, residence (West Bank or Gaza Strip), and locality (urban, rural, or refugee camp). Items from validated scales were used to measure relationship characteristics (husband's controlling behavior, marital conflicts, marital power, and stressful life events) and social capital (help resources in the community). Political violence was measured with an inventory designed for the study. Multivariate logistic regression models were constructed for each type of IPV. Variables were entered in blocks: 1) demographic, 2) relationship, and 3) socio-political. The likelihood ratio test was used to examine whether the addition of the block of variables improved the fit of the model. 62%, 22%, and 11% of the respondents reported experiencing psychological, physical and sexual IPV, respectively. The addition of the relationship and the socio-political variables contributed significantly (all p-values < 0.01) to the fit of the models for each type of violence except for the socio-political variables predicting sexual IPV [p-value = 0.17]. IPV is widespread in the West Bank and Gaza Strip. Further examination of the associated factors could provide insight into effective interventions.

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FOCUS GROUP RESULTS ON CIGARETTE SMOKING DURING PREGNANCY AND ADVERSE OUTCOMES. *K N Duwe, C Cassell, D Levis, B Stone-Wiggins, M Council, M O'Hegarty (*Centers for Disease Control and Prevention, Decatur, GA)

Objective: Our objective was to better understand knowledge, attitudes, beliefs and behaviors related to cigarette smoking and adverse pregnancy outcomes, including birth defects. Methods: During June and July 2010, 12 focus groups were conducted in 4 US cities among 4 specific groups of childbearing-aged women. Participants were asked about knowledge of adverse outcomes that result from smoking during pregnancy, including birth defects. Given the federal Food and Drug Administration's proposal to place graphic warning labels on cigarette packaging, participants also were asked to comment on potential warning labels that depicted an infant with an orofacial cleft. Qualitative data analysis was conducted using NVivo 8 software. Results: A total of 79 females participated; the mean age of participants was 25 years old. About 60% of participants were white, 28% were black, and 12% were of 'other' race/ethnicity. The majority were aware that smoking during pregnancy can increase the risk for adverse outcomes, such as low birth weight or prematurity. Few were knowledgeable about cigarette smoking during pregnancy and orofacial clefts. After presenting participants with a graphic warning label showing a medical drawing of a baby who was born with cleft lip, most women agreed that the graphic label might encourage pregnant women to quit smoking. Many participants recommended that future messages about smoking during pregnancy emphasize the harmful effects on the baby. Conclusions: Study findings can inform the development of messages and policies that educate women about birth defects occurring as a result of prenatal smoking, with the intent of changing behavior among female smokers of reproductive age.

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PRENATAL MATERNAL STRESS AND PHYSICAL ABUSE AMONG HOMELESS WOMEN AND INFANT HEALTH OUTCOMES IN THE UNITED STATES. *J Calvert, R M Merrill, R Richards, and A Sloan (Brigham Young University, Provo, UT 84602)

Background: This study examines whether the relationship between maternal stress or abuse situations and infant birth weight differs between homeless and non-homeless women. Methods: We analyzed data from the Pregnancy Risk Assessment Monitoring System (PRAMS) taken between 2002 and 2007. Average infant birth weight was compared between homeless and non-homeless women using analysis of variance. Results: Homeless women were significantly more likely to experience stressful life events, abusive situations, and poor maternal health than non homeless women during pregnancy. Birth weight among infants of homeless women was an average of 17.4 grams lighter than for infants of non homeless women, after adjusting for maternal age, race, ethnicity, region, education, and marital status. The impact of maternal health, stress, and abuse variables on infant birth weight was significantly interact with homeless status. For example, vaginal bleeding, nausea, kidney/bladder infection, and failure to receive early prenatal care had significantly larger negative impacts on birth weight among homeless women than non-homeless women. Infant birth weight was consistently lower among homeless women across all classifications of their pre-pregnancy weight. Finally, experiencing stress or abuse among homeless women compared with non homeless women tends to have a much more negative impact on infant birth weight. Conclusion: Stress and abusive situations among pregnant women have a negative influence on infant birth weight. However, this negative influence is even more pronounced among homeless women.

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PATTERNS OF ORAL CONTRACEPTIVE USE AMONG PREMENOPAUSAL WOMEN AND CIRCULATING IGF-1: IMPLICATIONS FOR DISEASE RISK. *K M Blackmore, J Wong, J A Knight (Prosserman Center for Health Research, Samuel Lunenfeld Research Institute, Mount Sinai Hospital, Toronto, ON Canada)

Insulin-like growth factor-1 (IGF-1) is important in normal growth, development, and homeostasis. Current oral contraceptive (OC) use decreases IGF-1 but little is known about the effects of past use, age and/or timing of use. Both IGF-1 and current OC use have been linked to premenopausal breast and colorectal cancers, osteoporosis and cardiovascular disease (CVD). How OC use affects IGF-1 levels may offer insight into its influence on disease risk in young women. In a cross-sectional study of 328 premenopausal women ages 18 to 21 and 31 to 40 we examined the relationship between different patterns of OC use and circulating IGF-1 using adjusted linear regression analysis. Among women aged 18 to 21, ever OC use was significantly associated with decreased IGF-1 levels compared to never use ($\beta = -57.2$ ng/ml, 95% confidence interval (CI): -88.7, -25.8). Among women aged 31 to 40, past users who first used OC at 25 years of age or older ($\beta = 43.8$ ng/ml, 95% CI: 8.8, 78.8), in the last 15 years ($\beta = 35.1$ ng/ml, 95% CI: 9.3, 61.0) or after 1995 ($\beta = 46.6$ ng/ml, 95% CI: 13.4, 79.8) had significantly higher IGF-1 levels compared to never users. This study highlights the importance of considering the long term effects of OC use after cessation on IGF-1 levels in premenopausal women. IGF-1 may mediate some of the health effects of OC use, although additional studies are needed, as the relationship is complex and possibly influenced by age/timing of OC use and the OC formulation used (i.e. 3rd versus 2nd generation OC)

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CESAREAN SECTION AND POSTPARTUM DEPRESSION IN A COHORT OF CHINESE WOMEN WITH HIGH CESAREAN DELIVERY RATE. *R-h Xie, J Lei, S Wang, H Xie, M Walker, and S W Wen (Department of Obstetrics & Gynecology, University of Ottawa, Faculty of Medicine, Ottawa, ON Canada, K1H 8L6)

Whether cesarean delivery is independently associated with postpartum depression (PPD) remains controversial. We carried out a prospective cohort study from February through September 2007 in Hunan Maternal and Infant Hospital, the First Affiliated and the Third Affiliated Hospitals of the Central South University in Changsha, Hunan, People's Republic of China. Primiparous married women 20-45 years of age who presented for prenatal care at the participating hospitals at 30 to 32 weeks of gestation and who planned to stay in Changsha city during the postpartum period were approached to participate in the study. The Chinese version of the Edinburgh Postnatal Depression Scale (EPDS) was used at 2 weeks postpartum to assess PPD, with a score of 13 or higher as the cut-off for PPD. A total of 534 women were included in the final analysis, with 415 (77.7%) delivered by cesarean section (majority with no medical indication). The rate of PPD was 21.7% in women who had a cesarean delivery and 10.9% in women who delivered vaginally. The PPD rate was higher in elective cesarean delivery group than emergent cesarean delivery group, but no difference in PPD rate was observed among study subjects with different indications for cesarean delivery. We conclude Cesarean section is associated with increased risk of PPD in Chinese women with high cesarean delivery rate.

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MATERNAL ANTENATAL STATE-ANXIETY: PATTERN AND DETERMINANTS. *S Akiki, K N Speechley, W R Avison, M K Campbell (University of Western Ontario, London, ON, Canada N6A 3K7)

While much research in the area of maternal mental health has focused on the effects of depression during pregnancy, anxiety has received relatively little focus during the antenatal period. The mean age of onset for many anxiety disorders is in the early 20's, a time when many women are considering pregnancy. The primary objective of this study was to investigate potential risk factors for antenatal state anxiety as identified in the literature. The secondary objective was to identify the pattern of maternal anxiety by gestational age (results pending). Data used for this study were obtained from the Prenatal Health Project, which is a population-based prospective cohort study of 2357 women in London, Ontario. Our primary hypothesis stated that "feelings about the pregnancy" would be a determinant of maternal antenatal state anxiety after controlling for other potential covariates. The abbreviated version of the Spielberger State and Trait Anxiety Inventory (STAI) was used to measure state anxiety. Preliminary linear regression analyses concluded that feeling unsure/unhappy about the pregnancy, being single, having a prior fetal loss, having a prior/existing medical condition, smoking, depressive symptoms, low education, low income, being younger and having an unplanned pregnancy were significantly associated with state anxiety scores. We concluded that "feelings about the pregnancy" are a predictor of maternal antenatal state anxiety ($\beta = 4.0$, $p = < 0.0001$). The findings of this study will help to identify the pattern and risk factors of antenatal state anxiety so that prevention efforts may be constructed to assist pregnant women with high levels of anxiety.

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THE VISION OF FEMALE SEX WORKERS AND THEIR NON-COMMERCIAL SEXUAL PARTNERS REGARDING THEIR PERILOUS ROLE. *A Sayarifard, A A Kolahi, M H Hamedani (Department of Community Medicine, Faculty of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran, 193954719)

This study estimates the viewpoint of female sex workers and their non-commercial sexual partners, using condom application pattern in sexual intercourses in Tehran/Iran. This descriptive-analytical study was performed in 2009, by participation of 128 female sex workers of Tehran/Iran. The sampling was a combination of available samples from who worked in the streets, visitor passes to Drop-in Centers and those who were introduced by young men and introduced by female sex workers through respondent driven sampling. Data from interviews were collected by trained personnel. Condom use at the latest sexual intercourse with clients and non-commercial partners such as sex with a friend, a fiancé and spouse in recent month were questioned. The average age of female sex workers who had non-commercially sexed were 26.9 ± 7.4 . Sixty three (49.2%) of participants averagely 3.3 times (1-15) in recent month had a non-commercial sexual intercourse. Nineteen persons (30.2%) never used condoms, 14 (22.2%) always used condoms and 30 (47.6%) sometimes used condoms. Twenty seven (42.9%) of these women used condom in their last sex with non-paying partners in contrast 76.2% used condom in last sex with clients ($p < 0.001$). The study showed that when the sex workers have non-commercial intercourse, making use of condom is 1.8 times lesser than the time of commercial intercourse. Therefore it can be concluded that female sex workers and possibly their non-commercial sexual partners such as friend and spouse, recognize the male clients have a greater risk for transmission of sexually transmitted infections, particularly HIV/AIDS.

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ARE NATURALLY MENOPAUSAL WOMEN REPRESENTATIVE? COMPARISONS WITH ALL OTHER WOMEN IN A NATIONAL SURVEY. *K Brett, P Mendola and R Tandon (National Center for Health Statistics, Hyattsville, MD 20782)

Research on reproductive senescence generally assumes that naturally menopausal women are representative of all women. However, more than one-third of US women have had a hysterectomy by age 60 and most do so before their natural menopause. Additionally, medical interventions may cause the cessation of menses and recall of menopause can be of concern. We analyzed post-menopausal women ages 55 years and over from the 1999-2008 National Health and Nutrition Examination Survey to compare demographic characteristics by menopause status (natural, surgical/medical, and unknown). Cross-tabulations by current age, education, poverty status, race/ethnicity, marital status, obesity, smoking, and parity were conducted and differences were tested using Cochran-Mantel-Haenszel chi-square. Separate logistic regression models were used to evaluate subgroup differences controlling for the complex sample design using SUDAAN. Of 4952 respondents, 55.2% had undergone a natural menopause, 32.8% had undergone surgical menopause (hysterectomy and/or bilateral oophorectomy before cessation of menses) and 12.0% could not be categorized due to missing or conflicting data related to cessation of menses. Compared to naturally menopausal women, those surgically menopausal were less likely to be 80 years or over, Mexican-American or widowed. Women with unknown menopause type were older, less educated and more likely to be non-Hispanic Black. Our findings suggest recall of age at natural menopause and age of medical/surgical menopause may be problematic in older women. Women who have surgical menopause are significantly different from naturally menopausal women with respect to age, ethnicity and marital status.

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EPIDEMIOLOGY OF TRANSFUSION PRACTICES IN POSTPARTUM HEMORRHAGE. *M P Bonnet, C Deneux-Tharoux, M H Bouvier-Colle (INSERM, U953, UPMC, Paris, France, 75020)

Postpartum hemorrhage (PPH) affects 5-10% of deliveries and is associated with substantial maternal morbidity and mortality. As known risk factors are poorly predictive, PPH management, e.g. transfusion, must be evaluated because its improvement could reduce the rate of severe maternal outcomes due to PPH. We described transfusion practices - type and quantities of blood products, Fresh Frozen Plasma (FFP) to Red Blood Cells (RBC) ratio, transfusion delay - and examined their association with characteristics of women, labor and delivery, and causes of PPH in severe PPH, in a prospective study conducted in 106 French maternity units (146,876 deliveries, December 2005-November 2006). Associations were tested using ANOVA and Chi-square, and quantified with logistic regression. Among 6660 women with PPH, RBC and FFP were administered to 9.7% and 4.4%, respectively. The mean quantities of RBC and FFP were $4.8 (\pm 3.9)$ and $4.6 (\pm 3.8)$ units, respectively, with a mean FFP:RBC ratio of $0.47 (\pm 0.53)$. In women with severe PPH, instrumental delivery was associated with significantly greater quantities of RBC and FFP and higher FFP:RBC ratio, and with higher proportions of genital tract trauma, coagulopathy, and uterine rupture. The risk of massive transfusion ($\geq 10\text{RBC}$) was four times higher in instrumental than in cesarean or vaginal delivery - OR 4.4 (95% Confidence Interval 1.8-10.7) -. This association could reflect more severe PPH in case of instrumental delivery or real variations in practices. Further investigation of the determinants of transfusion strategy in PPH is needed in order to explain these findings.

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PREMENSTRUAL SYNDROME AND CYTOKINE LEVELS ACROSS THE MENSTRUAL CYCLE. *E Bertone-Johnson, S Mumford, A Pollack, N Luisi, J Wactawski-Wende, E Schisterman, B Whitcomb (University of Massachusetts, Amherst, MA)

Premenstrual syndrome (PMS) affects millions of reproductive-aged women. Inflammation may affect serotonin metabolism and hypothalamic-pituitary-adrenal axis function, both of which may contribute to the occurrence of PMS. We evaluated the relation of cytokines and PMS among a subset of women in the BioCycle study, a prospective cohort of 259 healthy women aged 18-44 followed for 1-2 menstrual cycles. Participants provided first morning urine samples up to 8 times per cycle. On standardized cycle days 2, 7, 14 and 22, participants also reported the severity of 17 physical and emotional menstrual symptoms over the past week. Symptom reports were used to identify women meeting criteria for moderate PMS ($n = 64$) and a comparison group with few or no menstrual symptoms ($n = 40$). Urinary levels of interleukin (IL)-1beta, IL-4, IL-6, IL-10, IL-12, interferon (IFN)alpha, and tumor necrosis factor alpha were measured by multiplex assay. Differences in mean cytokine levels between PMS cases and comparison women across the menstrual cycle were compared with generalized linear models. Mean levels of IL-1beta, IL-4, IL-6, IL-10 and IFNalpha differed significantly between cases and comparison women during one or more cycle phases. For example, mean IL-6 levels in both groups were similar during the follicular and ovulatory phases; levels then increased 2-fold during the luteal phase in comparison women, while no change was observed in cases (P for overall case-control difference = 0.03). Our results support a potential role of inflammation in the etiology of PMS. Larger prospective studies are needed to determine if controlling inflammation may be useful in preventing or treating PMS.

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B VITAMIN INTAKE AND PREMENSTRUAL SYNDROME IN YOUNG WOMEN. *P Chocano-Bedoya, A G Ronnenberg, L Chasan-Taber, C Bigelow, S E Zagarins, B Takashima, E R Bertone-Johnson, (Departments of Public Health and Nutrition, University of Massachusetts, Amherst, MA)

Premenstrual syndrome (PMS) affects 8 to 15% of women of reproductive age and is associated with a substantial reduction in quality of life. B vitamins are required in the synthesis of neurotransmitters potentially involved in the pathophysiology of PMS. While several trials have evaluated vitamin B6 as a treatment for PMS, few studies have evaluated the association between dietary intake of B vitamins and PMS. We conducted a cross-sectional analysis among a subset of participants of the UMass Vitamin D Status Study. Between 2006 and 2010, 237 women aged 18-31 (mean age = 21.6 years) completed questionnaires to assess menstrual symptoms and other health and lifestyle factors. Using standard criteria, we identified 56 women with moderate to severe premenstrual syndrome and a comparison group of 60 women with no or mild premenstrual symptoms. Intakes of thiamin, riboflavin, niacin, vitamin B6, folate, and vitamin B12 from foods and supplements in the previous 2 months were assessed by food frequency questionnaire. After adjustment for age, smoking status, multivitamin use and vitamin D intake, women with niacin intake above the median level (28.7 mg/day) had an odds ratio of 0.35 (95% confidence interval: 0.14, 0.91) for PMS compared to women with intake below the median. Results for thiamin, riboflavin, and vitamin B6 were suggestive of inverse associations with PMS but were not statistically significant. In summary, we observed a significantly lower risk of PMS in young women with niacin intake slightly above the RDA (20mg/day). Prospective studies are needed to further evaluate whether B vitamins may be useful in preventing or treating PMS.

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PRENATAL SCREENING FOR SUBOPTIMAL MENTAL HEALTH IN THE POSTPARTUM PERIOD. *S McDonald, J Wall, K Forbes, H Kehler, and S Tough (University of Calgary, Calgary, AB, Canada)

Postpartum depression (PPD) is the most common complication of pregnancy in developed countries, affecting 10-15% of all new mothers. There has been a shift in thinking less in terms of PPD per se to poor psychosocial outcomes and difficulties transitioning to the parenting role after giving birth. The objective of this study was to develop a screening tool that identifies women at risk of distress in the postpartum period using information collected prenatally. We used data collected for the All Our Babies Study, a prospective cohort study of pregnant women living in Alberta, Canada ($N = 1578$) that collects a diverse array of information at three time points during the perinatal period. We developed the tool using 2/3 of the sample and performed internal validation on the remaining 1/3. Using a regression coefficient-based scoring method, we developed an integer score-based prediction rule for the prevalence of PPD at 4 months postpartum. We calculated the sensitivity, specificity, likelihood ratios for positive and negative predictive values, and area under the ROC curve by varying the threshold of our screening score for optimal discrimination. The best fit model included known risk factors for PPD and suboptimal psychosocial health: depression and stress in late pregnancy, history of abuse, and poor relationship quality with partner. The area under the ROC curve was 0.76, with acceptable sensitivity and specificity for a cut-off score of 2 (range 0 - 7). Comparison of the tool with a widely used PPD screening inventory showed that our tool had better performance indicators. Further validation of our tool for psychosocial distress was seen in its utility for identifying symptoms of anxiety, in addition to depression, at 4 months.

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WITHDRAWN

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ASSOCIATION OF CESAREAN SECTION DELIVERY AMONG PREGNANT WOMEN WITH DIABETES. *C A Knox, J A Delaney, A G Winterstein. (University of Florida, Gainesville, FL 32610)

The rate of cesarean deliveries in the US has steadily risen in past decades. Cesarean deliveries (CD) carry substantial health risks for both mother and infant, emphasizing the importance to identify risk factors. To examine if diabetes is associated with increased CD, conditional on maternal characteristics in nulliparous singleton pregnant women. In the 2004 US Vital Statistics Birth Database, regression analysis with mixed effects was used to assess the relationship between CD and maternal characteristics such as, age, race, weight, number of prenatal visits, and diabetes status was examined and clustered by state. Women with a diagnosis of hypertension (chronic and pregnancy related) and eclampsia were excluded from analysis. 325,279 of 1,176,569 live births were delivered by CD, with approximately 5% of women being diabetic. There was a statistically significant increase in the association between CD and age (comparing women > 40 years to 20-30; relative risk (RR) of 2.05 (95% CI: 1.95, 2.16), women who gained over 40 pounds compared to 21-30 RR = 1.28 (1.27, 1.29), and women of black race compared to white had a RR = 1.18 (1.17, 1.19). The number of prenatal visits reduced the association with CD, 1-6 visits had a RR = 0.89 (0.87, 0.90) vs. to 13+ visits. In women with CD, those with diabetes were older (28 vs. 26 years) and gained less weight (30 vs. 34 pounds). Women who were diabetic had a RR = 1.40 (1.33, 1.46) in the risk for CD compared to non-diabetic women, after adjustment for potential confounders. Diabetes demonstrated a strong independent association with CD. This relation is not entirely explained by the maternal characteristics included in this study and warrants additional investigation.

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INTIMATE PARTNER VIOLENCE VICTIMIZATION AND WOMEN'S ALCOHOL USE: A LATENT CLASS ANALYSIS. *L La Flair, C Bradshaw, C Storr, K Green, A Alvanzo, and R Crum (Johns Hopkins University Bloomberg School of Public Health, Baltimore, MD 21205)

Violence perpetration is a well-characterized public health problem, but the relationship between intimate partner violence (IPV) victimization and women's problem drinking remains understudied. Prior research suggests that problem drinking varies by recency of IPV and may be mediated by mechanisms consistent with a tension-reduction theory. Study objectives were to (1) identify latent classes of drinking among women, (2) examine the association between recent IPV and drinking classes, and (3) evaluate major depressive disorder (MDD) as potential mediator of the IPV-alcohol relationship. Data are from a cohort of 11,782 women identified as current drinkers in Wave 1 (2001-2002) and Wave 2 (2003-2004) of the National Epidemiological Survey on Alcohol and Related Conditions, a nationally representative survey of U.S. adults. Latent class analysis was used to categorize participants using 11 DSM-IV abuse/dependence criteria. Weighted multinomial logistic regression was used to evaluate the association between IPV and drinking class membership, accounting for MDD, prior alcohol use, and sociodemographic variables. Three latent classes of drinkers were identified: Two problematic classes, severe (Class 1: 1.9%; n = 224) and moderate (Class 2: 14.2%; n = 1676), and few/no problems (Class 3: 83.9%; n = 9882). Past-year IPV was associated with severe and moderate problem drinking classes (Class 1 AOR: 5.41, 95% CI 3.54-8.28; Class 2 AOR: 1.82, 95% CI 1.35-2.45). Results show a strong association between recent IPV and problem drinking class membership and provide preliminary support for MDD as an intermediary factor.

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FACTORS LONGITUDINALLY RELATED TO AGE AT MENOPAUSE. *E B Gold, SL Crawford, N Avis, C J Crandall, S Harlow, J S Lee, K A Matthews, M Vuga, R Thurston, LE Waetjen. (*University of California Davis, Davis CA 95616)

Later age at the final menstrual period (FMP) is related to longer life expectancy and lower risk of cardiovascular disease, atherosclerosis, osteoporosis and fracture but higher risk of breast, endometrial and ovarian cancer. Based on the first 10 years of annual follow-ups from the multi-racial/ethnic sample of 3302 midlife women in the Study of Women's Health Across the Nation (SWAN), we examined factors related to age at FMP. Participants' data were censored at hormone therapy initiation, hysterectomy, and/or bilateral oophorectomy. After excluding 608 women with missing data, 1365 had observable FMPs, and 1329 were censored. We used Cox proportional hazards ratios (HRs) to examine the relation of baseline characteristics to age at FMP. The median age of participants at baseline was 46.3 years; the unadjusted median age at FMP was 52.5 years. After multivariable backward elimination, adjusting for site and day of blood draw, racial/ethnic differences in age at FMP were not statistically significant. The following were associated with significantly earlier age at FMP: participant's mother younger at FMP (< 45 years HR = 1.40, 95% CI 1.04 1.89) current smoking (HR = 1.70, 95% CI 1.45 1.99), poorer self-reported health (HR = 1.14, 95% CI 1.07 1.21), and higher follicle stimulating hormone (3rd vs. 1st quartile HR = 1.71, 95% CI 1.59 1.83). Participant's mother older at FMP (> 55 years HR = 0.80, 95% CI 0.65 0.99), anxiety (HR = 0.87, 95% CI 0.75, 1.00) and prior oral contraceptive use (HR = 0.79, 95% CI 0.69 0.89) resulted in significantly later age at FMP. Our longitudinal results in a multi-racial/ethnic cohort largely confirmed prior cross-sectional findings and add the relations with maternal age at FMP.

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FINE PARTICLE AIR POLLUTION AND PRETERM BIRTH IN NORTH CAROLINA, 2001-2005. *H H Chang, B J Reich, M L Miranda (Duke University, Durham, NC 27708)

We examined the association between ambient levels of particulate matter < 2.5 μm in diameter (PM_{2.5}) and the risk of preterm birth in North Carolina. We viewed gestational age as time-to-event data and estimated the risk of cumulative and lagged exposure to PM_{2.5} during pregnancy across 453,562 geocoded birth records. We considered individual-level PM_{2.5} exposure metrics derived from two sources: (1) ambient levels measured by the Air Quality System monitoring network (AQS); and (2) predicted concentrations by statistically fusing AQS with process-based numerical model output (FSD). The FSD database is a recent EPA product with higher spatial and temporal resolution compared to the AQS network. To our knowledge, this is the first large-scale population study that utilizes the FSD database to examine the adverse effects of air pollution and health. We investigated average PM_{2.5} exposure over seven long-term and short-term windows via a two-stage discrete-time survival model that controls for maternal race, age, education, marital status, tobacco use during pregnancy, seasonality, and unmeasured spatial confounders. Using the AQS measurements, an IQR (1.73 $\mu\text{g}/\text{m}^3$) increase in cumulative PM_{2.5} exposure was associated with a 7.7% (95% posterior interval 0.6-15.2%) increase in the risk of preterm birth. Using the FSD predicted levels and accounting for prediction uncertainty, we also found significant consistent adverse associations between trimester 1, trimester 2, and cumulative PM_{2.5} exposure and preterm birth. Our results provide evidence that ambient PM_{2.5} levels are positively associated with preterm births even at regions that are in attainment under current air quality standards.

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AMBIENT AIR POLLUTION EXPOSURE AND BLOOD PRESSURE CHANGES DURING PREGNANCY. P-C Lee, E O Talbott, J M Roberts, J M Catov, R K Sharma, *B Ritz (UCLA, Los Angeles, CA)

Maternal exposure to ambient air pollution has been previously associated with adverse birth outcomes such as preterm delivery but no study to date has linked air pollution to blood pressure changes during pregnancy, a period of dramatic cardiovascular function changes. We examined whether trimester specific exposure to particles of less than 10 μm (PM₁₀) or 2.5 μm diameter (PM_{2.5}), carbon monoxide, nitrogen dioxide, sulfur dioxide, and ozone (O₃) affect systolic (SBP) and diastolic (DBP) early to late pregnancy blood pressure changes in a prospectively followed cohort of 1,684 pregnant women in Allegheny County, PA. Air pollution measures for maternal zip code areas were derived with Kriging interpolation methods. First but not second or third trimester PM₁₀ and ozone exposure influenced early to late pregnancy blood pressure changes, most strongly in non-smokers. We estimated increase of 1.58 mmHg (95% CI = 0.72 to 2.44) or 3.14 (95% CI = 1.33 to 4.96) in SBP and 0.53 mmHg (95% CI = 0.39 to 1.45) or 1.23 (95% CI = 0.29 to 2.74) in DBP per interquartile increase in PM₁₀ or O₃ respectively during the first trimester in non-smokers. Our novel finding suggests that first trimester air pollution exposures may affect birth outcomes adversely via blood pressure increases later in pregnancy.

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ASSOCIATION BETWEEN FINE PARTICULATE MATTER EXPOSURE AND BIRTH WEIGHT. *K Ebisu, K Belanger, J F Gent, H-J Lee, P Koutrakis, B P Leaderer, M L Bell (Yale University, New Haven, CT 06511)

Exposure to fine particles (PM_{2.5}) during pregnancy has been linked to lower birth weight; however, the chemical constituents of PM_{2.5} varies widely. We investigated whether PM_{2.5} mass, constituents, and sources are associated with birth weight. PM_{2.5} filters collected in 3 Connecticut counties and 1 Massachusetts county, USA, from August 2000 to February 2004 were analyzed for over 50 elements. Source apportionment was used to estimate daily contributions of PM_{2.5} sources, including traffic, road dust/crustal, oil combustion, salt, and regional (sulfur) sources. Gestational and trimester exposure to PM_{2.5} mass, constituents, and source contributions were examined in relation to birth weight and risk of small-at-term birth (term birth < 2500 g) for 76,788 infants. Road dust and related constituents such as silicon and aluminum were associated with lower birth weight, as were the motor-vehicle-related species elemental carbon and zinc, and the oil-combustion-associated elements vanadium and nickel. An interquartile range increase in exposure was associated with low birth weight for zinc (12% increase in risk), elemental carbon (13%), silicon (10%), aluminum (11%), vanadium 8%), and nickel (11%). Analysis by trimester showed effects of third-trimester exposure to elemental carbon, nickel, vanadium, and oil-combustion PM_{2.5}. Exposures to higher levels of PM_{2.5} chemical constituents originating from specific sources are associated with lower birth weight. Potential biological pathway remains under the investigation, but our results on which constituents/sources and windows of exposure are most associated with birth weight can help guide future research.

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SPATIAL ADJUSTMENT OF MEASUREMENT ERROR IN MATERNAL EXPOSURE TO AIR POLLUTION. *S C Gray, A E Gelfand, M L Miranda (Duke University, Durham NC 27708)

The link between air pollution exposure and adverse birth outcomes has been extensively investigated. Although several studies have illustrated this relationship, traditional methods use air pollution measurements from the closest monitor as a proxy for personal exposure. This technique assumes that pollution concentrations are spatially homogeneous in the neighborhoods associated with the monitors and consequently introduces measurement error into a resultant model. To model the relationship between air pollution exposure and birth weight, we build spatial and non-spatial hierarchical models that account for the associated measurement error. We allow four possible scenarios, with increasing flexibility, for capturing this uncertainty. In the two simplest cases we specify one model with a constant variance term and another with a variance component that allows the uncertainty in the exposure measurements to increase as the distance between maternal residence and the location of the closest monitor increases. In the remaining two models, we introduce spatial dependence in these errors using spatial processes in the form of random effects models. The models are illustrated using air pollution data from the U.S. Environmental Protection Agency and pregnancy outcomes from the North Carolina Detailed Birth Records. Statistical analyses are implemented using hierarchical modeling within a Bayesian framework. Results show that compared to the non-spatial and simple linear models, the spatial models have tighter confidence intervals around parameter estimates and better estimates of model fit. Accounting for the spatial dependence of the measurement error in these exposure-response models, may yield more accurate estimates than ordinary proximity models.

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20-YEAR RISK OF TYPE 2 DIABETES IN RELATION TO MODIFIABLE RISK FACTORS: THE ARIC STUDY. *J S Pankow, P L Lutsey, E Selvin, R R Huxley, D J Couper, T H Mosley, A R Folsom (University of Minnesota, Minneapolis, MN)

Randomized trials have demonstrated that lifestyle interventions reduce the risk of type 2 diabetes among those with prediabetes, but even larger reductions may occur by prevention of risk factors themselves (primordial prevention). We evaluated absolute and attributable risks of diabetes in the ARIC Study, a population-based cohort of men and women ages 45-64 sampled from four U.S. communities in 1987-89. We considered three modifiable factors measured at baseline: diet, adiposity, and physical activity. We classified participants as having optimal risk factors if they: (1) were below the 40th percentile for a "Western" dietary pattern derived from principal-components analysis of food groups ascertained from a 66-item food frequency questionnaire; (2) had body mass index < 25 and waist circumference < 89 cm in women or < 102 cm in men; and (3) averaged at least 150 minutes of moderate and/or vigorous physical activity per week. Self-reported information on diabetes diagnosis and treatment was ascertained in up to 14 separate follow-up interviews administered through 2007. Among 11,784 participants without diabetes at baseline, 2% of African American men, 6% of white men, 2% of African American women, and 11% of white women were classified as optimal for all three risk factors. There were only 27 incident cases of diabetes among 849 individuals with optimal risk factors; age-, gender-, and race-adjusted incidence rates in the optimal group were 2.0 per 1000 person-years versus 9.7 per 1000 in the rest of the population. Population attributable risk estimates were large in all race and gender groups; in the combined population, elevations in one or more of these risk factors could account for up to 79% (95% CI: 65-91%) of cases of incident diabetes. These long-term prospective data underscore the vast potential for primordial prevention in halting the epidemic of type 2 diabetes.

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USE OF EMERGENCY DEPARTMENTS FOR DIABETES WITH HYPOGLYCEMIA, UNITED STATES 2008. *L S Geiss, J Wang, E W Gregg (Centers for Disease Control and Prevention, Atlanta, GA 30341)

Hypoglycemia is one of the most common complications of diabetes, but no nationally representative estimates have been reported for the United States. To estimate and describe emergency department (ED) use for diabetic adults (≥ 18 years of age) with hypoglycemia, we analyzed data from the National Emergency Department Sample. ED visits among adults with both diabetes (ICD-9-CM code of 250) and hypoglycemia (using validated algorithm of codes) as any listed diagnosis were identified and used as numerators for the calculation of rates. The denominators for rates were the estimated number of people with diabetes from 2007-2009 National Health Interview Survey. In 2008, there were an estimated 504,838 ($\pm 28,263$) ED visits involving both diabetes and hypoglycemia. About 43.0% ($\pm 1.4\%$) resulted in a hospital admission and 1.3% ($\pm 0.1\%$) resulted in death. The proportion admitted to the hospital and the proportion resulting in death increased with age group (both $p < .01$). The overall annual rate of ED visits with diabetes and hypoglycemia was 2.7 (± 0.2) per 100 diabetic persons – 2.5% among men and 2.8% among women. Rates displayed a J shaped pattern with age (quadratic trend $p < .01$) with rates highest in those 18-44 years (2.8%) and those ≥ 75 years (5.5%). These data suggest that ED visits involving hypoglycemia may be particularly problematic for older people with diabetes. Our study provides the first nationally representative estimates of ED visits diabetes and hypoglycemia in the United States and provides a baseline for future surveillance of ED use associated with hypoglycemia among adults with diabetes.

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ARE SLEEP DISPARITIES ASSOCIATED WITH DOWNSTREAM HEALTH OUTCOMES? RESULTS FROM THE BOSTON AREA COMMUNITY HEALTH (BACH) STUDY. *R S Piccolo, A B Araujo, J B McKinlay (New England Research Institutes, Watertown, MA 02472)

Sleep problems concern many people, and appear to disproportionately affect those of lower socioeconomic (SES) and racial/ethnic minorities. Length of sleep and sleep quality are reportedly associated with downstream health consequences, including increased risk for obesity, diabetes (DM), hypertension (HTN), cardiovascular disease (CVD), and mortality. Research is still unclear on whether disparities in sleep may manifest themselves in disparities in health. The BACH baseline study is a population-based random-sample cohort (2002-2005) of 5,503 participants aged 30-79. We subsequently surveyed 4,415 of these subjects (2007-2010) for disease incidence. We found significant racial/ethnic and SES disparities in the number of men reporting short sleep duration (defined as ≤ 5 h/night over the past week). Black men and middle class men were the most likely to report ≤ 5 h sleep ($p < .001$ for race/ethnicity and SES). SES disparities in restless sleep were found among both men and women (Men, $p = .01$; Women, $p < .001$). Results reveal no significant racial/ethnic differences in the incidence of DM, HTN, CVD or obesity by either of our measures of sleep. We observed effect modification in the relationship between SES and the incidence of DM and CVD by sleep parameters. Short sleep and restless sleep increased the incidence of diabetes among lower class adults in particular ($p = .001$ and $< .001$, respectively). Restless sleep also differentially affected lower class women in the development of CVD ($p = .01$). Our results indicate upstream sleep disparities are associated with downstream adverse health outcomes. Future analyses of the BACH cohort may offer information on the mechanisms of these associations. Supported by Award Number U01DK056842 from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (NIH). Content is solely the responsibility of the authors and does not necessarily represent the official views of NIDDK or NIH.

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FETAL PROGRAMMING EFFECT RELATED TO PRENATAL EXPOSURE TO DIABETES - A POPULATION-BASED STUDY. *C S Wu, E A Nohr, B H Bech, M Vestergaard, J Olsen (Department of Epidemiology, Aarhus University, Aarhus 8000, Denmark)

Children exposed to a diabetic environment in utero have an increased risk of fetal and neonatal morbidities including congenital malformation, pre-term birth, fetal macrosomia, neonatal respiratory distress. Maternal diabetes may also have long-term health consequences for offspring. The increased risks might be induced by fetal programming as suggested by the developmental-origins hypothesis or might be induced by other factors, like genetic causes. If fetal programming plays a major role one would not expect an increased risk should be presented among children exposed only to paternal diabetes. We conducted a population-based cohort study by identifying 1,518,426 children born in Denmark from 1977 to 2006 in the final analyses. Children were followed from the day of birth up to 30 years until the first hospitalization or first outpatient visit for the outcomes of interest (malignant neoplasm and cardiovascular diseases), death, emigration, or December 31, 2006, whichever came first. We used Cox regress to estimate hazard ratios (HRs) and 95% confident interval (95%CI) of outcomes under study among children exposed to maternal diabetes or paternal diabetes. Children only exposed to maternal diabetes (type 2) had an increased risk of malignant neoplasm (HR = 2.50, 95%CI: 1.47; 4.25) and cardiovascular diseases (HR = 1.67, 95%CI: 1.19; 2.35) while the HRs for the two outcomes among children only exposed to paternal diabetes were 0.41(95%CI: 0.06; 2.90) and 1.60 (95%CI: 0.89; 2.89), respectively. The results suggest that the increased risks might be induced by children responses to alterations in intrauterine environment.

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ASSOCIATION OF SERUM 25-HYDROXYVITAMIN D AND SERUM C-PEPTIDE IN A NATIONALLY REPRESENTATIVE SAMPLE OF ADULTS IN THE UNITED STATES. *K Eldeirawi, C Lee, S Greco (University of Illinois at Chicago, Chicago, IL 60612)

Increased levels of C-peptide (a biomarker of insulin secretion) are associated with insulin resistance, diabetes, and other conditions related to insulin resistance. Vitamin D deficiency has also been linked with the risk of diabetes, impaired glucose tolerance, and insulin resistance. However, the association of vitamin D with serum levels of C-peptide in people without diabetes has not been well delineated. The purpose of the current cross-sectional analysis was to examine the relationship of serum levels of 25-hydroxyvitamin D (25OHD) with serum levels of C-peptide. The study utilized data from a nationally representative sample of adults (> 20 years of age) in the United States who participated in the Third National Health and Nutrition Examination Survey. Serum C-peptide concentrations were dichotomized into low/normal (< 0.631 pmol/mL) or high (\geq 0.631 pmol/mL). Serum levels of 25OHD were categorized as insufficient (< 30 ng/mL) or sufficient (\geq 30 ng/mL). Bivariate and multiple logistic regression analyses were conducted to examine the association of serum vitamin D with serum C-peptide. Fifty percent of participants had high serum C-peptide while approximately 68% had insufficient serum 25OHD concentration. We observed a statistically significant inverse relationship between serum levels of 25OHD and serum concentrations of C-peptide. Participants who had insufficient serum 25OHD were 1.66 times more likely to have high serum C-peptide than those who had sufficient serum 25OHD concentration (95% confidence interval [CI]: 1.46, 1.88). This relationship persisted after we controlled for age, sex, race-ethnicity, census region, education, body mass index, physical activity, and other covariates (odds ratio: 1.35; 95% CI: 1.10, 1.66). Our findings suggest inverse associations of vitamin D status and insulin secretion in individuals without diabetes. Prospective studies are needed to further elucidate this relationship.

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COMMUNITY, HOUSEHOLD AND INDIVIDUAL PREDICTORS OF AGRICULTURAL HOUSEHOLD HEALTH: A MULTI-LEVEL ANALYSIS. *D C Cole, F Orozco, S Wanigaratne, S Ibrahim (Dalla Lana School of Public Health, University of Toronto, Toronto, ON, Canada M5T 3M7)

Longitudinal studies examining health inequities in lower and middle income countries (LMICs) are rare. We examined gradients among small farm members participating in a health and agriculture program in highland Ecuador. We profiled 24 communities through key informant interviews, secondary data (percent of population with unsatisfied basic needs), and intervention implementation indicators. Pre (2005) and post (2007) surveys of the primary household and crop managers included common questions (education, age, a neurobehavioural performance indicator, digit span, scaled 0-10) and pesticide-related practice questions. Household assets and pesticide use variables were shared across managers. Multi-level models predicting 2007 digit span were constructed for each manager type with staged introduction of predictor variables. 376 household managers (79% of 2005 participants) and 380 crop managers (76% of 2005 participants) had complete data for analysis. The most important predictor of 2007 digit span was 2005 digit span: β (Standard Error) of 0.31(0.05) per unit for household managers; 0.17(0.04) for crop managers. Household asset score was next most important: 0.14(0.06) per unit for household and 0.14(0.05) for crop managers. Community percent with unsatisfied basic needs was associated with reductions in 2007 digit span: -0.04(0.01) per percent for household and -0.03(0.01) for crop managers. Health gradients among small farmers reflect life-course endowments, persistent neurotoxic pesticide exposure, and unequal social structures.

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SOCIOECONOMIC POSITION AND LONG-TERM DEPRESSION TRAJECTORY: A 13-YEAR FOLLOW-UP OF THE GAZEL COHORT STUDY. *M Melchior, J-F Chastang, J Head, M Goldberg, M Zins, H Nabi, N Younès (INSERM U1018 CESP, Villejuif, France)

Individuals with low socioeconomic position have high rates of depression at any point in time; however, it is not clear whether they also have worse depression trajectories. Most prior research was conducted in high-risk or clinical samples, and risk factors of long-term patterns of depression in the population at large are not well-known. To determine whether socioeconomic position, as measured by occupational grade, predicts depression trajectory, we used data from a cohort of 12,789 men and women participating in the French GAZEL cohort study who were followed for 13 years. Depression trajectory (low, decreasing, intermediate/increasing, persistently high), was assessed based on participants' Center for Epidemiological Studies-Depression (CES-D) score in 1996, 1999, 2002, 2005, 2008. Using multinomial logistic regression models, we found that participants in intermediate and low occupational grades were significantly more likely than those in high grades to have an unfavourable depression trajectory, especially persistent depression (age-adjusted Odds Ratios: respectively 1.40, 95% CI 1.16-1.70 and 2.65, 95% CI 2.04-3.45 in men, 2.48, 95% CI 1.36-4.54 and 4.53, 95% CI 2.38-8.63 in women). Up to 21% of the occupational gradient in long-term depression risk in men and up to 59% in women were statistically explained by marital status, tobacco smoking, alcohol consumption, body mass index, negative life events, and preexisting psychological and physical chronic health problems (respiratory disorders, cardiovascular disorder, arthrosis, diabetes and cancer). Long-term trajectories of depression follow a socioeconomic gradient. This implies that efforts aiming to reduce the burden of depression cannot exclusively focus on high-risk groups but should take into account the mental health needs of the entire population.

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EMPLOYMENT, NON-EMPLOYMENT AND PSYCHOLOGICAL DISTRESS IN CANADA. *A Marchand, A Drapeau, D Beaulieu-Prévost (University of Montreal, Montreal, QC H3C 3J7, Canada)

Previous studies have been unable to consider jointly employment status, occupations, work organisation conditions and reasons of non-employment in the experience of psychological distress. Different non-employment situations may associate differently with psychological distress. It is generally assumed that work is good for health, but workers may also experience mental health problems because of pathogenic occupations and work organization conditions. This study investigated variations in psychological distress according to employment status, occupations, work organisation conditions and reasons of non-employment. Data came from the Canadian National Population Health Survey of Statistics Canada (2000-2001). Multiple regression analyses were carried out on a sample of 8708 individuals aged between 18 to 75 years old. Occupation, social support at work, age, self-esteem, presence of children aged 0 to 5 and social support outside the workplace were associated with lower levels of psychological distress. Permanent and temporary disability, psychological demands in the workplace, job insecurity, female gender, stressful financial, marital and parental situations were associated with higher levels of psychological distress. Challenging the results of previous studies, this study found that any job is not always better than non-employment in explaining psychological distress. It also supported the idea that different non-employment situations associate differently with psychological distress. Because work mobilises a large time part of the adult life, the results suggest that the development of public health policies and interventions directed toward the regulation of mental health problems in the workplace are undoubtedly needed.

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PERSISTENT HUMAN PAPILLOMAVIRUS INFECTION AND CERVICAL INTRAEPITHELIAL NEOPLASIA: ANALYSIS OF LONG TERM FOLLOW-UP FROM THE LUDWIG-MCGILL COHORT. *A V Ramanakumar, S Ferreira, M C Costa, J S Sobrinho, J C M Prado, T E Rohan, L L Villa, E L Franco (McGill University, Montreal, QC, Canada)

Persistent human papillomavirus (HPV) infection is recognized as the causal intermediate in cervical carcinogenesis. Very few cohort studies with long term follow-up have been conducted to evaluate cumulative or persistent exposure to HPV infection and its relation with cervical lesions. We assessed the risk of cervical neoplasia in relation to prior HPV infections and their duration. A longitudinal study of HPV infection and cervical neoplasia was conducted during 1993-1997 in São Paulo, Brazil. Participants were followed-up with repeated measurements of HPV and cervical lesions until 2005. In total, 2361 women with normal cytology at enrolment were followed up for a maximum of 15 visits. Cervical smears were collected for PAP cytology, and HPV testing was done by MY09/11 and PGMV protocols (every 4 months in the first year and twice yearly thereafter). Cervical cancer precursor lesions were ascertained by expert review and reported using Bethesda classification. Among women never exposed to any HPV, the incidence rate of squamous intraepithelial lesions (SILs) was 0.17 per 1000 women-months (95% CI: 0.11-0.25) and 6.1 (95% CI: 4.9-7.6) among women previously exposed to at least one high oncogenic risk HPV infection. 88% of women with persistent high risk infections developed SIL during the follow-up period. Compared to women who were negative for any high risk HPV types, the relative risk (RR) of incident SIL was 12.0 (95% CI, 7.5-19.1) for women diagnosed with any known high risk HPV type(s). The equivalent RR of incident high-grade SIL was 18.6 (95% CI, 3.5-99.7), and increased to 88.7 (95% CI: 28.9-362.6) for women with persistent high-risk HPV infections. The RRs of lesions were considerably higher for persistent infections with HPV type 16 or 18. Genotyping for persistent HPV infections may serve an important role in cervical cancer screening and risk prediction.

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CERVICAL CANCER SCREENING IN AN URBAN JAIL. *S Kim, S Richardson, M Puisis, S Chakrabarti, F Davis. (University of Illinois at Chicago, IL 60612)

The number of incarcerated women in the US has been increasing. Health issues in this population are significant public health concerns, but women in jail are often excluded from conventional public health programs. The cervical cancer incidence and mortality rates are higher among ethnic minorities and women living in poverty. Considering characteristics of women in jail, the rate of abnormal cervical changes may be higher in this population than in the general population. But, little is known about screening and results of cervical cancer among incarcerated women. We examined cervical cancer screening results from 1999 to 2007 in the Cook County Jail (CCJ). The CCJ screening results were compared with the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) report and the Illinois incidence data. A total of 10,943 women received cervical screening in CCJ: 71% were black and 5.6% were Hispanic. 91% were normal, 3% exhibited abnormal changes, and 1% had invasive changes. Hispanic women had the highest rate of abnormal changes (4.4%), followed by black women (3.5%). The age adjusted rate of invasive changes in jail was higher than women in the NBCCEDP (0.67% vs. 0.59%), while the rate of abnormalities including low grade changes was lower for women in jail compared to the NBCCEDP (1.9% vs. 2.6%). Over 51% of women in the jail returned home before they received the results. The geographic maps showed that women in CCJ resided predominantly in disadvantaged neighborhoods. These areas also had high cervical cancer rate. Seamless linkages between jail and the public health systems in these neighborhoods may improve early detection and follow-up of cervical cancer among underserved women living in high prevalent areas.

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EPIDEMIOLOGIC APPROACH TO EVALUATE THE POTENTIAL FOR HUMAN PAPILLOMAVIRUS TYPE REPLACEMENT POST-VACCINATION. *J Tota, A V Ramana-Kumar, F Coutlee, L Villa, H Richardson, A Burchell, M H Mayrand, E L Franco (McGill University, Montreal, QC H2W 1S6, Canada)

Introduction: An important concern regarding human papillomavirus (HPV) vaccination is type replacement, i.e., the potential for the distribution of HPV types to change as a reflection of the vacated ecologic niches following the elimination of HPVs 16 and 18. We address the potential for type replacement using data available from four of our studies. Methods: HPV DNA testing and patient information came from: a) the Ludwig-McGill Cohort Study (n = 2462), b) the Biomarkers Cervical Cancer Research (BCCR) study (n = 1500), c) the HPV Infection and Transmission among Couples through Heterosexual activity (HITCH) cohort study (n = 503), and d) the Canadian Cervical Cancer Screening Trial (CCCaST) (n = 10154). In all studies HPV DNA was assessed using the well-established PGMV PCR protocol and linear array to permit genotyping of up to 37 genital types. We evaluated the joint prevalence of HPV types 16 and 18 with 36 other HPV types using baseline and one-year period prevalence information. For each pair combination, we calculated the expected frequency (E) of co-occurrence and compared this with the observed frequency (O). If the O/E ratio was < 1 with an associated 95% confidence interval (CI) that excluded the null value, this would suggest that the HPV type being considered should remain under suspicion for replacement. Results: For HPV 18, none of the HPV types with an O/E ratio < 1 were statistically significant. For HPV 16, only type 52 produced a statistically significant result. Conclusions: Results from this study provide empirical evidence against the argument for type replacement post-vaccination.

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HIGH PREVALENCE OF ORAL HUMAN PAPILLOMAVIRUS (HPV) AMONG HIV-POSITIVE AND HIGH RISK HIV-NEGATIVE ADULTS. *D Beachler, M Gillison, H Strickler, R Burk, R Cranston, D Wiley, K Weber, H Minkoff, S Reddy, J Margolick, G D'Souza (Johns Hopkins School of Public Health, Baltimore, MD 21205)

Human papillomavirus (HPV) causes a subset of head and neck squamous cell carcinomas (HNSCCs) but factors related to oral HPV infection are not well understood. We investigated oral HPV infection in participants from the Multicenter AIDS Cohort Study (MACS) and the Women's Interagency HIV Study (WIHS). Oral exfoliated cells were collected from 379 HIV-positive and 266 HIV-negative individuals. Samples were tested for 37 types of HPV DNA using PGMV09/11 consensus primers and reverse line blot hybridization. Risk factors for HPV infection were explored using logistic regression with robust variance and generalized estimated equations to adjust for the within-individual correlation among participants with multiple infections. Prevalent oral HPV infection was common, and significantly higher among HIV-positive than HIV-negative individuals (40% vs. 25%, p < 0.001). HPV16 was the most common HPV type detected (5.7%), which is among the highest reported prevalence in a non-cancer population. Effect modification by HIV-status and MACS/WIHS study were observed. Increased number of recent oral sex and rimming partners (p-trend < 0.001) were associated with oral HPV infection in HIV-negative but not HIV-positive individuals. Among HIV-positive individuals lower current CD4 T cell count was significantly associated with odds of oral HPV infection (p-trend < 0.001). The strong association between immunosuppression and increased oral HPV prevalence is similar to that observed for cervical HPV and may help explain the increased risk of HPV-associated HNSCC in HIV-positive individuals.

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DIAGNOSTIC VALUE OF PAPANICOLAOU CYTOLOGY WHEN HUMAN PAPILOMAVIRUS STATUS IS KNOWN. *L Richardson, A V Ramanakumar, G Sangwa-Lugoma, J Liaras, S Mahmud, A Ferenczy, A Lorincz, P Kayembe, R Tozin, E Franco (McGill University, Montreal, QC H2W1S6, Canada)

Background: In cervical screening, support is mounting for the use of Papanicolaou (Pap) cytology as a secondary (triage) test following primary screening for Human Papillomavirus (HPV) DNA. Diagnostic properties of Pap in this novel triage role are of great interest. To simulate this algorithm in true practice conditions, we assessed whether the accuracy of Pap smear readings would improve when cytotechnicians were aware of the patient's cervical HPV status. Methods: We used data and cervical specimens from a cervical cancer screening study in Kinshasa, Congo. Slides were re-read with knowledge of HPV status for all HPV-positive ($n = 153$) and a random sample of HPV-negative women ($n = 228$). Cervical disease was diagnosed by colposcopy with histological ascertainment. Un-weighted Kappa tests measured agreement between original readings and re-reads. Diagnostic accuracy of Pap cytology was compared and modeled. Results: Agreement between original Pap readings and re-reads was 79.1% (Kappa = 0.65). Proportions of women classified Pap-positive were higher when HPV-positivity was revealed versus concealed for borderline (42.5% vs. 37.3%) and low-grade (37.9% vs. 30.1%) cytology cut-offs. Excess borderline cervical abnormalities from re-reads were falsely positive, reducing specificity from 70.5% [95%CI = 61.9,78.1] to 64.4% [95%CI = 55.6,72.5]. We also examined the influence of factors related to the patient and laboratory. Conclusion: When the patient's cervical HPV status was revealed to cytotechnicians the diagnostic accuracy of Pap cytology was reduced, possibly as a result of the heightened awareness of potential abnormalities that could be missed."

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CHILDHOOD BODY MASS INDEX TRAJECTORIES: MODELING, ESTIMATES, CORRELATIONS, AND PREDICTORS. *X Wen, M W Gillman, K P Kleinman, S L Rifas-Shiman, B Sherry, E M Taveras (Obesity Prevention Program, Dept. of Population Medicine, Harvard Pilgrim Health Care Institute/Harvard Medical School, Boston, MA 02215)

Modeling childhood body mass index (BMI) trajectories versus estimating change in BMI between specific ages may improve prediction of later body-size-related outcomes. Prior studies of BMI trajectories are limited by relatively few repeated measures and insufficient use of trajectory information. Among 2,455 children seen at 62,755 pediatric well-child visits from birth to 18 y during 1980-2008, we fit individual BMI trajectories, separately for boys and girls, using mixed models with fractional polynomial functions. We estimated ages and BMI at infancy peak, BMI ("adiposity") rebound, and (applicable for some girls) adolescence peak where BMI curve reversed directions; and velocity and area under curve between these milestones. Among boys, mean (SD) ages at infancy BMI peak and adiposity rebound were 7.3 (0.7) and 50.8 (11.8) months, respectively. Among girls, mean (SD) ages at infancy BMI peak, adiposity rebound, and adolescence peak were 9.6 (1.6), 53.9 (9.3), and 207.1 (6.9) months, respectively. Ages at infancy peak and adiposity rebound were inversely correlated ($r = -0.39$), as were ages at adiposity rebound and adolescence peak ($r = -0.34$). BMI at infancy peak, adiposity rebound, and adolescence peak were positively correlated ($r = 0.61-0.87$). Overall, BMI trajectories did not differ by birth year, but blacks and Hispanics had later infancy peak and higher BMI at adiposity rebound than whites, and higher birth weight z-score predicted earlier adiposity rebound and higher BMI at all 3 milestone ages. Future research should evaluate impacts of these novel BMI characteristics on later outcomes.

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COMMUNITY-LEVEL AND INDIVIDUAL-LEVEL SOCIOECONOMIC STATUS EFFECTS ON ADOLESCENT SMOKING OUTCOMES: A MULTILEVEL GROWTH CURVE ANALYSIS. *C Mathur, D J Erickson, J L Forster (University of Minnesota, Twin Cities, MN 55454)

Social stratification distributes certain health behaviors across social groups, which in turn generates differences in health. Less is known about the differential effects of social class on youth smoking, although understanding these effects on adolescent smoking trajectories could guide prevention efforts. This analysis explores change over time in smoking and the independent effects of parental education (a proxy measure for individual-level socioeconomic status) and community-level socioeconomic status (SES) on both initial level of smoking and change over time during the course of adolescence. It also examines community-level SES as a potential effect modifier. Data were derived from a multi-wave study of adolescents, the Minnesota Adolescent Community Cohort study, a population-based, observational cohort study designed to assess the effects of tobacco control policies and programs on adolescent smoking. Cohort-sequential latent growth models were estimated. Results show that adolescents of parents with lower education smoke more over time compared to adolescents with more educated parents. Community-level SES was not associated with adolescent smoking. The interaction between individual- and community-level SES, however, was significant; residing in a community with a higher overall SES had a positive effect on smoking trajectories for low individual-level SES adolescents (they smoked more) and a negative effect on smoking trajectories among high individual-level SES youth (they smoked less). Results from the current study reinforces the findings of others that SES has contextual effects as well as individual effects, and extends these findings to smoking.

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A COMPARISON OF ANALYTICAL TECHNIQUES USED TO ANALYZE GAP TIMES IN RECURRENT EVENT DATA. *R J Steele, P-J Bergeron, I Shrier (McGill University, Montreal, QC, Canada)

Published analyses of time to recurrent event data (e.g. injury, hospitalization for chronic obstructive pulmonary disease) in many fields have analyzed only the time to first event. Unfortunately, these analyses ignore the richness of the data set, particularly the time differences to each event (or gap times) and do not address the question of whether a previous event is a causal risk factor for the time to subsequent events. The objective of this abstract is to compare the advantages and limitations of different statistical approaches to gap time analysis with a focus on methods that have recently appeared in the statistical literature, but have not been fully adopted by epidemiologists. In brief, we first demonstrate how a commonly used survival analysis approach is biased because it will always suggest a previous event increases the risk of a future event even if it does not. A simple modification restricting the sample to subjects with a certain number of events allows one to visually compare event risk but cannot easily accommodate statistical testing or the estimation of marginal distributions. Using an example of injury data from Cirque du Soleil, we then compare three different approaches: a proportional hazards model incorporating random effects, a modified semi-parametric approach using generalized estimating equations, and a doubly robust weighting approach. We compare the three different approaches with respect to both the ability to estimate relevant parameters, robustness to violations of model assumptions, and the complexity of the analysis and interpretation of results.

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THE NOVEL APPLICATION OF REPEATED EVENT SURVIVAL MODELS TO 20 YEARS OF LONGITUDINAL KIDNEY TRANSPLANT DATA FROM THE UNOS NATIONAL REGISTRY. *C S Bell, J R Angelo, J P Samuel, E L Cheung, M C Braun (Division of Pediatric Nephrology & Hypertension, University of Texas Health Science Center - Houston, Houston, TX 77030)

The United Network for Organ Sharing (UNOS) reported 16,829 kidney transplants completed in 2010 with more than 10% involving repeat transplant recipients who had previously received at least one kidney transplant. Current median graft survival times in primary kidney transplant recipients have improved due to superior immunosuppression regimens with a national average of 71.9% of grafts surviving at least 5 years after transplantation. Repeat transplants, done after the primary transplanted kidney has failed, have significantly lower survival times with 66.8% of repeat grafts surviving at least 5 years. Although longitudinal data on patients undergoing repeat transplantation exist, the majority of studies have used cross-sectional analysis to compare primary and repeat transplant outcomes in different patients with similar characteristics and transplant era. Repeated event survival models, specifically variance-corrected Cox models and discrete time general estimating equations (GEE), are better suited to examine the within-subject dependencies of transplant survival times as well as the effect of important time-varying factors such as donor matching characteristics. Between 1987-2007, the UNOS transplant registry has recorded 201,263 kidney transplants with 12,052 (6%) completed in repeat transplant recipients. By fitting both the Cox and GEE models to this data, we will assess the accuracy of each model's assumptions for use in longitudinal transplant data and the ability of these models to determine any within-patient correlation effect on repeat transplant outcomes. The goal of this study is to build more informative models that can assist clinicians in determining the best clinical course for repeat transplant recipients.

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RATE OF CHANGE IN ELDERLY WITH HIGH AND LOW COGNITIVE FUNCTION: A TEST OF COGNITIVE RESERVE. *M Glymour, C Tzourio, C Dufouil (Harvard School of Public Health, Boston, MA)

Objective: We hypothesized that if high cognitive function provides reserve to slow age-related cognitive declines then high-functioning elderly should decline more slowly than low-functioning elderly. We tested this hypothesis using quantile regression trajectory curves at high and low quantiles of cognitive performance in two independent cohorts. Methods: The ISAAC Verbal Fluency test was assessed up to four times in 4,480 residents of Dijon, France aged 65+ participating in the 3C study. Participants in the Assets and Health Dynamics Among the Oldest Old (AHEAD) cohort (n = 6,311) were assessed up to 7 times on immediate and delayed recall of a 10-word list of common nouns (range of the sum: 0-20). After assessing floor and ceiling effects, we estimated quantile regression trajectory models for the 20th, 50th, and 80th quantiles and compared rate of change at high and low quantiles for verbal fluency (in 3C participants) or word recall (AHEAD participants). We also assessed literacy (with NAART in 3C and a brief vocabulary test in AHEAD) and tested whether baseline literacy score modified rate of change in each quantile. Results: There were no significant differences in rate of decline between the 20th and 80th quantiles in Verbal Fluency in 3C participants. The 80th quantile declined more quickly than the 20th quantile on Word Recall in AHEAD participants. Baseline literacy did not predict rate of change at the 20th, 50th, or 80th quantile in 3C. Better baseline vocabulary was associated with slightly faster rate of decline in both the 20th and 50th quantiles in AHEAD. Conclusions: We find no support for the hypothesis that high cognitive function predicts slower rate of cognitive decline over time.

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LIFE COURSE SOCIOECONOMIC POSITION AND INCIDENCE OF DEPRESSIVE SYMPTOMS AMONG OLDER MEXICAN AMERICANS. *A Zeki Al Hazzouri, M N Haan, S Galea, A E Aiello (University of Michigan, Ann Arbor, MI 48109)

The socioeconomic gradient of depressive symptoms remains relatively unexplored among older Mexican Americans; majority of the work is cross-sectional and does not address the multiple dimensions of socioeconomic conditions. This analysis examines the associations between life course socioeconomic conditions and risk of depressive symptoms among a cohort (N = 1,789) of older Mexican Americans followed for up to a decade in the Sacramento Area Latino Study on Aging. Depressive symptoms were assessed at baseline and each of six follow-up visits by the 20-item Center for Epidemiologic Studies- Depression Scale. Indicators of socioeconomic position (SEP) from three life stages were used to derive a measure of cumulative disadvantage and a categorical measure of trajectories of SEP mobility. In fully-adjusted Generalized Estimating Equations models, the risk of depressive symptoms was 50% lower among participants who maintained high SEP across the life course (RR = 0.50; 95%CI = 0.34, 0.74; p-value = 0.0005) compared to those who maintained low SEP across the life course, at baseline. Participants with an upward or downward SEP trajectory but who achieved high education showed lower risk of depressive symptoms compared to those with low SEP across the life course (RR = 0.53; 95%CI = 0.28, 1.00; p-value = 0.05 and RR = 0.63; 95%CI = 0.46, 0.86; p-value = 0.004, respectively). In fully-adjusted models, an increase in one unit of cumulative SEP disadvantage was associated with a 7% increase in risk of depressive symptoms. Depressive symptoms later in life are shaped by life course socioeconomic experiences.

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NEUROBIOLOGICAL AND EARLY LIFE PREDICTORS OF VERBAL LEARNING IN THE ELDERLY. *J Kuo, L Beckett, D Harvey, (University of California-Davis, Davis, CA 95616)

The relationship between biological determinants and brain pathology on practice effects in longitudinal cognitive assessments was investigated in elderly normal controls (NC) and mild cognitive impairment (MCI) individuals in the Alzheimer's Disease Neuroimaging Initiative (ADNI). Mixed-model analyses were used to examine the effects of these predictors on performance on the Rey Auditory Verbal Learning Test (RAVLT) and the word-list learning portion of the Alzheimer's Disease Assessment Scale-cognitive subscale (ADAS-Cog); both tests had multiple trials at each visit. Individuals with smaller volume of brain regions associated with memory (hippocampus, entorhinal cortex) experienced less verbal learning within a visit regardless of age, APOE genotype, and diagnostic category. The occipital lobe, not known to be associated with Alzheimer's disease (AD) or learning, served as a crosscheck for region-specific brain volumes versus whole brain atrophy; it was not associated with word-list learning. Increased CSF beta amyloid levels were associated with increased learning per trial and higher levels of CSF p-tau with lower scores at both the visit and the trial level. FDG-PET measures in the temporal and parietal lobes and posterior cingulate were not associated with word-list learning trends. The final part of this analysis explored whether the baseline within-visit learning trend in the RAVLT predicted subsequent progression from MCI to AD. Total word-list learning was highly predictive of a delay in progression from MCI to AD regardless of demographics or memory-related brain structure volume. Assessing practice effects within each visit gives a direct measure of learning associated with biological determinants and is predictive of progression to AD.

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HIPPOCAMPAL VOLUME AND DEPRESSIVE SYMPTOMS IN A COHORT OF OLDER ADULTS. *M Elbejjani, R Fuhrer, B Mazoyer, F Crivello, C Tzourio, C Dufouil (Dept. of Epidemiology, Biostatistics and Occupational Health, McGill University, Montreal, QC, Canada H3A 1A2)

Several studies have reported that people with depression have reduced hippocampal volumes (HCV) while other reports found no association. These studies were mostly cross-sectional, based on small clinical samples, and thus their results remain debated. Our study's objective was to explore the association between HCV and depressive symptoms using a longitudinal design and a community-based sample. The study sample was a prospective cohort ($n = 794$) of older adults aged 63-75 years who had a magnetic resonance imaging scan at baseline and repeated measurements of depressive symptoms for over 3 years of follow-up. HCV was measured using automated methods. Subject-specific mixed models were used to estimate the cross-sectional and longitudinal associations between adjusted HCV (per mille of total intracranial volume) and depressive symptoms (Center for Epidemiologic Studies-Depression scale). Cognitive functioning was considered both as a confounder and a mediator. Larger fractional HCV at baseline was associated with lower concomitant depressive symptoms ($\beta = -1.14$; 95% CI: -2.19, -0.09, $p = 0.034$) and with an additional decrease in depressive symptoms ($\beta = -0.54$; 95% CI: -1.09, 0.013, $p = 0.056$) for each 1.5 year of follow-up time. Potential confounding for health and individual characteristics did not explain these findings. The results remained similar under both models of the role of cognition: one adjusted for confounding by cognition and another wherein cognitive functioning was treated as an intermediate factor. In conclusion, larger fractional HCV was associated with fewer concurrent and subsequent depressive symptoms.

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A COMPARATIVE EFFECTIVENESS STUDY OF RHYTHM VS RATE CONTROL TREATMENT IN PATIENTS WITH ATRIAL FIBRILLATION. *R Ionescu-Ittu, M Abrahamowicz, C Jackevicius, V Essebag, M Eisenberg, H Richard, L Pilote (McGill University, Montréal, QC H3A1A2, Canada)

The 2002 AFFIRM trial showed no difference in 5-year mortality between rhythm and rate control treatment strategies, but no observational studies have confirmed this finding in the general population of atrial fibrillation (AF) patients. We performed a population-based comparative effectiveness study of the impact of rhythm vs. rate control therapy in decreasing long-term mortality of AF patients. We used administrative data from Quebec, Canada from 1999 to 2007 to select patients aged ≥ 66 hospitalized with an AF diagnosis who did not have AF-related drug prescriptions in the year before the admission, but received a prescription within 7 days of discharge. Patients were followed until death or administrative censoring in December 2007. Data were analyzed by multiple Cox regression. Among 30,664 patients followed for a mean of 3.1 years, there were 15,494 (50.5%) deaths. After adjusting for covariates, mortality was similar in the two treatment groups after the first 3 years of follow-up (hazard ratio 0.96, 95% CI 0.92-1.00). The mortality became 12% lower for the rhythm control group after 5 years of follow-up (0.88, 0.82-0.94), and 23% lower after 8 years (0.77, 0.68-0.86) after 8 years. In this population-based study we found no difference in mortality between patients initiating rhythm vs rate control therapy within 3 years of treatment initiation, but rhythm control therapy appears to be superior in the long-term. The comparison of the methodology and findings of recent randomized trials vs this population-based observational study suggests potential differences in the treatment effect among patients with different baseline risks of outcome.

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USE OF THE CASE-CENTERED ANALYTIC METHOD IN EPIDEMIOLOGIC STUDIES OF IMMUNIZATION SAFETY. *A Rowhani-Rahbar, B Fireman, N Lewis, N Klein, R Baxter (Northern California Kaiser Permanente Vaccine Study Center, Oakland, CA 94612)

In immunization safety research, traditional cohort and case-control designs compare the incidence of an adverse event (AE) or the odds of receipt of a vaccine between distinct individuals. Due to confounding arising from inherent differences between immunized and unimmunized individuals, vaccinated-only (risk-interval) and case-only (self-controlled case series) designs, where comparisons are made within the same individual between risk (exposed) and control (unexposed) intervals, have gained popularity. In this presentation, we will review the features of a new analytic approach (case-centered method) that could serve as a valuable design in epidemiologic studies of immunization safety [1]. In this method, all immunized individuals with the AE of interest (i.e., exposed cases) during a certain observation period are selected. A logistic regression model with an intercept only and an offset term is used to calculate the odds ratio. The dependent variable is the immunization status of each case in relation (inside vs. outside) to a risk interval of interest prior to the development of the AE in her/him. The offset term is the expected odds of immunization in the risk interval for each case, which is calculated using information from the underlying population who belong to that individual's risk set. We will show the application of this method in epidemiologic research through discussing a recently published Vaccine Safety Datalink study of the association between immunization with measles-mumps-rubella-varicella (MMRV) vaccine and febrile seizure [2]. 1. Fireman B, et al. *Am J Epidemiol* 2009; 170:650-6. 2. Klein N, et al. *Pediatrics* 2010; 126:e1-8.

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A METHODOLOGY TO USE THE MEDICARE CLAIMS DATABASE TO EVALUATE MEDICAL DEVICE SAFETY: THE CASE OF UROGYNECOLOGIC SURGICAL MESH FOR REPAIR OF PELVIC ORGAN PROLAPSE. *C J Krulewicz, M E Ritchey, H Cheng, D Marinac-Dabic, T Gross, Gibbs J (Food and Drug Administration, Center for Devices and Radiological Health, Washington, DC)

Background: The Medicare claims database allows population-based research with a longitudinal cohort. Pelvic organ prolapse (POP) is a significant health issue for women worldwide. As surgical methods have rapidly evolved, surgical mesh has become popular. In October 2008, FDA issued a Public Health Notification to healthcare practitioners regarding surgical mesh used to treat POP and stress urinary incontinence (SUI). Objective: This study aims to create a methodological process to identify medical device use and evaluate the long-term adverse effects through subsequent billable events using the Medicare claims database. Method: We used 100% of the records in the Medicare claims database from 2006-2010, using Current Procedural Terminology (CPT) and the International Classification of Disease, Ninth Revision, Clinical Modification (ICD-9-CM) convention. Subjects having a transvaginal POP procedure and who were continuously enrolled in the database 180 days prior to the surgery and 365 days following surgery were included into the cohort and evaluated for that time period. Subjects were categorized by the use of surgical mesh in the procedure (mesh/no mesh). Demographic and hospital information, and comorbidity factors were evaluated. Results: We identified 212,129 patients with POP procedures. 115,631 surgeries without mesh and 96,498 surgeries with mesh from 1/1/06 to 9/30/10. There was a 2.2 (1.98-2.68) times increased risk of having a repeat surgery among women who had the procedure with mesh compared to those without mesh.

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STIMULANT TREATMENT AND INJURY AMONG CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD): AN APPLICATION OF THE SELF-CONTROLLED CASE SERIES STUDY DESIGN. *S R Raman, S W Marshall, T Stürmer, B Gaynes, K Haynes, A J Naftel (University of North Carolina at Chapel Hill, Chapel Hill, NC)

Background: Children with ADHD experience high rates of injuries and stimulant medication use is hypothesized to decrease injury risk by reducing symptoms. Objective: To assess the association between stimulant medication use and risk of injury among children diagnosed with ADHD. Methods: All children ages 1 to 18 years old diagnosed with ADHD who experienced an incident medically-attended injury event and received at least 1 prescription for stimulant medication between 1993 and 2008 (n = 328) were identified from the UK-based Health Improvement Network (THIN) primary care database. A self-controlled case series method was used to estimate incident rate ratios (IRR) and 95% confidence intervals (CI) for injury comparing periods of time exposed to stimulant medication to unexposed periods. Results: The rate of medically-attended injury was decreased during periods of stimulant medication use as compared to unexposed periods [IRR (95%CI): 0.70 (0.52, 0.93)]. The association was clearly apparent for males and did not decline with increasing time on treatment. Estimates stratified by injury type, day of injury, and period of time (pre or post 2000) were all similar to the main estimate, except for head injury (IRR = 1.18; 95%CI: 0.56, 2.48). Excluding post-diagnosis untreated time prior to medication initiation yielded a slightly higher estimate (IRR = 0.82, 95%CI: 0.58, 1.17). Conclusions: Stimulant medication use may be associated with a decreased risk of injury among children treated for ADHD. Injury risk can be considered in the decision-making process about the use of stimulant medication for ADHD.

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OBJECTIVELY-ASSESSED PHYSICAL ACTIVITY, SEDENTARY TIME AND BIOMARKERS OF BREAST CANCER RISK IN POSTMENOPAUSAL WOMEN: NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY 2003-06. *B M Lynch, C M Friedenreich, E Winkler, G N Healy, J Vallance, E Eakin, N Owen (Alberta Health Services, Calgary, AB T2N 2C7, Canada)

Physical activity reduces the risk of postmenopausal breast cancer through multiple inter-related biologic mechanisms; sedentary time may contribute additionally to cancer risk. We examined cross-sectional associations of objectively-assessed physical activity and sedentary time with biomarkers of breast cancer risk (waist circumference, homeostasis model assessment of insulin resistance (HOMA-IR) and C-reactive protein (CRP)) in 1093 postmenopausal women. Participants wore an accelerometer for 7 days; data were summarized as moderate-vigorous (≥ 1952 counts per minute; cpm), light (100-1951 cpm) and sedentary time (< 100 cpm). Further, to consider effects of *how* moderate-vigorous activity was accrued, the length of individual bouts was averaged across valid days of data recording. Similarly, mean duration of all sedentary bouts was estimated. Waist circumference measurements and blood draws were taken by study staff at examination centers. Moderate-vigorous activity was inversely associated with waist circumference ($p < 0.001$), HOMA-IR ($p = 0.006$) and CRP ($p = 0.007$) in adjusted models. There were no associations with light activity or sedentary time. Mean length of moderate-vigorous bouts was inversely associated with CRP ($p = 0.017$), while sedentary bouts were positively associated with waist circumference ($p < 0.001$) and HOMA-IR ($p = 0.039$). These findings confirm the beneficial effects of moderate-vigorous activity on breast cancer risk. Longer sedentary bouts may have deleterious effects on adiposity and insulin resistance: interrupting prolonged periods of sedentary time could also decrease breast cancer risk.

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CANCER PREVENTION RECOMMENDATIONS AND COLORECTAL CANCER RISK. *T Hastert, E White (Fred Hutchinson Cancer Research Center, Seattle, WA)

In 2007 the World Cancer Research Fund and the American Institute for Cancer Research published 8 recommendations regarding body weight, physical activity and dietary behaviors aimed at reducing cancer incidence worldwide based on a comprehensive review of the literature related to common cancers. We operationalized five of those recommendations (maintaining normal body weight, getting 30 minutes of moderate physical activity per day, eating at least 14 oz of non-starchy fruits and vegetables per day, consuming no more than 18 oz of red meat per week, and limiting alcohol intake to one drink per day for women and two for men) and examined their association with colorectal cancer incidence over 7 years of follow-up in the VITamins And Lifestyle (VITAL) Study cohort. Participants included 60,956 men and women aged 50-76 years at baseline in 2000-2002 with no history of colorectal cancer and with complete data for the recommendations evaluated. Incident colorectal cancers (n = 507) were tracked through the Western Washington Surveillance, Epidemiology and End Results (SEER) registry. The median number of recommendations followed was 2 (0-5). After adjusting for age, sex, education, race/ethnicity, marital status, non-steroidal anti-inflammatory use, pack-years of smoking, sigmoidoscopy in past 10 years and history of colorectal cancer in a first-degree relative, meeting even one recommendation reduced cancer risk by half (hazard ratio (HR) 0.48, 95% CI 0.32-0.71). Meeting 2-4 recommendations conferred similar benefits; however, adherence to all 5 recommendations was associated with an 80% reduction in colorectal cancer risk (HR 0.20, 95% CI 0.06-0.66). These results suggest that adherence to the WCRF/AICR body weight, physical activity and dietary recommendations could substantially reduce risk of colorectal cancer.

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ASSOCIATION BETWEEN PHYSICAL ACTIVITY AND OXIDATIVE STRESS: RESULTS FROM THE MONICA/KORA AUGSBURG SURVEYS 1984-1995. *C S Autenrieth, R Emeny, C Herder, A Döring, A Peters, W Koenig, B Thorand (Institute of Epidemiology II, Helmholtz Zentrum München, German Research Center for Environmental Health, Neuherberg, Germany)

Background: Oxidative stress-induced cell damage contributes to several chronic conditions such as cardiovascular disease, but only few studies have examined the influence of regular physical activity (PA) on oxidative stress markers. Methods: 910 men and 911 women aged 35-74 years were randomly drawn from three population-based MONICA/KORA Augsburg Surveys conducted between 1984 and 1995 as part of a case-cohort study. Multivariable linear regression was used to calculate geometric means of the oxidative stress markers myeloperoxidase (MPO) and oxidized LDL (ox-LDL) for four levels of self-reported work and leisure PA. Adjustments were made for age, survey, education, body mass index, alcohol consumption, smoking status, actual hypertension, diabetes, total-to-HDL cholesterol ratio, and self-reported limited PA due to health problems. Results: Mean ox-LDL concentrations were lower for men engaging in vigorous physical work (91.54 U/ml; 95% confidence interval (CI), 86.80-96.54) compared to the inactive reference group (95.75 U/ml; 95% CI, 92.41-99.21) (p for trend across PA levels: 0.028). Men, who reported > 2 hours/week of leisure PA, had lower MPO concentrations (123.35 $\mu\text{g/ml}$; 95% CI, 113.57-133.97) than the non-active group (134.01 $\mu\text{g/ml}$; 95% CI, 125.48-143.13) (p for trend across PA levels: 0.035). Among women, no significant association between oxidative stress markers and PA (p for trend between 0.120 and 0.955) was observed. Conclusion: These data indicate that regular leisure and work PA may reduce the level of oxidative stress markers among men.

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INTERPROVINCIAL PHYSICAL ACTIVITY RANKINGS VARY WITH ACTIVITY DOMAIN *B Theis, R Raut, H Irving, L D Marrett (Cancer Care Ontario, Toronto, ON M5G 1X3, Canada)

Leisure-time physical activity is widely reported in Canadian health reports. Despite concerns about validity, particularly for trends, it is the primary indicator used to compare jurisdictions because of its comprehensive question set and consistency across survey waves. In 2005 the Canadian Community Health Survey collected data on three domains of physical activity: leisure, active transportation (walking/bicycling to work/school), and occupational. We compared provincial and territorial rankings for 2005 by age-standardized estimates of the percent adult population at least moderately active, separately for leisure, active transportation, and occupational physical activity. Leisure and transportation activity levels were based on metabolic equivalent values; occupational information was less detailed. Leisure activity showed a commonly cited east-west gradient, ranging from 44%–46% in three Atlantic provinces and Nunavut to 58% in British Columbia (BC). Conversely, for occupational activity the northern territories and western provinces ranked low or intermediate (71% in the Yukon, 77% in BC) while eastern provinces were highest (82% in Newfoundland-Labrador). Active transportation showed yet a different ranking, with the lowest level in Quebec (20%) and highest levels in Saskatchewan (40%) and the territories. Survey methods literature suggests subculture differences in differentiating among leisure, transport and work activities and in question comprehension, and varied rankings by physical activity domain has face validity. In addition, combining domains presents methodologic challenges. Our findings suggest that caution be used, and all available domains be examined, when interpreting Canadian geographic variation in physical activity.

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THE IMPLICATIONS OF BODY MASS INDEX, CHANGES IN PROSTATE SPECIFIC ANTIGEN LEVELS AND PROSTATE VOLUME ON PROSTATE CANCER DETECTION. *L P Wallner, H Morgenstern, M E McGree, D J Jacobson, J L St. Sauver, S J Jacobsen, A V Sarma (University of Michigan, Ann Arbor, MI)

The goal of this study was to investigate the association of body mass index (BMI) and BMI change with change in prostate specific antigen (PSA) level and to assess the possible roles of PSA hemodilution and prostate volume in explaining the associations of obesity with PSA level. In 1990, a randomly selected cohort of Caucasian men, ages 40-79 years, from Olmsted County, MN completed questionnaires that ascertained demographic characteristics, current medical conditions and medications. Men were followed biennially thereafter, with a subset undergoing blood draws and clinical exams. Linear mixed effects models were used to predict annual changes and intercepts of individual changes in BMI, PSA, prostate volume, plasma volume, and PSA mass in 545 men with at least two serial PSA, BMI and prostate volume measurements. Baseline BMI was inversely associated with the annual percent change in PSA, after adjusting for baseline age, PSA, and prostate volume and the rates of change in BMI and prostate volume ($\beta = -0.003$, 95% Confidence Interval: -0.006, -0.0003). Baseline obesity was positively associated with mean baseline values in prostate volume ($p = 0.002$) and with mean baseline levels and rate of change in plasma volume ($p < 0.001$) but was not associated with either the mean baseline values or the rate of change in PSA mass. Our results suggest the inverse association of obesity with prostate cancer diagnosis may be partly due to decreased detection, stemming in part from larger prostate volumes and PSA hemodilution in obese men.

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SOCIOECONOMIC STATUS, DIAGNOSTIC INTENSITY, TREATMENT AND MORTALITY IN MEN WITH HIGH RISK PROSTATE CANCER: A POPULATION-BASED STUDY IN PCBASE SWEDEN. *A Berglund, H Garmo, D Robinsson, C Tishelman, L Holmberg, O Bratt, J P Stattin, M Lambe (Dept. of Medical Epidemiology and Biostatistics, Karolinska Institute, Stockholm, Sweden)

To investigate if socioeconomic status is associated with diagnostic intensity, treatment, and mortality in men with high risk prostate cancer (PCa). The study was based on a nationwide population-based register study in PCBaSe Sweden. Socioeconomic status was defined by occupation. Main outcome measures were use of bone scan, treatment and mortality. We identified 17522 men with high risk PCa diagnosed between 1997 and 2006. Bone scan was more often performed in higher white-collar than in blue-collar workers, odds ratio 1.30 (95% confidence interval 1.21-1.40). In men with no metastases, the odds ratio of intention to treat was higher in higher white-collar workers, 1.43 (1.28-1.57). Among men who received curative treatment, the likelihood was higher to undergo prostatectomy for higher white-collar patients, odds ratio 1.29 (1.10-1.47). In men with no metastases, the cumulative 10-year PCa-specific mortality after curative therapy was 10.0% (6.7-13.3%) in higher white-collar workers and 14.4% (11.2-17.8%) in blue-collar workers. In the same group, the overall mortality was lower among higher white-collar workers, hazard ratio 0.76 (0.60-0.97) and PCa-specific mortality, 0.70 (0.49-0.99). In men with high risk prostate cancer managed within the Swedish national health care system, there was a higher diagnostic and treatment intensity and lower mortality in higher white collar worker. These findings may reflect social inequalities in access to care, general health status, variations in physician's adherence to guidelines and patient-physician interaction.

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LIFETIME STRESS AT WORK AND RISK OF PROSTATE CANCER. *L D D Vilela, M Desy, M-E Parent (INRS-Institut Armand-Frappier, Laval, QC H7V 1B7, Canada)

Psychosocial factors may play a role in cancer aetiology. Potential mechanisms proposed include an alteration of the immune function and/or of hormone levels. Several studies have suggested a link between stress and breast cancer risk. Hardly any evidence exists for other cancer types. Prostate cancer is thought to be influenced, at least in part, by environmental circumstances modulating hormone levels. We report here on the association between lifelong stress at work and prostate cancer risk in the context of a case-control study involving 973 incident, pathology confirmed prostate cancer cases and 1,087 population controls in Montreal, Canada. As part of in-person interviews, subjects were asked to provide a detailed description of each job held over their lifetime, including specific tasks, and were asked to indicate whether these jobs made them feel tense, anxious or stressed. Regression analysis was used to estimate odds ratio (OR) and 95% confidence intervals (CI) associated with stress at work, while adjusting for age, ethnicity, first-degree family history of prostate cancer and education. Compared to men reporting no work-related stress, the OR among those who did increased with longer cumulative durations of work-related stress (p for trend = 0.023). The ORs for prostate cancer according to the duration of work-related stress were: OR(1-10 years) = 1.12, 95%CI 0.81-1.54; OR(11-20 years) = 1.17, 95%CI 0.87-1.58; OR(21-30 years) = 1.32, 95%CI 1.00-1.74; OR(more than 30 years) = 1.29, 95%CI 1.02-1.64. Results remained unaltered when income, smoking, alcohol intake and body mass index were accounted for. Our findings of an association between work-related stress and prostate cancer are largely novel and require replication in other studies.

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GENETIC VARIATION IN BASE EXCISION REPAIR PATHWAY GENES, PESTICIDE EXPOSURE, AND PROSTATE CANCER RISK. *K H Barry, S Koutros, S I Berndt, G Andreotti, J A Hoppin, D P Sandler, L A Burdette, M Yeager, L E Beane Freeman, J H Lubin, X Ma, T Zheng, M C R Alavanja (DCEG, NCI, NIH, DHHS, Rockville, MD 20852)

Previous research indicates increased prostate cancer risk for pesticide applicators. Given evidence suggesting a role of oxidative DNA damage and the importance of the base excision repair (BER) pathway in repairing this damage, we evaluated interactions between 39 pesticides and 394 tag single nucleotide polymorphisms (SNPs) for 31 BER genes among 776 prostate cancer cases and 1,444 controls in a nested case-control study of white male Agricultural Health Study (AHS) pesticide applicators. We used likelihood ratio tests from logistic regression models to estimate interaction *P*-values, using three-level pesticide variables (none/low/high) based on lifetime days of use weighted to an intensity score, and the False Discovery Rate (FDR) multiple comparison adjustment approach. Men with CT or TT genotypes for *NEIL3* rs1983132 exhibited a monotonic increase in prostate cancer risk with increasing fonofos exposure (Odds Ratio for high versus no use = 3.25; 95% Confidence Interval: 1.78-5.92), whereas men with the CC genotype exhibited no change ($P_{\text{interaction}} = 9.3 \times 10^{-6}$; FDR *P*-value = 0.01). Carbofuran and EPTC interacted similarly with rs1983132, as did fonofos, terbufos and atrazine with other *NEIL3*, *XRCC1*, *TDG*, *LIG1* and *POLE* SNPs, although results did not meet FDR < 0.2. Our significant fonofos finding is consistent with previous AHS findings of increased prostate cancer risk with fonofos exposure among those with a family history of prostate cancer. While requiring replication, our results suggest a role of BER genetic variation in pesticide-associated prostate cancer risk.

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DIETARY CHOLESTEROL AND CANCER RISK. *J Hu, C La Vecchia, M de Groh, E Negri, L Mery (Science Integration Division, CCDPC, Public Health Agency of Canada, Ottawa, ON, Canada)

This study assesses the association between dietary cholesterol intake and the risk of various cancers. Mailed questionnaires were completed between 1994 and 1997 in 8 Canadian provinces by 1182 incident, histologically confirmed cases of the stomach, 1727 of the colon, 1447 of the rectum, 628 of the pancreas, 3341 of the lung, 2362 of the breast, 442 of the ovary, 1799 of the prostate, 686 of the testis, 1345 of the kidney, 1029 of the bladder, 1009 of the brain, 1666 non-Hodgkin's lymphomas (NHL) and 1069 leukaemias, and 5039 population controls. Information on dietary habits and nutrition intake were obtained using a 69-item food frequency questionnaire, which provided data on eating habits two years before the study. Odds ratios (OR) and 95% confidence intervals (CI) were derived by unconditional logistic regression to adjust for total energy intake and other potential confounding factors. Dietary cholesterol was positively associated with the risk of cancers of the stomach (OR, 1.60 for the highest versus the lowest quartile), colon (OR, 1.45), rectum (OR, 1.74), pancreas (OR, 1.57), lung (OR, 1.61), breast (OR, 1.45) (mainly postmenopausal, OR, 1.48), kidney (OR, 1.41), bladder (OR, 1.54) and NHL (OR, 1.36). In contrast, cholesterol intake was inversely associated with prostate cancer. No significant association was observed for cancers of the ovary, testis and brain. Our findings add to the evidence that high cholesterol intake is linked to increased risk of various cancers. A diet low in cholesterol may play a role in the cancer prevention of several cancers.

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CHANGES IN EXPRESSION OF CRITICAL PROSTATE CANCER GENES UPON EXPOSURE TO ENVIRONMENTAL ANTI-ANDROGENIC PESTICIDE, VINCLOZOLIN. *S Prasad, D Krewski, J Gomes (University of Ottawa, Ottawa, ON, Canada)

Prostate cancer (PCa), the most commonly diagnosed cancer in the developed world, is a hormonal disease highly dependent on proper functioning and expression of several regulatory genes. Vinclozolin (VCZ), an antiandrogenic fungicide commonly used on food crops, acts as an endocrine disrupting chemical (EDC) on prostate cells and has shown to alter expression of androgen dependant genes. VCZ is known to produce transgenerational epigenetic alterations in rat offsprings including atrophy of the prostate. Due to its anti-androgenicity, VCZ may alter expression of androgen dependant genes and genes involved in metabolism that are common in development of PCa. These include: GSTP1, a phase II xenobiotic metabolizing enzyme gene, NKX3.1, a tumour suppressor gene involved in regulating normal prostate epithelial growth, CYP3A4, gene involved in xenobiotic metabolism and PCa development when dysregulated. We examined the expression of the genes of interest in prostatic cells from dose- and time-dependent exposures to VCZ. Androgen-sensitive human LNCaP cells were exposed to endogenous hormone dihydrotestosterone and VCZ in a time- and dose-dependent manner. Treated and untreated cells were harvested at 6, 12, 24 and 48 after exposure test to substances at 100uM, 10uM, 1uM, 100nM and 10nM. Changes in gene expression levels were quantified using qRT PCR. Common reference genes (Actin, GAPDH, HPRT1, ALAS1 and TBP) were tested for normalization of genes of interests. Stability comparison of reference genes was calculated by geNorm and average expression stability measure, M, of each reference gene was determined. Gene expression was observed to be inversely associated with exposure. The expression of GSTP1 and NKX3.1 was significantly reduced at higher level exposures. It is evident that EDCs have the potential to communicate with endogenous hormones and alter expression of important genes. More work is needed to elucidate the pathway and mechanistic role of EDCs in PCa.

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UNKNOWN STAGE CANCER IN THE UNITED STATES: A POPULATION-BASED STUDY. *A E Anderson, R M Merrill, A Sloan, K Ryker (Brigham Young University, Provo, UT 84602)

Purpose: To provide an assessment of unknown stage disease for 18 cancer sites in the United States, according to the influence of age, sex, race, marital status, incidence, and lethality. Methods: Analyses are based on 1,040,381 male and 1,011,355 female incident cancer cases diagnosed during 2000 through 2007. Data were collected by population-based cancer registries in the National Cancer Institute's Surveillance, Epidemiology, and End Results Program. Results: The percentage of unknown stage cancer decreased from 2000 through 2007 for the majority of cancer sites in whites; for liver and prostate cancer in black males; and for stomach, lung and bronchus, and breast cancer in black females. For each cancer site considered, the percentage of unknown stage significantly increased with age and was lower among married men than among women. The percentage of unknown stage disease was similar between males and females except for esophageal and stomach cancers after adjusting for age and other variables. Blacks compared with whites had significantly higher unknown stage cancers of the urinary bladder, colon, rectum, skin (melanoma), and corpus uteri. Less common cancers with poorer survival are significantly more likely to be assigned an unknown stage. Conclusion: Staging of disease has increased for several major cancer sites, more so for white than for black patients. Unknown stage assignment increases with age and is higher for blacks and for unmarried patients. With only a few exceptions, sex is not associated with unknown staging. Patients with less prevalent, more lethal cancers are less likely to be staged.

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PARENTS' DIET BEFORE THE CHILD'S CONCEPTION AND CHILD'S RISK OF RETINOBLASTOMA RESULTING FROM NEW GERMLINE *RB1* MUTATION. *G Bunin, M Tseng, A Ganguly (Children's Hospital of Philadelphia, University of Pennsylvania, Philadelphia, PA 19104)

Although radiation and chemicals induce germline mutations in animals, no effects in humans have been detected. Sporadic bilateral retinoblastoma, a cancer of young children, results from a new germline *RB1* mutation, i.e. one that happens anew in a parents' germ cell before the child's conception and is passed to the child. We conducted a case-control study of parents' exposures before the child's conception as possible risk factors. Parents of 206 cases from 9 North American institutions and 269 age-matched friend controls participated; fathers of 182 cases and 223 controls and mothers of 204 cases and 260 controls answered a food frequency questionnaire by phone. Cases provided DNA for *RB1* mutation testing. In univariate analysis, significant associations with fathers' fruit, dairy, cured meats, and sweets consumption were observed; 6 other food groups had little effect. The odds ratios (ORs) and 95% confidence intervals (CIs) per father's daily serving, from conditional logistic regression and adjusted for the 3 other significant food groups, race, education, child's birth year, and total calories were: fruit, 0.8 (0.6, 1.2, $p = 0.31$); dairy, 0.8 (0.6, 1.1, $p = 0.19$); cured meats, 4.7 (1.3, 12, $p = 0.002$); and sweets, 1.9 (1.3, 2.9, $p = 0.001$). Mothers' food groups showed little effect (ORs = 0.9 to 1.4). The *RB1* mutation spectrum of cases did not differ by parents' diet. The results suggest an effect of father's but not mother's diet on risk of new germline *RB1* mutation, a pattern consistent with the paternal origin of 85% of these mutations, although bias, confounding and/or chance may also explain our results.

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ANTHROPOMETRIC FACTORS AND RISK OF CUTANEOUS MELANOMA: THE FRENCH E3N PROSPECTIVE COHORT. *M Kvaskoff, A Bijon, S Mesrine, F Clavel-Chapelon, M C Boutron-Ruault (Inserm U1018, Villejuif, France)

Several epidemiological studies examined the relationships between anthropometric factors and melanoma risk in women, but results were inconsistent, few analyses involved large prospective cohort data, and most studies included only a narrow range of characteristics. To investigate the associations between melanoma and anthropometric factors in women, we used data from E3N, a French prospective cohort involving 98,995 women born in 1925-1950. Participants completed self-administered questionnaires sent biennially over 1990-2005. Relative risks (RRs) and 95% confidence intervals (CIs) were computed using Cox regression models. A significant inverse dose-response relationship was observed between melanoma risk and leg length-to-height ratio (0.467-0.481: RR = 0.87, 95% CI = 0.63 to 1.19; ≥ 0.482 : RR = 0.66, 95% CI = 0.47 to 0.93; compared with < 0.467 ; p for trend = 0.02). Sitting height was positively associated with melanoma risk (83-85 cm: RR = 1.80, 95% CI = 1.26 to 2.56; ≥ 0.86 cm: RR = 1.66, 95% CI = 1.15 to 2.39; compared with < 0.83 cm; p for trend = 0.009). There were inverse associations between melanoma risk and body silhouette at menarche (large: RR = 0.77, 95% CI = 0.59 to 1.00; compared with lean) and at ages 35-40 years (medium: RR = 0.80, 95% CI = 0.65 to 0.99; large: RR = 0.79, 95% CI = 0.61 to 1.00; compared with lean; p for trend = 0.04). Other anthropometric characteristics were not significantly associated with risk. These findings suggest an influence of the pre-pubertal environment on melanoma risk later in life. This study is the first to explore associations between melanoma risk and components of height and body silhouettes. Further studies should investigate these potential relationships.

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SPATIAL ANALYSIS OF ENVIRONMENTAL RADIONUCLIDES AND CANCER RISK IN GEORGIA COUNTIES. *S E Wagner, S L Rathbun, A R Bayakly, J E Vena (University of GA, Athens, GA 30602)

The impact of exposure to radionuclides on cancer risk is not well understood, though, there is evidence suggesting a relationship. Georgia (GA) has racial health disparities, groundwater use, and elevated uranium and radon in some regions. A geographic information system was used to evaluate the relationship between radionuclides and cancer incidence from the GA Comprehensive Cancer Registry (1998-2005). Age-adjusted lung (N = 42,265), breast (N = 49,293), colon (N = 22,243), and prostate (N = 39,993) incidence rates were obtained for counties. Groundwater uranium concentrations were obtained from the National Uranium Resource Evaluation program; radon data were obtained from the University of GA Cooperative Extension. Kriging was used to smooth exposure data. Hotspot analyses were performed for cancer data by calculating Getis-Ord G_i^* statistics. Spatial and non-spatial regressions were used to evaluate the relationship between environmental uranium or radon, and cancer incidence. There were 19,973 radon (mean = 225 ± 4 pCi/L; max = 225 pCi/L) and 24,355 uranium (mean = 0.25 ± 4 ppb; max = 423 ppb) measurements in GA. Ten counties (6%) had a predicted uranium concentration in the highest quartile (0.2-20.9 ppb) and six counties (4%) had a predicted radon concentration in the highest quartile (2.5-80.7 pCi/L) and elevated ($p < 0.05$) breast cancer incidence. There were three counties with both elevated uranium concentrations and lung or prostate cancer incidence rates (both $p < 0.05$). An increasing trend in breast, lung, and prostate cancer rates was observed among GA counties with elevated groundwater uranium or household radon concentrations. Detailed analyses including spatial regression and cluster modeling at the census tract and individual-level are underway.

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TRENDS IN TESTICULAR GERM CELL TUMORS AMONG U.S. MILITARY SERVICEMEN, 1990-2003 *L Enewold, J Zhou, S S Devesa, R L Erickson, K Zhu, K A McGlynn (United States Military Cancer Institute, Walter Reed Army Medical Center, 6900 Georgia Ave. NW, Building 1, Suite A109, Washington, DC 20307)

OBJECTIVES. Determine the incidence of testicular germ cell tumors among active duty males and compare it with the incidence in the general U.S. population. METHODS. The Automated Cancer Tumor Registry (ACTUR) and the Surveillance, Epidemiology, and End Results Program (SEER) data from 1990-2003 were analyzed for men aged 20-59 years by histology and stage at diagnosis. Rates were age-adjusted using the male active duty military population as the standard. RESULTS. Nonseminoma incidence was significantly lower in the military than in the general population (IRR = 0.90, 95% CI = 0.82-0.98). Trends in incidence tended to be similar in the two populations. Increases were observed for both histologic types, but were only significant for seminoma (ACTUR: 21% and SEER: 16%; $p < 0.05$). Increases in incidence were only observed for localized tumors of both histologic types. CONCLUSIONS. The lower incidence of nonseminoma in the military and the increased incidence of localized tumors in both populations remain unexplained.

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COMMON GENETIC VARIANTS RELATED TO GENOMIC INTEGRITY AND RISK OF PAPILLARY THYROID CANCER. *G Neta, A Brenner, E M Sturgis, R M Pfeiffer, A Hutchinson, B Aschebrook-Kilfoy, L Xu, W Wheeler, M Abend, E Ron, M Tucker, S Chanock, A J Sigurdson (NCI/DCEG, Rockville, MD)

Exposure to ionizing radiation at a young age is a risk factor for papillary thyroid cancer (PTC). Radiation induces DNA damage, so genes related to maintaining genomic integrity may influence PTC risk. Candidate gene studies targeting some of these genes have identified few polymorphisms associated with risk of PTC. We expanded the scope of previous candidate studies by increasing the number of genes related to maintenance of genomic integrity. We evaluated 5,077 tag single nucleotide polymorphisms (SNPs) from 340 candidate gene regions hypothesized to be involved in DNA repair, epigenetics, tumor suppression, apoptosis, telomere function, and cell cycle control and signaling pathways in a case-control study of 344 PTC cases and 452 age and gender frequency-matched controls. We estimated odds ratios for associations of single SNPs with PTC risk and combined P-values for SNPs in the same gene region or pathway to obtain gene region-specific or pathway-specific P-values using adaptive rank-truncated product methods. Nine SNPs had P values < 0.0005. Three were in HDAC4 and were inversely related to PTC risk. After multiple comparisons adjustment, no SNPs were statistically significantly associated with PTC risk. Seven gene regions were associated with PTC risk at P < 0.01, including HUS1, ALKBH3, HDAC4, BAK1, FAF1_CDKN2C, DACT3, and FZD6. Our results suggest a possible role for epigenetic and other genomic integrity genes in modulating risk of PTC. HDAC4 may be of specific interest because HDAC inhibitors are known to augment standard PTC adjuvant therapies.

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RISK FACTORS FOR LENTIGO MALIGNA MELANOMA VERSUS SUPERFICIAL SPREADING MELANOMA: A CASE-CONTROL STUDY IN AUSTRALIA. *M Kvaskoff, V Siskind, A C Green (Queensland Institute of Medical Research, Cancer and Population Studies Group, Herston, QLC 4006, Australia)

It is generally accepted that lentigo maligna melanoma (LMM) is caused by excessive sun exposure. Beyond this factor however, little is known about the etiology of this subtype, and it is unclear which factors determine the development of LMM in contrast to the more common superficial spreading melanoma (SSM) in susceptible people. We investigated this issue in a population-based case-control study of melanoma in Queensland, Australia. We analysed data collected at personal interview from 49 LMM and 141 SSM patients aged 14-86 years at diagnosis in 1979-1980, and from 232 matched controls using unconditional logistic regression models. SSM risk was strongly associated with number of nevi (p for trend < 0.0001), while the association was weaker with LMM risk (p for trend = 0.02). Red/auburn and blond/brown hair color significantly predicted SSM but not LMM risk, whereas green/hazel eyes significantly determined LMM but not SSM risk. LMM risk seemed more strongly associated with freckling, propensity to sunburn, number of lentiginos and keratoses, and history of excised skin cancers than SSM risk. Associations with hours of sun exposure during lifetime or occupation were stronger in LMM than SSM, although no significant heterogeneity was detected. SSM risk was significantly associated with number of sunburns at different ages or anatomic locations, whereas associations with LMM risk were not statistically significant. Our findings support the hypothesis that LMM and SSM represent two distinct melanoma risk profiles. Further studies are required to improve our understanding of the etiology of these distinct subtypes.

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MATERNAL PREGNANCY EVENTS AND EXPOSURES AND RISK OF HEPATOBLASTOMA: A CHILDREN'S ONCOLOGY GROUP (COG) STUDY. *J Musselman, J Ross, J Feusner, M Krailo, L Spector (University of Minnesota, Minneapolis, MN 55455)

Hepatoblastoma is a rare childhood liver cancer with an obscure etiology. Given the short latency, we examined potential associations between selected pregnancy events and hepatoblastoma using logistic regression. Mothers of 383 hepatoblastoma cases diagnosed in the COG at age < 15 years and 387 controls frequency matched for sex, age, and geographic location completed an interview. After adjustment for birth weight, maternal smoking during pregnancy, plurality, maternal age, and maternal race, we found a significantly decreased risk of hepatoblastoma with maternal multivitamin use (Odds Ratio (OR) = 0.67; 95% Confidence Interval (CI) 0.48, 0.94) and an increased risk with maternal weight gain during the first trimester (OR = 1.02; 95% CI 1.00, 1.04 per 1 lb increase). Odds were not significantly associated with pre-pregnancy BMI or nine-month maternal weight gain or with other types of vitamin use (prenatal vitamins and folate). Non-significant increased odds were found for most maternal illnesses during pregnancy (morning sickness, high blood pressure, toxemia, threatened miscarriage and vaginal bleeding) while non-significant decreased odds were estimated for gestational diabetes. Using common pain relievers during pregnancy was not significantly associated with hepatoblastoma. We found little evidence that maternal illness or most medication use during pregnancy are associated with hepatoblastoma in offspring. Supported by NIH R01 CA111355, T32 CA099936, and the Children's Cancer Research Fund, Minneapolis, MN.

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BODY FAT DISTRIBUTION, WEIGHT CHANGE DURING ADULTHOOD, AND THYROID CANCER RISK IN THE NIH-AARP DIET AND HEALTH STUDY. *C M Kitahara, E A Platz, Y Park, A R Hollenbeck, A Schatzkin, A Berrington de González (Division of Cancer Epidemiology and Genetics, Rockville, MD 20852)

Body mass index (BMI) has been positively associated with thyroid cancer risk in several studies, but the underlying mechanisms remain unclear. We examined the associations for waist and hip circumference and weight change during adulthood with thyroid cancer risk among 125,347 men and 72,363 in the NIH-AARP Diet and Health Study who completed a follow-up questionnaire (1996-97) and were not diagnosed with cancer before follow-up. Hazard ratios (HRs) and 95% confidence intervals (CIs) were calculated separately by sex. Over follow-up (median = 10.1 years), 106 men and 105 women were diagnosed with a first primary thyroid cancer. Having a waist circumference above the clinical cutpoint for normal (> 102 cm in men; > 88 cm in women) was associated with increased risk in both men (HR = 1.79, 95% CI: 1.21-2.63) and women (HR = 1.54, 95% CI: 1.05-2.26), and a significant dose-response association between waist circumference quartiles and thyroid cancer risk was observed in men (P-trend = 0.007) but not women (P-trend = 0.20). In men, a large waist circumference was associated with thyroid cancer risk within BMI categories for normal-weight, overweight, and obese. We also observed a positive association for weight gain between ages 18-35 in men (gained \geq 10.0 kg versus lost/gained < 5 kg, HR = 1.49, 95% CI: 0.93-2.39, P-trend = 0.03) but not women. No clear effect of weight gain in later life was observed for either men or women. A large waist circumference was associated with an increased risk of thyroid cancer, especially in men, supporting a potential role for hormonal and metabolic parameters common to central adiposity in thyroid carcinogenesis.

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COMMON GENETIC VARIANTS IN SEX HORMONE PATHWAY GENES AND PAPILLARY THYROID CANCER RISK. *S J Schonfeld, A V Brenner, G Neta, E M Sturgis, R M Pfeiffer, A A Hutchinson, L Xu, W Wheeler, P Guénel, P Rajaraman, F de Vathaire, E Ron, M A Tucker, S J Chanock, A J Sigurdson (DCEG, NCI, NIH, Bethesda, MD 20892)

Hormonal differences are hypothesized to contribute to the 3-fold higher thyroid cancer incidence rates among women compared to men worldwide but evidence is conflicting. Although thyroid cancer cells express estrogen receptors and estrogen has a proliferative effect on papillary thyroid cancer (PTC) cells *in vitro*, epidemiologic studies of women have not found clear associations between thyroid cancer and hormonal and reproductive factors. Few studies have examined whether polymorphisms in hormone pathway genes are associated with thyroid cancer risk. We evaluated the association between PTC and 1,134 tag single nucleotide polymorphisms (SNPs) in 58 candidate genes involved in sex hormone metabolism and synthesis, germ cell development, gonadotropins, and prolactin in a case-control study of 344 PTC cases and 452 controls, frequency-matched on age and sex. Logistic regression models were used to estimate odds ratios and P-values for the linear trend for the association between each tag SNP genotype and PTC risk. P-values for SNPs in the same gene region or pathway were combined using adaptive rank-truncated product methods to obtain gene region-specific or pathway-specific P-values. Although there were seven SNPs with an unadjusted P-value < 0.01, including four in *CYP19A1*, none of the SNPs remained significant after false discovery rate correction for multiple comparisons. Results were similar when restricting the dataset to women. P-values for examined gene regions and for all genes combined were ≥ 0.09 . Based on these results, SNPs in hormone pathway genes do not appear to be related to PTC risk.

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GAMMA-GLUTAMYLTRANSFERASE AND CANCER INCIDENCE: THE OHSAKI COHORT STUDY. *T Tsuboya, S Kuriyama, M Nagai, A Hozawa, Y Sugawara, Y Tomata, M Kakizaki, Y Nishino, I Tsuji (Division of Epidemiology, Tohoku University School of Medicine, Tohoku, Japan)

Although animal experiments have demonstrated a relationship between gamma-glutamyltransferase (GGT) and the pathogenesis of tumor progression, little is known about the epidemiologic relationship of GGT to cancer incidence. To investigate whether GGT is a predictor of cancer incidence, we examined a cohort of 15,031 Japanese adults aged 40-79 years who attended an annual health checkup in 1995 and were free of cancers at that time. GGT was measured using Szasz's method. The participants were then followed from 1 January 1996 until 31 December 2005, and cancer incidences were identified through the Miyagi Regional Cancer Registry. The hazard ratio (HR) was computed for each GGT quartile, and compared with the lowest quartile (GGT < 13 IU/ml, Q1) as a reference category. Over the 10-year follow-up period, we documented 1,505 cancers. The multivariate HR for cancers overall in the highest GGT quartile (GGT ≥ 31.0 IU/ml, Q4) was 1.31 (95% Confidence Interval (C.I.) 1.10-1.56) and p for trend was < .001. The multivariate HR for liver cancer was 9.69, and that for non-liver cancer was 1.19 (95% C.I. 1.00-1.42), p for trend being < .001. A statistically significant association was observed for pancreatic cancer and colorectal cancer. Similarly, a positive linear association between GGT and non-liver cancer incidence was observed, irrespective of drinking habit: p for trend was 0.06, < .001 and 0.04 for never drinkers, light drinkers and heavy drinkers, respectively. In conclusion, our findings clearly show that elevation of the GGT level is a predictor of cancer incidence.

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MUMPS, ORCHITIS AND TESTICULAR GERM CELL TUMORS: A CAUSE FOR CONCERN? *B Trabert, B I Graubard, R L Erickson, K A McGlynn (National Cancer Institute, Rockville, MD 20852)

Testicular germ cell tumors (TGCT) are the most common cancer among young men in the United States. Prior evidence linking TGCT and mumps is largely null, while a number of studies support an association between postpubertal mumps and/or orchitis and TGCT. A recent increase in mumps orchitis among pubertal and postpubertal males attributed to a reduction in the uptake of measles-mumps-rubella (MMR) vaccine during the 1990's prompted us to evaluate the relationship between mumps or orchitis and TGCT using existing data from the US Servicemen's Testicular Tumor Environmental and Endocrine Determinants (STEED) case-control study. TGCT cases diagnosed between 2002 and 2005 (n = 767) were matched on age, race and serum draw date to at least one control (n = 929). Multivariable conditional logistic regression was used to calculate odds ratios (OR) and 95% confidence intervals (95% CI) associated with mumps and orchitis adjusting for family history of TGCT and cryptorchidism. Analyses were conducted for all TGCT and by histologic subgroups (seminoma and nonseminoma). Orchitis was associated with TGCT risk [OR: 2.17, 95% CI: 1.37-3.46] while mumps was not [OR: 0.88, 95% CI: 0.63-1.23]. For seminoma, neither mumps [OR: 0.79, 95% CI: 0.52-1.20] nor orchitis [OR: 1.65, 95% CI: 0.94-2.90] were risk factors. Nonseminoma was associated with orchitis [OR: 2.50, 95% CI: 1.43-4.38] but not mumps [OR: 1.22, 95% CI: 0.81-1.84]. Our finding of an increased risk of TGCT with orchitis but not mumps is compatible with the hypothesized involvement of viral infection in late childhood in the etiology of a fraction of cases with TGCT. These data suggest that future trends in orchitis should be closely monitored.

661-S

DIETARY CALCIUM INTAKE IN RELATION TO CANCER INCIDENCE AND MORTALITY IN THE EUROPEAN PROSPECTIVE INVESTIGATION INTO CANCER AND NUTRITION (EPIC)-HEIDELBERG COHORT. *K Li, R Kaaks, J Linseisen, S Rohrmann (Division of Cancer Epidemiology, German Cancer Research Center, Heidelberg, Germany)

Background: It has been suggested that high dietary calcium intake may reduce the risk of several site-specific cancers. Objective: To evaluate the association of dietary calcium intake with cancer incidence and mortality. Design: In 1994-1998, 25,540 individuals, aged 35-64 years, participated in the European Prospective Investigation into Cancer and Nutrition (EPIC)-Heidelberg cohort and completed a baseline food frequency questionnaire. Multivariate Cox regressions were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs). Results: After an average follow-up time of 11 years, compared with subjects in the lowest quartile of dietary calcium intake, those in the highest quartile had significantly reduced colorectal cancer risk (HR: 0.44; 95% CI: 0.26, 0.77; P for trend = 0.007), significantly reduced lung cancer risk (HR: 0.48; 95% CI: 0.26, 0.90; P for trend = 0.005), and significantly reduced overall cancer mortality (HR: 0.70; 95% CI: 0.51, 0.97; P for trend = 0.02). The latter was particularly pronounced for men, long-term smokers (> 20 years), and individuals with above-median lifetime alcohol intake (> 20 g/d for men and > 5 g/d for women). All significant associations persisted in the 2-year lag sub-analysis except for lung cancer risk (HR the highest versus the lowest quartile: 0.56; 95% CI: 0.29, 1.10; P for trend = 0.03). Conclusions: High dietary calcium intake may reduce colorectal cancer risk and overall cancer mortality particularly in men, long-term smokers, and relatively heavy alcohol drinkers.

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COFFEE AND TEA AND FATAL ORAL/PHARYNGEAL CANCER. *J S Hildebrand, A V Patel, M L McCullough, M M Gaudet, A Y Chen, S M Gapstur (Epidemiology Research Program, American Cancer Society, Atlanta, GA 30303)

The strongest risk factors for cancer of the mouth or pharynx are tobacco and alcohol use; men are at higher risk than women. A number of epidemiologic studies, mostly case-control, suggest that coffee is associated with reduced risk of oral/pharyngeal cancer. We examined the association between fatal oral/pharyngeal cancer and caffeinated coffee, decaffeinated coffee, and tea, in the American Cancer Society Cancer Prevention Study II, a prospective U.S. cohort. Among 968,619 men and women who were cancer-free at enrollment in 1982, 925 deaths due to oral or pharyngeal cancer occurred during 24 years of follow-up. Cox proportional hazards regression was used to estimate multivariate-adjusted relative risk (RR) of death from oral/pharyngeal cancer as associated with daily intake of caffeinated, decaffeinated coffee, and tea. Daily caffeinated coffee was associated with a 29% lower risk relative to no or only occasional coffee (95% confidence interval (CI) 0.62-0.83), with a dose-response trend of declining risk by single cup per day ($p = 0.002$). The lowest RR associated with caffeinated coffee was seen among those who reported drinking 4-6 cups per day (RR 0.54, 95% CI 0.43-0.67). The association did not differ by sex, smoking status or alcohol use. Neither decaffeinated coffee nor tea was associated with fatal oral/pharyngeal cancer. This study, to our knowledge the largest to date on the topic, supports the hypothesis that caffeinated coffee is associated with a reduced risk of fatal oral/pharyngeal cancer. Research is needed to elucidate the biologic mechanisms whereby coffee, one of the most widely consumed beverages in the world, may lower risk of these often fatal cancers.

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CARCINOMAS IN CHILDHOOD: A RECORD LINKAGE STUDY. *K J Johnson, S E Carozza, E J Chow, E E Fox, S Horel, C C McLaughlin, B A Mueller, SE Puumala, P Reynolds, J Von Behren, L G Spector (Washington University, St. Louis, MO)

Although common in adults, carcinomas in children are rare and little is known about their etiology, especially for those diagnosed prior to age 15 years. We conducted a population based case-control study to examine associations between birth characteristics and childhood carcinomas diagnosed from 28 days-14 years during 1980-2004 using pooled data from five states (NY, WA, MN, TX, and CA) that had linked their birth and cancer registries. A total of 57,966 controls and 475 cases of melanoma, thyroid, renal, hepatic, gonadal, adrenocortical, nasopharyngeal, skin, and 'other' carcinomas were contained in the pooled dataset. We used logistic regression to calculate adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for the relationship between birth characteristics and any carcinoma, melanoma, and thyroid cancer that each had > 100 cases. As expected, White compared to 'Other' race was associated with a significantly increased risk of melanoma (OR = 3.2, 95% CI: 1.3-8.3) and females had an increased risk of thyroid cancer compared to males (OR = 3.1, 95% CI: 2.1-4.5). Marginally significant linear increases in risk were detected in association with maternal age for melanoma (OR per 5 year age increase = 1.2, 95% CI: 1.0-1.4) and with paternal age for any carcinoma (OR per 5 year age increase = 1.1, 95% CI: 1.0-1.2) and thyroid carcinoma (OR per 5 year age increase = 1.2, 95% CI: 1.0-1.3). Gestational age, plurality, birth weight, and birth order were not associated with childhood carcinomas. In conclusion, this study suggests that older parental age may play a role in the etiology of thyroid carcinoma and melanoma during childhood. Supported by T32CA099936, and the Children's Cancer Research Fund, Minneapolis, MN.

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UV EXPOSURE AND RISK OF CANCER AND MORTALITY. *S-W Lin, D Wheeler, Y Park, M Freedman, A Schatzkin, C Abnet (National Cancer Institute, Bethesda, MD 20852)

Objective: To test the association between potential UV exposure and risk of total and site-specific cancer incidence and total and cause-specific mortality. Methods: Ambient residential UV exposure (erythemal) was generated by linking satellite Total Ozone Mapping Spectrometer data from NASA to the US Census tract (centroid) of baseline residence for the NIH-AARP Diet and Health Study ($n = 450,944$). We used a generalized additive model adjusted for residual spatial autocorrelation and multiple potential confounders (e.g., age, smoking, alcohol, physical activity) to estimate odds ratios (OR) and 95% confidence intervals (CI) per 33.7 units of UV exposure over 10-year follow-up. Results: We identified 75,939 cancer cases and 46,258 total deaths. Ambient UV exposure was associated with increased risk of melanoma (OR 1.08, CI 1.03, 1.15). UV exposure was associated with decreased risk of esophageal squamous cell carcinoma (OR 0.76, CI 0.62, 0.93), Non-Hodgkin's lymphoma (OR 0.93, CI 0.88, 0.98), and cancers of the pleura (OR 0.67, CI 0.54, 0.83), pancreas (OR 0.92, CI 0.86, 0.99), and prostate (OR 0.97, CI 0.95, 0.99). UV exposure was not associated with total cancer incidence (OR 0.99, CI 0.97, 1.00) but was associated with cancer mortality (OR 1.04, CI 1.02, 1.07). UV exposure was not associated with all-cause total mortality (OR 1.00, CI 0.99, 1.02) but was associated with cardiovascular (OR 0.96, CI 0.94, 0.99) and infection-related (OR 0.91, CI 0.82, 0.99) mortality. Conclusions: Ambient UV exposure was not associated with risk of total cancer but was associated with risk of some cancer types. UV exposure was not associated with total mortality but was associated with increased risk of cancer-specific mortality.

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METABOLIC SYNDROME INCREASES RISK FOR ENDOMETRIAL CANCER. *C M Friedenreich, D C W Lau, I Csizmad, A Magliocco, K S Courneya, Y Yasui, L S Cook (Alberta Health Services, Calgary, AB, Canada)

Metabolic Syndrome (MetS) may predict endometrial cancer (EC) risk better than weight, diabetes, hypertension, insulin resistance or dysglycemia alone. We conducted a population-based case-control study in Alberta, Canada (2002-2006) that included 515 incident endometrial cancer cases and 962 frequency age-matched controls. Data were collected through in-person interviews, anthropometric measurements and fasting bloods. Bloods were analyzed using quantitative colorimetric assays specific to MetS markers. MetS was defined using harmonized guidelines requiring presence of ≥ 3 of the following risk factors: waist circumference (WC) ≥ 88 cm, triglycerides (TG) ≥ 150 mg/dL, HDL cholesterol < 50 mg/dL, systolic blood pressure (BP) ≥ 130 or diastolic BP ≥ 85 mm Hg or treatment of previously diagnosed hypertension, and fasting plasma glucose ≥ 100 mg/dL. Odds ratios (OR) and 95% confidence intervals (CI) for EC risk with presence of MetS and individual MetS components were estimated using logistic regression analysis. MetS was significantly greater amongst cases (62%) than controls (38%). Menopausal status modified the association between MetS and EC. In 1,094 post-menopausal women, risk was significantly elevated with MetS (multivariable-adjusted OR = 2.22, 95% CI 1.71-2.88). Age-adjusted risk for most MetS components was also increased, including WC ≥ 88 cm (OR = 2.45, 95% CI 1.89-3.17), hypertension (OR = 2.22, 95% CI 1.68-2.94), TG ≥ 150 mg/dL (OR = 1.52, 95% CI 1.16-1.99) and fasting plasma glucose ≥ 100 mg/dL (OR = 1.43, 95% CI 1.10-1.84). Risk also increased in pre- and peri-menopausal women, but was limited by sample size. MetS increases EC risk and could be targeted for risk reduction.

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HETEROCYCLIC AROMATIC AMINES AND CANCER RISK – A STUDY OF DIETARY EXPOSURE AND BIOMARKERS OF EARLY BIOLOGIC EFFECT. *V Ho, T E Massey, W D King (Queen's University, Kingston, ON, Canada)

Heterocyclic aromatic amines (HAAs) are formed during the cooking of muscle meats at high temperatures and are a suspected risk factor for cancer. However, inconsistent results have been reported on the HAA-cancer relationship in epidemiologic studies. This is potentially due to the difficulty in measuring HAA exposures and variation in individual susceptibilities to HAAs. Metabolites of HAAs form DNA adducts in cells, an initiating step in chemical carcinogenesis, which may represent an early carcinogenic effect of HAA exposure. The objective of this cross-sectional study was to provide further understanding of the relationship between dietary exposure to HAAs and levels of HAA-DNA adducts measured in easily accessible white blood cells among a sample of 125 healthy volunteers. A detailed questionnaire was used in combination with a database that estimates average intake of HAAs in cooked meats. A blood sample was used to quantify HAA-DNA adduct levels and determine polymorphisms in genes involved in HAA metabolism and DNA repair. In the preliminary data, HAA-DNA adducts were detectable in 17 of 23 individuals. Results show that dietary HAAs were predictive of adduct levels (Spearman Correlation Coefficient = 0.39, $p = 0.06$). Further analyses on the remaining cohort will be conducted using least squares regression to model adduct levels as a function of dietary HAAs and other relevant dietary, lifestyle and genetic factors; gene-diet interactions will also be explored. The goal of this research is to contribute to understanding the initial steps in this potentially carcinogenic pathway between meat consumption and cancer – important for assessing causality and the prevention of modifiable exposures.

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CANCER RISK IN CHILDREN WITH BIRTH DEFECTS: A LONGITUDINAL, POPULATION-BASED ASSESSMENT AMONG 2.7 MILLION BIRTHS. *P A Romitti, T Flood, M L Feldkamp, S Krikov, S Puzhankara, R Goedken, M Fluchel, J Little, L D Botto (University of Iowa, Iowa City, IA)

Assessing cancer risk among children with birth defects has important implications for etiologic research and clinical management. With a few exceptions, the literature to date is inconclusive. To develop this information, we used a population-based approach that combined longitudinal, statewide birth cohorts from Arizona, Iowa, and Utah, among over 2.7 million births born from 1983-2006. Birth defects were identified through statewide birth defect registries, cancer cases through linked cancer registries. A population-based cohort of over 43,000 children with major birth defects (including trisomies 13, 18, and 21) was compared to a three-times larger cohort of nearly 148,000 births without birth defects, randomly sampled from the same underlying birth population and frequency-matched to the birth defects cohort by birth year. We used a Kaplan-Meier time-to-event approach, accounting for censoring by death, to estimate cancer risk up to age 15 years. Compared to the reference cohort, children with birth defects appeared to have a statistically significant, nearly three-fold increase in risk for cancer (Relative Risk [RR], 2.73). Risk was highest among children with chromosomal conditions, specifically Down syndrome (RR, 13.2), and was driven largely by leukemias. Risk for cancer, however, remained moderately increased also among those with a birth defect but without these chromosomal anomalies (RR, 1.82). In this group, cancer risk was driven mainly by brain tumors and some embryonal tumors (neuroblastoma, hepatoblastoma), and occurred mainly in children with brain malformations, cleft palate, rectal malformations, and some heart defects. These population-based findings support and extend previous findings that suggest an increased risk for cancer in children with birth defects, including non-chromosomal birth defects, and suggest selected case groups in which further research could help identify a common genetic susceptibility to cancer and birth defects.

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ALLERGIES AND RISK OF PANCREATIC CANCER: A POOLED ANALYSIS IN PANC4. *S H Olson, M Hsu, J Satagopan, P Maisonneuve, D Silverman (Memorial Sloan-Kettering Cancer Center, New York, NY)

Several studies have reported that allergies are associated with reduced risk of pancreatic cancer. The purpose of this analysis was to pool data from existing case-control studies to further define the risk and to evaluate the influence of age at onset. Data on allergies came from 3617 cases and 9283 controls in 10 studies. We first calculated study-specific odds ratios (OR) and 95% confidence intervals (CI) using unconditional logistic regression adjusted for age, sex, and smoking. Between-study heterogeneity was assessed using Cochran's Q statistic. We then pooled the study-specific odds ratios (ORs) using a random-effects model. We determined the earliest age of onset of any allergy for each study and categorized cases and controls as above or below the median onset age for that study. Overall results were highly heterogeneous, due to two studies with higher risk in those with allergy. The pooled OR was 0.85 (CI 0.66-1.1). The only individual allergy significantly associated with risk was to animals (OR = 0.63, CI 0.41-0.98). Studies with low prevalence of allergies in controls showed a non-significant increase in risk (OR = 1.2, CI 0.56-2.53), while studies with medium and high prevalence showed decreases in risk (OR = 0.59, CI 0.42-0.84 and OR = 0.80, CI 0.61-1.04, respectively). ORs for allergies with early onset were heterogeneous among studies, with a common OR = 0.85 (CI 0.65-1.11), while ORs for later onset were not heterogeneous, with a common OR = 0.71 (CI 0.61-0.83). Overall, the association of allergies with reduced risk of pancreatic cancer is not consistent across studies and is stronger where prevalence of allergies is higher. Later onset of allergies, perhaps reflecting heightened immune response at older ages, is associated with reduced risk.

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SMOKING AND DRINKING IN RELATION TO ORAL POTENTIALLY MALIGNANT DISORDERS IN PUERTO RICO. *L Li, W J Psoter, C J Buxó, A Elias, L Cuadrado, D E Morse (New York University College of Dentistry, New York, NY)

Oral cancer incidence is high on the Island of Puerto Rico (PR), particularly among males. As part of a larger study conducted in PR, we evaluated smoking and drinking as risk factors for oral potentially malignant disorders (OPMDs). Methods: Persons diagnosed with either an OPMD ($n = 86$) [oral epithelial dysplasia (OED), oral hyperkeratosis without OED, oral epithelial hyperplasia] or a benign oral tissue condition ($n = 155$) were identified through PR pathology laboratories. Subjects were interviewed using a standardized, structured questionnaire that obtained information including detailed histories of smoking and drinking. Odds ratios (ORs) for smoking and drinking in relation to having an OPMD, relative to persons with a benign oral tissue condition, were obtained using logistic regression and adjusted for age, gender, education, fruit/vegetable intake and smoking or drinking. Results: For persons with an OPMD and relative to individuals with a benign oral tissue condition, the adjusted OR for current smoking was 4.32 (95% CI: 1.99-9.38), while for former smokers, the ORadj was 1.47 (95% CI: 0.67-3.21), each ORadj relative to never smokers, linear test of trend, $P_{trend} < 0.001$. With regard to drinking, no adjusted ORs approached statistical significance, and few point estimates exceeded 1.0, whether consumption was defined in terms of ever, current, level (drinks/week), or beverage type. Conclusions: In this study, conducted in Puerto Rico, current smoking was a substantial risk factor for OPMDs while former smokers had a considerably reduced risk compared to current smokers. There was little evidence suggesting that alcohol consumption was positively associated with OPMD risk.

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USE OF NON-STEROIDAL ANTI-INFLAMMATORY DRUGS AND RISK OF BASAL CELL CARCINOMA IN THE UNITED STATES RADIOLOGIC TECHNOLOGISTS STUDY. *E Khaykin, P Rajaraman, B H Alexander, M M Doody, M S Linet, D M Freedman (National Cancer Institute, Bethesda, MD 20892)

Non-steroidal anti-inflammatory drugs (NSAIDs) have been associated with reduced risk of colorectal and other cancers, but the association with basal cell carcinoma (BCC) is unclear. Previous epidemiological studies have been small, conducted in especially vulnerable populations, or have not accounted for solar UV exposure, a major risk factor for BCC. In a prospective nationwide cancer study in the United States Radiologic Technologists cohort, we followed Caucasian subjects to assess risk of NSAID use on first incident BCC. We included Caucasian participants who responded to both the second and third questionnaires and reported no cancer at the second questionnaire, N = 58,213. BCC, constituent risk factors (e.g., eye color, complexion, hair color) and sun exposure history were assessed through self-administered survey. Hazard ratios (HRs) and 95% confidence intervals (CIs) were calculated using Cox proportional hazards models. Of the 58,213 people in the study population, 2,291 went on to develop a first BCC. Any NSAID use was not associated with incidence of BCC (HR = 1.03, 95% CI: 0.92-1.16) after adjusting for age, sex, and estimated lifetime sun exposure. No association was observed when stratified by NSAID type (Aspirin and other NSAIDs), nor did dose-response patterns emerge by frequency of use (average days per month). Further analyses did not reveal interaction with sex, birth cohort, smoking, alcohol consumption, sun exposure, or personal risk factors for BCC. In this large prospective study, we observed no association between NSAID use and subsequent BCC risk.

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BASAL CELL CARCINOMA AND ANTHROPOMETRIC FACTORS IN THE U.S. RADIOLOGIC TECHNOLOGISTS STUDY. M R Gerstenblith, P Rajaraman, E Khaykin, M M Doody, B H Alexander, M S Linet, *D M Freedman (National Cancer Institute, Bethesda, MD 20852)

Basal cell carcinoma (BCC) is the most common type of cancer in Caucasian populations. Although several UVR-related risk factors are well-established, few studies have examined the relationship between anthropometric measures and BCC. Using Cox proportional hazards regression analysis, we prospectively assessed the relationship between height, weight, and body mass index (BMI) and BCC risk in 58,213 Caucasian participants (11,631 men; 46,582 women) from the nation-wide United States Radiological Technologists (USRT) cohort. This analysis was limited to participants who were cancer-free as of the first of two self-administered surveys. The baseline survey provided self-reported anthropometric factors and the subsequent survey provided skin cancer susceptibility factors, lifetime ambient and personal (time outside) UVR exposure, and outcomes. During 509,465 person-years of follow-up, we identified 2,291 BCC cases (486 men; 1,805 women). BCC risk was directly related to height in both men and women. It was inversely related to weight and BMI in men and women, even after adjusting for UVR susceptibility and exposures. For BMI categories: < 25 (reference); 25- < 30; 30- < 35; ≥ 35 kg/m², multivariate hazard ratios (HRs) in women were: 1.00; 0.73 (95% CI = 0.65-0.82); 0.66 (0.55-0.79); and 0.55 (0.43-0.72) respectively, p-trend ≤ 0.0001 . HRs were similar in men. Although the inverse associations with BMI were largely unaffected by controlling for UVR exposures, they may nonetheless reflect residual confounding. Further prospective research with more detailed UVR exposure data, including clothing patterns, could help clarify the relationship between BMI and BCC.

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ACCURACY OF SELF-REPORT OF COLONOSCOPY FINDINGS. *V P Doria-Rose, C N Klabunde, T Riley, T Hickey, R E Schoen (NCI, Bethesda, MD)

Many studies have examined patients' ability to accurately report receipt of colonoscopy, though few have assessed self-report of colonoscopy findings. Using data from the Study of Colonoscopy Utilization (SCU) nested within the Prostate, Lung, Colorectal, and Ovarian (PLCO) cancer screening trial, we examined the accuracy of subjects' self-report of adenomas and (more generally) polyps. SCU sampled PLCO screening arm participants based on attendance at and findings from a baseline sigmoidoscopy. Subjects were queried in telephone interviews about subsequent colonoscopy use and findings. For those reporting colonoscopy, medical records were obtained to verify self-reported information. Of 2,804 subjects reporting at least one colonoscopy, 2,561 (91%) had a colonoscopy confirmed in medical records over a median follow-up of 8 years. Overall, only 8% of subjects with verified adenomas reported having been diagnosed with an adenoma, though most without adenomas reported this accurately (specificity 99%); agreement was not notably better than would be expected by chance (Cohen's kappa 0.09). The corresponding values for polyp self-report were 62% sensitivity and 84% specificity (moderate agreement, kappa = 0.47). Those with adenomas diagnosed on baseline sigmoidoscopy did not more accurately report subsequent adenomas/polyps than did those with a negative sigmoidoscopy at baseline. These results strongly suggest that medical records are a more accurate source of information than self-report for epidemiologic studies of colorectal adenomas. Further research to identify ways of improving respondent accuracy in reporting colonoscopy outcomes in surveys is needed.

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SYSTEMATIC REVIEW AND META ANALYSIS OF THE CARCINOGENIC EFFECTS OF DIETARY ACRYLAMIDE EXPOSURE *A S Yasseen III, S Prasad, J Gomes. (EndoTox Lab, Environmental Health Research Unit, University of Ottawa, Ottawa, ON, Canada)

Molecular and animal based studies suggest a link between acrylamide and various different cancers, but results from epidemiological studies have been conflicting. A systematic review of literature using NLM Gateway (1980 - 2010) dietary acrylamide intake and cancer was conducted to evaluate the relationship between acrylamide intake and cancer. Relevant data was extracted and evaluated for quality and for homogeneity and publication bias using a random effects meta-analysis model. This review includes 22 peer reviewed journal articles covering 19 cancers across 11 study populations. The overall random effects meta-estimate was 1.027 (95%CI: 0.942 - 1.120) for all odds ratios and 0.996 (95%CI: 0.954 - 1.040) for all relative risks, with no apparent publication bias. We also analyzed the effect of study quality through a specifically developed quality checklist (adapted from a previous design) to investigate internal and external validity of experiment collected for the review. Study quality made no difference in summary effects. Breast, gastro-intestinal, reproductive, respiratory tract and all other cancers not sub grouped within the study were analyzed independently, and yielded summary estimates of 0.953 (95%CI: 0.873 - 1.040), 1.003 (95%CI: 0.963 - 1.045), 0.980 (95%CI: 0.814 - 1.050), 0.951 (95%CI: 0.879 - 1.029) and 1.047 (95%CI: 0.977 - 1.121) respectively. Overall, the results suggest that there is no apparent association between human cancers and dietary acrylamide exposure, but acknowledges the need for further epidemiological research to investigate a better method to assess the exposure and consider different dietary habits.

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THE ROLE OF ENVIRONMENTAL COFACTORS IN THE PROGRESSION OF CERVICAL PRECANCEROUS LESIONS. *M deVries, R V Agnihotram, A Koushik, D Provencher, L Gilbert, W Gotlieb, A Ferenczy, F Coutlee, E L Franco (McGill University, Montreal, QC, Canada)

Several environmental cofactors are recognized as risk factors for precancerous lesions and cervical cancer, but the stage at which these factors act in the progression of disease is unknown. To determine the gradient by which these factors are associated with progression from a lower grade cervical intraepithelial neoplasia (CIN) to a higher grade and further to squamous cell carcinoma (SCC) we used an ongoing study conducted on Montreal women. The Biomarkers of Cervical Cancer Risk case-control study provided us with data for human papillomavirus positive women with normal cytology (n = 279) and women with histologically diagnosed CIN 1 (n = 60), CIN 2 (n = 177), CIN 3 (n = 268) and SCC (n = 137). Odds ratio (OR) estimates for the association between smoking, oral contraceptive (OC) use and parity and having a more severe diagnosis were obtained using a multiple logistic regression model comparing each step on the continuum of disease progression to the one immediately preceding it. Women who gave birth to at least one child had an increased risk of progressing from CIN 3 to SCC compared to nulliparous women (OR = 3.2, 95% confidence interval: 1.5-6.8), but no increased risk of progression due to parity was observed at the lower grade lesions. There was no significant association between smoking or OC use and disease progression. Although host and viral cofactors are important in determining disease progression, the role of environmental cofactors will be explored further. Establishing when factors act to increase the risk of progression will provide insight into the characteristics which cause some women to be more susceptible to developing precancerous lesions and cancer.

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ENDOSCOPIST VARIATION IN POLYPECTOMY RATES PERSISTS AFTER ADJUSTING FOR PATIENT COLORECTAL CANCER RISK FACTORS. *M Jiang, M Sewitch, L Joseph (McGill University, Montreal, QC, Canada)

BACKGROUND: Polypectomy rate is an important quality indicator for colonoscopy that is a function of both patient colorectal cancer (CRC) risk profile and endoscopist performance. Published studies that measured endoscopist variation included few endoscopists and without adequately adjusting for patient risk profile. OBJECTIVE: To measure variability of polypectomy rates among endoscopists using patient level data and while adjusting for patient CRC risk profile. METHODS: A cross-sectional analysis of patients aged 50-75 who underwent colonoscopy with one of 45 endoscopists from 7 Montreal hospitals. Consecutive patients were interviewed by a research assistant in the waiting room prior to colonoscopy. Colonoscopy Indication (screening vs. non-screening) was based on self-reported history of gastrointestinal problems and large bowel symptoms. Self-reported family history of CRC was also collected. Patient age category, sex and polypectomy status were obtained from Quebec provincial physician billing records. Hierarchical logistic regression was used to model polypectomy rate as a function of patient level covariates and to estimate hospital and physician level variability. RESULTS: 2143 patients were included (mean age = 61, 50% female). In the unadjusted model, polypectomy rates among endoscopists ranged from 10.1% to 54.6%. After adjusting for age category, sex, family history of colorectal cancer, and colonoscopy indication, the range of polypectomy rates was 4.8% - 35.9%. CONCLUSION: Significant variation in endoscopist polypectomy rates exist even after adjustment for patient CRC risk profile.

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A POSITIVE ASSOCIATION BETWEEN OVARIAN CYSTS AND OVARIAN CANCER IN THE BREAST CANCER FAMILY REGISTRY. *J Ferris, Y Liao, S Buys, M Daly, M B Terry (Columbia University, New York, NY 10032)

Most studies of unrelated average risk women have observed a positive association between ovarian cysts and ovarian cancer. Although the underlying mechanism is still unclear, ovarian cysts are considered a possible precursor to ovarian cancer. We examined the association between history of ovarian cysts and the risk of ovarian cancer in related high risk female participants in the Breast Cancer Family Registry. We used generalized estimating equations (GEE) to evaluate the risk of ovarian cancer, adjusting for age, race, parity and oral contraceptive use. In addition, we performed a matched sister-pair analysis using conditional logistic regression, adjusting for age, parity and oral contraceptive use. For the GEE analysis, which included all ovarian cancer cases and sister controls, there were 405 ovarian cancer cases and 188 sister controls. Women with a history of benign ovarian cysts had a statistically significant increased risk of ovarian cancer compared to women with no history of benign ovarian cysts (odds ratio (OR) = 2.0, 95% confidence interval (CI): 1.3, 3.1). For the conditional logistic regression analysis, which included only sister cases with matched sister controls, there were 137 ovarian cancer sister cases and 188 sister controls. Within sisters, women with a history of benign ovarian cysts had a statistically significant increased risk of ovarian cancer compared to women with no history of benign ovarian cysts (OR = 4.2, 95% CI: 1.8, 9.6). Within the same population, we previously found ovarian cysts to be associated with a decreased risk of breast cancer. If replicated, these results suggest that women with a history of benign ovarian cysts have an increased risk of ovarian cancer.

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MEASURING BARRIERS TO FLEXIBLE SIGMOIDOSCOPY AND COLONOSCOPY: A VALIDATION STUDY. *R M Jones, B M Magnusson, L Dumenci, S W Vernon. (Virginia Commonwealth University, Richmond, VA 23298-0212)

Although quite a bit is known about colorectal cancer screening barriers, comprehensive, modality-specific scales for endoscopy are lacking. The limited evidence indicates that barriers vary by modality. The authors used Mplus to conduct confirmatory factor analysis on data from patients, aged 50 years and older, with no history of colorectal cancer who completed a mailed survey measuring barriers to sigmoidoscopy (n = 2,892) and colonoscopy (n = 2,876). Gender, race, and past screening history were assessed as moderators and validity was determined. Hierarchical four-factor solutions had the identical best model fit for both modalities (comparative fit index = 0.94; root mean square error of approximation = 0.08). In addition to comprehensive modality-specific barrier scales (sigmoidoscopy = 20 items; colonoscopy = 21 items), three sub-scales were identified for each modality: modality-specific attitudinal barriers, cost barriers, and awareness barriers. Cronbach's alpha was very good for the sub-scales (sigmoidoscopy: 0.81-0.93; colonoscopy: 0.87-0.95). Final models explained 66.2% and 63.9% of the variance respectively in sigmoidoscopy and colonoscopy adherence. We concluded that there are four distinct barrier scales related to endoscopy adherence. Psychometrically sound scales measuring modality-specific barriers would facilitate standardized data collection of these relevant constructs.

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PSYCHOMETRIC PROPERTIES OF A FECAL OCCULT BLOOD TEST BARRIER SCALE. *R M Jones, B M Magnusson, L Dumenci, S W Vernon. (Virginia Commonwealth University, Richmond, VA 23298-0212)

Evidence indicates that modality-specific fecal occult blood testing (FOBT) barriers exist; however, standardized comprehensive measures are lacking. The authors used Mplus to conduct confirmatory factor analysis on data from 2,956 primary care patients, aged 50 years and older, with no history of colorectal cancer who completed a FOBT barriers instrument. Gender, race, and prior FOBT screening were assessed as moderators and validity was determined. A hierarchical four-factor solution had the best model fit (comparative fit index = 0.93; root mean square error of approximation = 0.08). In addition to a comprehensive FOBT barrier scale (n = 19 items), three sub-scales were identified measuring: FOBT-specific attitudinal barriers, cost barriers, and awareness barriers. Cronbach's alpha for the sub-scales ranged from 0.84 to 0.93. The final model explained 64.7% of the variance in FOBT adherence. We concluded that there are four distinct FOBT barrier constructs related to screening with FOBT. Psychometrically sound FOBT-specific barrier scales will improve our ability to assess barriers related to FOBT adherence.

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POLYMORPHISMS IN GSTM1, GSTT1, COFFEE CONSUMPTION AND CUTANEOUS MELANOMA RISK. *C Fortes, S Mastroeni, L Innocenzi, G Antonelli, F Melchi, F Venanzetti, P Pasquini (Istituto Dermopatico Dell' Immacolata, IDI-IRCSS, Rome, Italy)

Background: There is increasing evidence identifying the role of dietary components in modulating the risk of melanoma. Glutathione S-transferase genes GSTM1 have been reported to influence UV sensitivity and melanoma risk. The aim of this study was to investigate GSTM1, GSTT1, coffee consumption and the risk of cutaneous melanoma. Methods: A case-control study on melanoma (304 cases and 305 controls) was conducted in the inpatient wards of IDI-San Carlo hospital, individual patterns at two polymorphic genes (GSTM1 and GSTT1) belonging to Glutathione S-Transferases family (GSTs) were investigated in a sub-set of patients. Information on socio-demographic characteristics, diet, smoking history, sun exposure and pigmentary characteristics was collected. The association between coffee consumption and cutaneous melanoma was assessed by logistic regression. Results: High frequency of coffee drinking (more than daily), compared with low frequency consumption of coffee (7 times or less weekly) was associated with a protective effect for cutaneous melanoma (Odds Ratio(OR): 0.46; 95%Confidence Intervals (CI): 0.31- 0.69) after controlling for age, sex, education, number of nevi, pigmentary characteristics, tobacco smoking, sun exposure. After controlling for other food items simultaneously in the model the protective effect of coffee remained. After stratifying for GSTM1 and GSTT1 genotypes, the protective effect was more pronounced for GSTM1 null genotype (OR:0.35; 95% 0.15-0.78) and GSTT1 null genotype (OR: 0.031; 95% CI: 0.006- 0.30. Conclusion: Our results show that consumption of coffee is protective for melanoma and GSTM1 and GSTT1 null individuals may benefit more of this protection than GSTM1, GSTT1 positive individuals.

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FACTORS AFFECTING ADENOMA DETECTION RATE IN SCREENING COLONOSCOPY. *M Almad, M Sewitch, L Joseph, A Barkun (Department of Medicine, McGill University, Montreal, QC, Canada)

Background. Adenoma detection rate (ADR) has been associated with the incidence of interval colorectal cancer (CRC) in patients undergoing screening colonoscopy. Objective. This study aimed to identify factors that effect adenoma detection during screening colonoscopy. Methods. A retrospective cross-sectional study was conducted of patients who underwent screening colonoscopy between June 1st and August 25th 2009 at the McGill University Health Center. Screening colonoscopy was defined as colonoscopies in asymptomatic individuals while adenoma detection, a binary variable, was defined as the proportion of patients undergoing screening colonoscopy and are found to have at least one adenoma. Two electronic databases, Endoworks for colonoscopy reports and OACIS for pathology reports for polyps removed, were the data sources. Multivariable logistic regression was used to identify factors associated with adenoma detection. Results. 430 patients were identified. Adenomas were more likely to be detected in patients who were male, older, had prior polypectomy, had a colonoscopy where the cecum was photo-documented, and where more than 1 polyp was removed. Adenoma detection was decreased in patients at average risk for CRC, and in endoscopy sessions with increasing numbers of procedures were performed prior to the index colonoscopy, and where the colonoscopy was performed by a surgeon (vs. a gastroenterologist). Conclusions. Patient characteristics and factors associated with the endoscopist such as operator fatigue were associated with adenoma detection. Further research is required to evaluate factors that would optimize the ADR and performance of colonoscopy as a screening tool for CRC.

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APOLIPOPROTEIN B LEVELS IN THE UNITED STATES, NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY 2005-2008. *D Lacher, M Carroll, M Wolz, P Sorlie, P Srinivas (National Center for Health Statistics, Centers for Disease Control and Prevention, Hyattsville, MD 20782)

Elevated apolipoprotein (apo) B, a major protein component of low-density lipoprotein (LDL), is a risk factor for coronary heart disease. Serum apo B and other blood lipids were examined using the 2005-2008 National Health and Examination Surveys. Serum apo B was measured in 5632 participants ages 12 and older who were asked to fast for at least 9 hours prior to phlebotomy. The distribution of apo B was not Gaussian and a square root transformation was used to obtain a normal distribution. Mean (SE) apo B was 69 (0.7) mg/dL for ages 12-19 and 91 (0.7) mg/dL for adults 20 years and older. Adult men had higher (p < 0.001) apo B (93 (0.7) mg/dL) than women (89 (0.9) mg/dL). There was no significant gender difference (p = 0.14) for ages 12-19 years (males 68 (1.0) vs. females 70 (1.2) mg/dL). Mean apo B increased with age in men and women (p < 0.001), reaching a peak at ages 50-59 years and then decreasing for men 60 years and older (p < 0.001). Mean apo B was higher in Mexican American adult men (99 (1.2) mg/dL) compared with non-Hispanic white (93 (0.8) mg/dL) and black (90 (1.6) mg/dL) adult men (p < 0.001). Mean apo B was higher in Mexican American adult women (92 (1.2) mg/dL) compared to non-Hispanic black adult women (86 (1.2) mg/dL) (p < 0.006). The relationships between apo B and other lipids were examined. Apo B correlated highly (Pearson r = 0.946) with non-high-density lipoprotein (HDL) cholesterol (total cholesterol - HDL). Apo B also was also highly correlated with LDL cholesterol (r = 0.893) and total cholesterol (r = 0.872)

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ANKLE-BRACHIAL INDEX (ABI) AND CORONARY ARTERY CALCIFICATION (CAC): THE JACKSON HEART STUDY. *J Sung, J Lee, M Criqui, J Carr, B Tullos, J Liu, M Mitchell, H Taylor (Jackson State University, Jackson, MS 39213)

Introduction: We tested the hypothesis that extent of peripheral atherosclerosis, as assessed by the ABI, could predict the presence and extent of CAC plaque measured by CT 7 years after baseline in the Jackson Heart Study cohort who at baseline were free of clinical coronary heart disease (no physician-diagnosed angina, myocardial infarction, coronary artery revascularization, any type of surgery on heart or arteries). **Methods:** ABI was divided into four categories: < 0.9 Low ABI, 0.9–1.0 borderline ABI, 1.01–1.39 normal ABI, > 1.4 high ABI. The presence of significant CAC was defined as greater than 75th percentile among people with non-zero Agaston scores. We performed multivariable log-binomial models to assess the association of ABI and CAC after controlling for age, gender, smoking, hypertension, diabetes, anti-hyperlipidemic medication and total/HDL cholesterol ratio. **Results:** There were 2,398 patients who were included in this analysis (men: 35%, average age 55 years). The majority (84.6%) of participants in this study were categorized into the normal ABI, 6.8% in the borderline ABI, 4.6% in the low ABI, and 4.0% in the high ABI. In multivariable log-binomial models, the prevalence of significant CAC scores was 1.6 times higher for people having the low ABI (95% CI = 1.1-2.1; $p = 0.008$) and 1.6 times higher for those having the borderline ABI (95% CI = 1.1-2.5; p -value = 0.04) than those with the normal ABI. However, the difference for the high ABI was not significant (PR = 0.5; 95% CI = 0.19-1.5; $p = 0.23$). ABI was significantly associated with the presence of significant CAC measured 7 years later.

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RETINAL MICROVASCULAR ABNORMALITIES AND COGNITIVE FUNCTION IN LATINO ADULTS IN LOS ANGELES. *N M Gatto, R Varma, M Torres, T Y Wong, F Segal-Gidan, P L Johnson, W J Mack (Department of Epidemiology, UCLA, Los Angeles, CA)

The retinal vessels may provide a readily accessible approach to non-invasively study vascular disease in the small vessels in the brain. The few previous epidemiologic studies that have assessed the association between retinal microvascular abnormalities and cognitive function have not included large numbers of Latino subjects who have a high prevalence of diabetes and hypertension. We used data from 809 elderly participants in the Los Angeles Latino Eye Study (LALES) to assess whether retinal vessel caliber and abnormalities in the retinal microvasculature are associated with lower cognitive function in Latino persons. Cognitive screening was conducted with the Cognitive Abilities Screening Instrument-Short form (CASI-S) and in-depth testing with the Spanish English Neuropsychological Assessment Scales (SENAS). Retinal fundus photographs were used to identify retinopathy signs and to measure retinal vessel caliber. About 2/3 of the study population had measured or self-reported high blood pressure, 1/3 had diabetes, but self-reported physician diagnoses of heart attack, heart failure, angina and stroke were rare. Subjects with generalized arteriolar narrowing [caliber < 25th percentile of the population] were about twice as likely to have a CASI-S score in the lowest 10th percentile of the population (OR = 2.04, 95% CI = 1.14, 3.66) and those with both generalized arteriolar narrowing and retinopathy signs were eight times as likely to have this CASI-S score (OR = 8.22, 95% CI = 1.91, 35.4). This study suggests that retinal microvasculature imaging may provide insights into the small blood vessel influences on cognition in Latino populations. Additional studies in diverse populations and in prospective settings are needed.

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IMPACT OF CARDIAC REHABILITATION ON METABOLIC SYNDROME IN IRANIAN PATIENTS WITH CORONARY HEART DISEASE. *A Kabir, N Sarrafzadegan, A Amini, R Safi Aryan, F Habibi Kerahroodi, K Rabiei, H R Taghipour, M Moghimi (Isfahan Cardiovascular Research Center, WHO collaborating Center, Isfahan University of Medical Sciences, Isfahan, Iran)

Background: Due to high prevalence of metabolic syndrome (MetS) and coronary heart disease (CHD) in Iran, and their mutual relationship, we evaluated how comprehensive cardiac rehabilitation (CR) can affect MetS in patients with CHD. **Methods:** In this study (1998-2003), we evaluated 547 patients with CHD undergoing comprehensive CR. **Results:** Cases with MetS decreased from 42.8% to 33.3% after CR program ($p < .001$). Decrease in FPG, TG, SBP and DBP and increase in HDL, FC and LVEF was more prominent in "MetS but no obese" group. While, TC, LDL, weight, BMI, and WC had more decrease in groups with obesity. **Conclusion:** Inability to improve SBP, DBP, FPG, TC, LDL, HDL, TG and WHR in obese patients who did not have MetS indicates the seriousness of obesity should be addressed in these patients specifically when "MetS and obese" and "obese but no MetS" groups had lower FC than other groups which had no obesity.

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NON-DIABETIC RETINOPATHY IN THE UNITED STATES: 2005-2008. *J Saaddine, C F Chou, X Zhang, M F Cotch, L Geiss, B E Klein, R Klein, (Centers for Disease Control and Prevention, Atlanta, GA 30341)

To describe the prevalence and risk factors of retinopathy among US non-diabetic adults 40 years and older, we analyzed data from the 2005-2008 National Health and Nutrition Examination Survey. Two digital fundus photographs were taken of each eye and graded using the Airlie House Classification scheme and the Early Treatment Diabetic Retinopathy Study severity scale. People with self reported diabetes or glycated hemoglobin A1C $\geq 6.5\%$ were excluded from the analysis. Estimates of non-diabetic retinopathy were weighted to represent the civilian, non-institutionalized US population 40 years and older. We used SAS 9.2 with SUDAAN to account for the complex survey design. The estimated prevalence of retinopathy was 6.8% (95% confidence interval [CI], 6.0%-7.7%) among people without diabetes. The prevalence increased with increasing A1c, ranging from 5.9% (95% CI, 4.8%-7.2%) among those with A1c < 5.4%, to 6.3% (95% CI, 5.0%-7.9%) with A1c 5.4% - < 5.7%, to 9.0% (95% CI, 7.5%-10.6%) with A1c 5.7% - < 6.5%. Mexican American ethnicity (Odds ratio [OR], 1.49; 95% CI, 1.00-2.21), higher A1c (OR, 1.58; 95% CI, 1.19-2.10), overweight (OR, 1.58; 95% CI, 1.06-2.35), were independently associated with retinopathy among men, while age (OR, 1.03; 95% CI, 1.01-1.05), systolic blood pressure (OR, 1.01 per 10 mmHg; 95% CI, 1.01-1.02), and current smoking (OR, 2.35; 95% CI, 1.70-3.24), were independently associated with retinopathy among women. Retinopathy is common in US non-diabetic adults 40 years and older. Even in the absence of diabetes, the data suggest a dose-response relationship between signs of retinopathy and A1c level. In addition, risk factors for retinopathy, among non-diabetics, might be different for men and women.

RACE/ETHNIC DISPARITIES IN USE OF STATINS. *S A Hall, G R Chiu, D W Kaufman, C L Link, J B McKinlay (New England Research Institutes, Watertown, MA 02472)

Indications for statins include heart disease, the leading cause of mortality among U.S. minority groups. Our objective was to examine potential race/ethnicity (r/e) and gender disparities in statin use in a population-based, urban epidemiologic study of 5,503 men and women (1767 black, 1876 Hispanic, 1859 white) aged 30-79 from Boston, MA. Drug use in the prior month was captured through self-report and interviewer recording of container labels. Comorbidities were measured by self-report of health care provider diagnoses. Direct measurement of serum cholesterol was available for a subpopulation of men. Analyses were conducted among those who would have been recommended for statin treatment according to the Adult Treatment Panel III guidelines (i.e., who had coronary heart disease [CHD] or a CHD risk equivalent, and hyperlipidemia, N = 640). Multivariate logistic regression was used to estimate odds ratios (OR) and 95% confidence intervals (CIs) for statin use by r/e (white = referent), with adjustment for age, socioeconomic status (SES) and health insurance status. Our results showed no associations among women for r/e and statin use (black, OR = 1.29, 95% CI:0.62-2.70; Hispanics, OR = 0.68, 95% CI:0.31-1.50). Among men, there was a strongly inverse association for black race and statin use (OR = 0.22, 95% CI:0.10-0.46) compared to white. For Hispanic men, ORs were also in the inverse but the CI included the null (OR = 0.49, 95% CI:0.20-1.24). The inverse association for black men was consistent in the subpopulation with serum hyperlipidemia measurement. In conclusion, our results suggest a disparity in statin use that disfavors black men that was not explained by SES or health insurance status. Funding for the BACH Survey was provided by National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (NIH) DK 56842. Additional funding was provided by National Center on Minority Health and Health Disparities (NCMHD)

IMPAIRED ENDOTHELIUM-DEPENDENT AND NITROGLYCERIN-INDUCED VASODILATION IN CHRONIC KIDNEY DISEASE (CKD). *J Chen, L Hamm, F Husserl, E Mohler, R Arora, E Khan, B Alper, M Kleinpeter, R Shenava, E Simon, J He (Tulane University, New Orleans, LA 70117)

Previous clinical studies reported that impaired endothelium-dependent vasodilation was common in patients with end stage renal disease. We studied endothelium-dependent and nitroglycerin (NTG)-induced vasodilation in 171 CKD patients and 183 controls. CKD was defined as estimated glomerular filtration rate < 60 ml/min/1.73m² or presence of albuminuria. Brachial artery endothelium-dependent vasodilation [flow mediated dilation (FMD)] to reactive hyperemia following 5 min of forearm ischemia and the response to sublingual NTG were measured in the subjects using a standard protocol. Compared to those without CKD, patients with CKD were older (56 vs. 53 yrs), more likely to be male (57% vs. 45%), less likely to have graduated from high school (59% vs. 81%), or consume alcohol (29% vs. 58.2%). Race and cigarette smoking were comparable between CKD patients and controls. Mean systolic pressure (132 vs. 122 mmHg), body mass index (32 vs. 29), fasting glucose (120 vs. 102 mg/dL), and triglyceride (144 vs. 106 mg/dL) were higher while HDL (50 vs. 58 mg/dL) and LDL cholesterol (102 vs. 118 mg/dL) were lower in CKD patients than in controls. After adjustment for these risk factors, multivariable-adjusted median (inter-quartile range) of FMD was 5.4% (2.6%, 8.74%) in CKD patients and 8.8% (5.8%, 11.9%) in controls (p < 0.0001 for group difference). In addition, multivariable-adjusted median (inter-quartile range) of NTG-induced vasodilation was 14.2% (9.4%, 19.5%) in CKD patients and 20.9% (14.6%, 26.5%) in controls (p = 0.005 for group difference). These data indicated that impaired endothelium-dependent and NTG-induced vasodilation were associated with CKD.

* = Presenter; S = The work was completed while the presenter was a student

GENETIC VARIANTS IN THE RENIN-ANGIOTENSIN-ALDOSTERONE SYSTEM (RAAS) AND BLOOD PRESSURE (BP) RESPONSES TO POTASSIUM INTAKE. *J He, D Gu, T Kelly, J Hixson, D Rao, C Jaquish, J Chen, C Gu, J Huang, L Shimmin, J Mu, X Ji, D Liu, P Whelton (Tulane University, New Orleans, LA 70117)

Epidemiologic studies have documented that dietary potassium intake lowers BP. We examined the association between genetic variants in the RAAS and BP responses to potassium intervention. A 7-day high-sodium followed by a 7-day high-sodium plus 60 mmol/day potassium-supplementation feeding study was conducted among 1,906 participants from rural northern China. Nine BP measurements were obtained at each intervention phase using a random-zero sphygmomanometer and 181 SNPs in 11 candidate genes of the RAAS were used for analyses. Several SNPs in nuclear receptor subfamily 3, group C, member 2 (NR3C2), angiotensin II type-1 receptor (AGTR1), hydroxysteroid (11-beta) dehydrogenase 1 (HSD11B1), and hydroxysteroid (11-beta) dehydrogenase 2 (HSD11B2) genes were significantly associated with BP responses to potassium intervention. For example, the number of G alleles of the N554S missense mutation (rs5527) of NR3C2 was significantly associated with greater systolic BP responses to potassium intervention; mean (95% CI) responses (mmHg) were -3.33 (-3.65, -3.02) for genotype A/A and -5.47 (-6.64, -4.29) for A/G, respectively (p-value = 0.0004). In addition, the number of C alleles of the A1166C variant (rs5186) in AGTR1 was significantly and inversely associated with systolic BP responses to potassium intervention; mean (95% CI) responses were -3.55 (-3.87, -3.24) for genotype A/A, -2.45 (-3.27, -1.62) for A/C, and 3.25 (-5.73, 12.23) for CC (p-value = 0.003). These novel findings indicated that genetic variants in the RAAS may play an important role in determining an individual's BP responses to dietary potassium intake.

THE METABOLIC SYNDROME: ARE RURAL RESIDENTS AT INCREASED RISK? *T Trivedi, J Liu, J Probst, A Martin (University of South Carolina, Columbia, SC 29208)

Background: Metabolic syndrome (MetS) affects slightly more than one-third of American adults. Yet the prevalence and risk factors for MetS among American rural residents are unknown. Methods: We estimated the prevalence and risk factors of MetS by residence using data from the 1999-2006 National Health and Nutrition Examination Survey (NHANES), restricting to 6,896 participants aged 20 and over with complete information. The National Cholesterol Education Program's Adult Treatment Panel III criterion was used to define MetS. Residence was measured at the census tract level using Rural-Urban Commuting Areas definitions. Multiple logistic regression models were used to examine urban-rural differences after adjusting socio-demographic, health, dietary, and lifestyle factors. Results: The prevalence of MetS was higher in rural than urban residents (39.9 vs. 32.8%), among both men (39.7 vs. 33.3%, respectively) and women (40.2 vs. 32.3%). Dwelling in rural areas was associated with significantly higher abdominal obesity, blood pressure and fasting blood glucose. The age and sex adjusted odds ratio (OR) for MetS in rural residents was 1.23 (95% CI 1.02-1.49) and was attenuated to 1.11 (95% CI, 0.93-1.34) after adjusting for additional covariates. Older age, Hispanic ethnicity, non-smoking, physical inactivity, sedentary lifestyle, higher meat intake, and skipping breakfast were associated with increased odds of MetS. Conclusion: Rural residence was associated with higher prevalence of MetS among US adults. Urban-rural differences are partially explained by the differences in demographic composition, diet and sedentary lifestyles among rural residents. The disparity by residence should be addressed in future health programs.

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DOES THE USE OF THE WHO BMI GROWTH CURVES IMPROVE THE PREDICTION OF CARDIOMETABOLIC RISK COMPARED TO THE CDC STANDARDS? *L Kakinami, M Henderson, E E Delvin, E Levy, J O'Loughlin, M Lambert, G Paradis (McGill University, Montreal, QC, Canada)

The Centers for Disease Control [CDC] and the World Health Organization [WHO] reference population growth curves' produce different prevalence estimates of overweight and obesity among youth. Their relative contributions in identifying children at risk for the cardiometabolic syndrome are unknown. The objective of this study was to test the predictive ability of these two reference growth curves with cardiometabolic risk factors, and the impact of the different definitions of overweight and obesity on their diagnostic accuracy in predicting cardiometabolic risk. Fasting lipids, glucose, insulin and blood pressure were measured in a population-based, representative sample of 2,475 girls and boys aged 9, 13 and 16 years from Québec, Canada in 1999. Analyses included sensitivity/specificity and Receiver Operating Characteristic Curves (ROC) of overweight and obesity for predicting abnormal levels of cardiometabolic risk factors. While body mass index between the CDC and the WHO growth curves differed 0-4 percentiles on the individual level ($p < .05$), their ROC curves predicting cardiometabolic risk were not significantly different. Areas under the ROC curves $> .70$ were found only for triglycerides and insulin. Although the CDC definition of obesity had higher sensitivity than the WHO definition, sensitivity was low ($< 45\%$). The WHO definition of overweight had higher sensitivity than the CDC definition, but only triglycerides among boys had a sensitivity $> 70\%$. While identification of cardiometabolic risk was similar between WHO and CDC growth curves, neither was a sufficient stand-alone tool to accurately predict cardiometabolic risk among youth.

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WITHDRAWN

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METABOLIC SYNDROME AND EXERCISE CAPACITY IN CARDIAC REHABILITATION PROGRAMS AND INTER-PROGRAM VARIATION. *M Zullo, M Dolansky, V Cheruvu, J Kropko, L Cho, C Whalen, S Debanne, L Jackson (Kent State University, Kent, OH 44242)

Exercise capacity in cardiac rehabilitation (CR) patients with metabolic syndrome (MS) is poor; however, it is unclear if this is due to participant or program factors. This research described the association between MS and exercise capacity in CR participants and examined program-related variation in capacity. Data were abstracted from CR records at five hospitals. A three category exposure variable was defined as body mass index (BMI) < 27 and no MS (reference), BMI ≥ 27 and no MS, and MS. Exercise capacity was defined as metabolic equivalence unit (MET). Hierarchical linear models described the association between MS and rate of change in METs ($n = 250$), MS and absolute change in METs ($n = 350$), and program-related variation in METs. Sixty percent of participants had MS. In the rate of change analyses, smaller improvements in METs were observed for BMI ≥ 27 with no MS ($\beta = -0.18$; 95% confidence interval (CI): $-0.28, -0.09$) and for MS ($\beta = -0.28$; CI: $-0.34, -0.23$) compared to the reference. There was no difference between the two groups with BMI ≥ 27 . In the absolute change analyses, there were smaller, non-significant improvements in average METs in the BMI ≥ 27 without MS ($\beta = -0.04$, CI: $-0.33, 0.25$) and MS groups ($\beta = -0.18$, CI: $-0.37, 0.00$) compared to the reference. Hospital accounted for 28% and 44% of the variance in the rate of change and absolute change models, respectively. Participants with MS had the slowest rate of change and smallest absolute change in METs compared to those without MS and substantial variation was observed across programs. Research is needed to test methods for standardizing exercise that will improve capacity and health outcomes in CR participants with MS.

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LIFE-COURSE INFECTIOUS ORIGINS OF SEXUAL INEQUALITIES IN CENTRAL ADIPOSITY. *C M Schooling, H E Jones, G M Leung (School of Public Health, City University of New York, New York, NY 10010)

Social disparities in obesity are often more marked among women than men possibly due to social factors. Taking a life course perspective, the authors hypothesized that biological processes, such as infections, could also be relevant via activation of the immune system suppressing the gonadotropic axis and thereby reducing sexual dimorphism in body shape. Multivariable linear regression was used to assess the adjusted associations of pathogen burden, considered as 0 ($n = 1002$), 1 ($n = 2199$), 2 ($n = 3442$) or 3 ($n = 4833$) of 'childhood' (herpes simplex virus (HSV) 1, cytomegalovirus and Hepatitis A) infections and 0 ($n = 5836$), 1 ($n = 3018$) or 2+ ($n = 720$) of 'adult' (HSV2, human herpes virus 8 and hepatitis B or C) infections, with waist hip ratio (WHR) and body mass index (BMI) using NHANES III (1988 to 1994). 'Childhood' pathogen burden was positively associated with WHR among women (0.18 standard deviations (SD), 95% confidence interval (CI) 0.04 to 0.32 for 3 'childhood' pathogens compared to 0) but not men (-0.04 , 95% CI -0.15 to 0.08 in the same comparison), adjusted for age, education, race/ethnicity, smoking and alcohol. Further adjustment for leg length and seated height made little difference. There were no such sex-specific associations for BMI or for adult pathogen burden. These observations are consistent with the life course hypothesis that early exposure to infections makes women vulnerable to central obesity. This hypothesis potentially sheds new light on the developmental origins of obesity, and is consistent with the generally higher levels of central obesity among women than men in developing populations.

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CHILDHOOD MEAT EATING AND INFLAMMATORY MARKERS: THE GUANGZHOU BIOBANK COHORT STUDY. *C M Schooling, C Q Jiang, T H Lam, W S Zhang, K K Cheng, G M Leung (Department of Community Medicine, and School of Public Health, The University of Hong Kong, Hong Kong SAR, China)

In long-term industrialized countries low socio-economic position is associated with inflammation. This association is not always evident for men in developing countries. Socio-economic development, via nutritionally driven levels of pubertal sex-steroids, could promote a pro-inflammatory state in men but not women. The authors used multivariable linear regression in baseline data from the Guangzhou Biobank Cohort Study phase 3 (2006-8) to examine the adjusted associations of a proxy for childhood nutrition, recalled childhood meat eating (< 1/week (n = 5,017), about once per week (n = 3,587) and almost daily (n = 1,249)), with white blood cell count and its differentials among older (≥ 50 years) men (n = 2,495) and women (n = 7,358) from a developing country. Adjusted for age, life course socio-economic position, components of height (leg length and sitting height) and lifestyle, childhood meat eating had sex-specific associations with white blood cell count and lymphocytes. Total white cell count was higher by 0.34 109/L (95% confidence interval (CI) 0.12 to 0.57) and lymphocytes by 0.17 109/L (95% CI 0.08 to 0.25) among men with almost daily childhood meat eating compared to < 1/week. Adjustment for obesity slightly attenuated these associations. There were no such associations in women. Economic development and the associated improvements in nutrition at puberty may be less beneficial for men than women.

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ADDITIVE AND MULTIPLICATIVE INTERACTIONS OF RACE WITH RISK FACTORS FOR ATRIAL FIBRILLATION: THE ARIC STUDY. *A Alonso, F L Lopez, R F MacLehose (University of Minnesota, Minneapolis, MN 55545)

Objective: African-Americans have a lower risk of atrial fibrillation (AF) compared to whites. We aimed to determine whether race modified the association between AF and established risk factors for this cardiac arrhythmia on the multiplicative and the more biologically meaningful additive scale. Methods: We studied 11075 whites and 3968 African-Americans in the ARIC study from 1987 to 2007. Risk factors were measured in a clinical exam at baseline. AF events were ascertained from hospitalization, electrocardiograms and death certificates. Additive binomial and multiplicative Poisson with robust variance regression models were used to estimate risk differences and relative risks among whites and African-Americans. Results: During an average follow-up of 16 years, 1564 incident AF events were identified (1266 in whites, 298 in African-Americans). No evidence of interaction with race in the risk ratio scale was observed for most studied risk factors (hypertension, myocardial infarction, heart failure, smoking, and obesity). However, interactions of race with hypertension, myocardial infarction, heart failure and smoking were evident on the risk difference scale, with stronger associations in whites than African-Americans. Only the interaction of diabetes with race was evident in the risk ratio but not the risk difference scale, with a stronger association in African-Americans than whites. Conclusion: Our results show that choice of scale has an impact in the evaluation of interactions. Future work should address potential biological mechanisms underlying the observed additive interactions.

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CHANGES IN THE PREVALENCE OF HYPERTENSION AMONG 21-40 YEAR OLDS IN THE U.S.; 2006-2008. *P Ahiawodzi, C A Hornung (Dept. of Epidemiology and Population Health, University of Louisville, Louisville, KY)

One in 3 adults in the United States and about 1 billion people worldwide has hypertension (HTN) and the prevalence is expected to increase by about 60% to 1.56 billion by 2025. The aim of this study is to determine changes in HTN prevalence among 21-40 year old individuals in the United States by gender and racial/ethnic background based on the 2005 to 2006 and 2007 to 2008 National Health and Nutrition Examination Surveys (NHANES). A total of 3,501 subjects from all racial/ethnic groups were studied from the 2 cohorts with age categorized as 21-25, 26-30, 31-35 and 36-40. Blood pressure status was categorized according to the seventh report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure: Normotensive = Systolic < 120 mmHg and Diastolic < 80 mmHg, Prehypertensive = Systolic 120-139 mmHg or Diastolic 80-89 mmHg, and Hypertensive (combined Stage I and II) = Systolic ≥ 140 mmHg or Diastolic ≥ 90 mmHg. Females are 50.7% of the sample, Mexican Americans 12.8%, Non-Hispanic Whites 62.6%, Non-Hispanic Blacks 12.4% and other races 12.1%. Hypertension was more prevalent in males (4.6% to 1.1%; $p < .0001$) and increased with age (21-25 = 0.8% to 36-40 = 2.3%; $p < .0003$). Obese Non-Hispanic white females were the only group in which there was a decrease in prevalence across the cohorts while prevalence increased by 800% among obese Mexican American males and 521% among Non-Hispanic Black male smokers. These data indicate that it is very important that physicians and public health professionals target young Non-Hispanic Black male smokers and young obese Mexican American males to reduce their risk of hypertension and its related diseases.

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QUALITY OF LIFE IN HEART FAILURE PATIENTS: A STRUCTURAL EQUATION MODEL. *M M Donneyong, N C Peiper, C A Hornung (Dept. of Epidemiology and Population Health, University of Louisville, Louisville, KY)

Heart failure (HF) is increasing in prevalence in the US with over 500K new cases each year largely as a result of reduced fatality rates from myocardial infarction and improved long-term survival with medical therapy and percutaneous coronary interventions. HF research has focused on reducing the frequency of emergency room visits and on rehospitalizations as well as on preserving the patient's functional status and health related quality of life (HRQoL). We used confirmatory factor methods to develop measures of physical functioning (PF) and emotional well being (EW) dimensions of HRQoL and structural equation methods to examine the impact of demographic, social support, clinical status, co-morbid conditions and treatment variables. Data were collected as part of a randomized trial that tested the efficacy of home based telemonitoring on rehospitalization rates in 134 patients with advanced HF. The fit of the model is acceptable by multiple criteria with 10% of the variance explained in PF and EW at baseline and 34% in PF and 23% in EW at follow-up. Older age is associated with better PF and better EW at baseline and also at 6 month follow up (F/U). Baseline PF and EW is also better among individuals with social support and those who are treated in accordance with AHA/ACC pharmacotherapy guidelines. Males as well as subjects with diabetes and those who are obese have lower PF and EW at baseline. PF and EW at baseline have the largest direct effects on PF and EW at f/u. Of note is the finding that pharmacotherapy recommended by the American Heart Association and the American College of Cardiology is associated with higher PF and better EW at baseline but poorer PF and poorer EW at F/U.

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BARE-METAL AND DRUG-ELUTING CORONARY AND PERIPHERAL VASCULAR STENT PROCEDURES: UTILIZATION IN THE U.S. *K Ong, H Watson, J Patel, C Kuehn, J Ochoa (Exponent FaAA, Philadelphia, PA 19104)

We evaluated use of bare-metal (BM) and drug-eluting (DE) stents (coronary and peripheral) in the U.S. The Nationwide Inpatient Sample was used to identify BM or DE stent procedures 1998-2007. Prevalence was calculated by age, gender, race, and primary payer. Reintervention burden (RB), defined as the ratio of stenting for reintervention to total primary and reintervention procedures, was evaluated for BM and DE stents. 3.91 million BM and 2.74 million DE coronary stent procedures were identified between 1998-2007 and 2002-2007, respectively (including 679,100 BM and 11,200 DE peripheral stenting procedures). BM stents accounted for 100% of coronary stents used in 2002, but declined to 10.4% in 2005. After 2005, use of BM stents increased steadily, accounting for 32.8% of coronary stenting in 2007 due to increased safety concerns with DE stents. In 2007, the RB for BM and DE coronary stents was 4.3% and 5.6%. Infection of a previous device preceded 5.9% of reintervention procedures using BM stents versus 2.3% for DE stents. Average length of stay in 2007 was 3.4 and 2.6 days for primary BM and DE coronary stent procedures, respectively. After FDA-approval of DE coronary stents in 2003, there was a steep increase (> 44%) in their use due to their reduced rates of restenosis, despite concerns about late stent thrombosis. Widespread publicity of these concerns led to an FDA meeting in 2006 and sharp decline in utilization. More research is needed to assess whether utilization will change over time as longer-term data and second generation DE stents become available. In the future, longitudinal administrative databases may provide a way to evaluate the comparative effectiveness of these procedures.

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PSYCHOSOCIAL WORK ENVIRONMENT AND AMBULATORY BLOOD PRESSURE: CONTRIBUTION OF TWO JOB STRESS MODELS. *X Trudel, C Brisson, A Milot (Université Laval, Québec, QC, Canada)

Background: Blood pressure is a major CHD risk factor. Two major theoretical models have been used to assess the impact of psychosocial work factors on blood pressure (BP): the demand-control model (DC) defined by Karasek and Siegrist's effort-reward imbalance (ERI) model. Little is known on the independent and combined effect of these models. **Objective:** To examine the respective contribution of the DC and the ERI models on ambulatory BP. **Method:** A repeated cross-sectional study was conducted among over 2000 white-collar women and men. Data were collected three times during a 7-year period. At each data collection time ambulatory BP was measured every 15 minutes during a working day. Psychosocial work factors were measured using validated scales. Systolic and diastolic BP means were computed. DC and ERI models were mutually adjusted and further adjusted for confounders. A combined exposure variable was also computed. **Results:** After mutual adjustment, active (+2.01/+1.37mmHg) and passive (+1.33/1.15mmHg) men, as well as men exposed to ERI (+1.39/+1.45mmHg) had higher systolic and diastolic BP means, compared to unexposed men. Men simultaneously exposed to an active job and to ERI had the highest BP elevation (+2.59/+1.86mmHg). In women, no significant association was found with the DC model while women exposed to ERI had higher systolic and diastolic BP means (+1.45/+1.27mmHg). These differences were all significant at the 0.05 level. **Conclusion:** The present study support the independent effect of psychosocial work factors from both DC and ERI models on BP in men while only exposure to ERI was associated with higher BP in women.

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HOSPITAL DEATH IN PATIENTS UNDERGOING TO CORONARY ARTERY BYPASS GRAFT (CABG) SURGERY. E L Oliveira, *M F Mastroeni, G A Westphal (University of Joinville Region—Univille, Joinville-SC, Brazil)

This study aimed to describe the general and clinical characteristics of patients undergoing to CABG surgery. This is a retrospective study investigated the charts of all patients undergoing to CABG surgery in a public hospital in the city of Joinville-SC, Brazil, from May 2002 to April 2010. Found 672 charts of CABG surgery in the investigated period and 17 did not meet the inclusion criteria. Of the 655 charts that were part of the study, the hospital mortality was observed in 12.1% of patients, and there were significant differences regarding sex (57.0% men), age group (64.6% had 60 or more years old), type of surgery (65.8% realized urgent surgery type), hospitalization time (62.0% stayed three or fewer days in the Intensive Care Unit) and comorbidity (67.1% had three or more types of comorbidity). There was no significant difference in direct cost of hospitalization among individuals who had discharged (\$US 4,153.39) and death (\$US 4,776.91) at the hospital, like as marital status (married; unmarried), cardiopulmonary bypass time per min (< 90; ≥ 90), clamping time per min (< 30; 30-60; ≥ 60), smoking (yes; no), and total hospitalization time per day (< 10; ≥ 10). Knowing the clinical and general characteristics of patients undergoing CABG surgery becomes an indispensable tool for the development of public policies capable of significantly reducing hospital death.

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ASSESSMENT OF FIRESTORM-ASSOCIATED EMERGENCY DEPARTMENT VISITS IN SAN DIEGO COUNTY USING THE BIOSENSE APPLICATION. *T Penn, S Lindsay, D Slymen, D Hatton, J Johnson (San Diego State University, San Diego County Public Health Services, San Diego, CA 92182)

Smoke and ash exposure due to wildfires has been shown to exacerbate those with existing cardiovascular and respiratory diseases and result in increased emergency department (ED) visits for those patients. During October 21-28, 2007, seven wildfires burned in San Diego County exposing the population to smoke and ash. The BioSense Application was created by The Center for Disease Control and Prevention to support the advancement of early detection capabilities. Data from this system were used in this study to obtain the three time periods, pre-fire, fire and post fire periods. A historical prospective study was conducted to examine health outcomes for each time period and determine what impact the fires had on those with cardiovascular and respiratory diseases. In order to compare outcomes between these diseases, a conditional test in which a two-sample inference for incidence-rate data was utilized. Both cardiovascular and respiratory diseases incidence rates significantly increased from pre-fire to fire period and pre-fire to post-fire period. For respiratory diseases, there was an increase of 161% from the pre-fire to the fire period and a 102% increase from the pre-fire to the post-fire period. A patient who utilized the ED in the pre-fire period for respiratory diseases was 6.7 times more likely to be seen during the fire period (95% confidence interval [CI95]: 4.46-10.02; p < 0.0001) and 3.2 times more likely to be seen in the post-fire period (CI95: 2.47-4.20; p < 0.0001) compared to all other diseases. This study concludes that the 2007 wildfires show disease exacerbation among people with existing cardiovascular and respiratory diseases.

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MERCURY, HOMOCYSTEINE, METHYLMALONIC ACID AND FOLATE IN US CHILDREN AGED 3-5 YEARS, NHANES 1999-2004. *C M Gallagher, J R Meliker. (Stony Brook University, Stony Brook, NY)

Mercury is a neurotoxicant; however, associations between exposures and neurodevelopment are inconsistent, and may be modified by nutritional susceptibilities. In vitro studies found that mercury inhibited methionine synthase, an enzyme that interacts with vitamin B-12 and folate to regenerate the amino acid methionine from homocysteine, and inhibition of methionine synthase diverted homocysteine to cysteine and glutathione production. This study aimed to evaluate associations between total blood mercury (Hg) and homocysteine in male and female children differentiated by higher and lower methylmalonic acid (MMA, an indicator of vitamin B-12 deficiency) and folate status. Cross-sectional data on Hg, serum homocysteine, MMA, and serum folate were obtained from the 1999-2004 National Health and Nutrition Examination Surveys for children aged 3-5 years (n = 1005). We used multiple linear regression to evaluate relationships between homocysteine and Hg quartiles, stratified by sex, MMA \geq and folate < sample medians, adjusted for age, BMI, blood cadmium, lead and cotinine, and 30-day fish intake. In boys with higher MMA and lower folate (n = 135), but not in other children, we observed inverse associations between Hg and homocysteine. Children with Hg > 3.49 $\mu\text{mol/L}$ showed 1.27 $\mu\text{mol/L}$ lower homocysteine (95% Confidence Interval = -1.91, -0.63) relative to the lowest Hg quartile ($\leq 0.70 \mu\text{mol/L}$) *p-value for trend = 0.002*; *R² = .30*. Compared to children without both higher MMA and lower folate, this subsample had significantly higher homocysteine levels. Compared to girls, this subsample had significantly lower Hg levels. In summary, Hg was inversely correlated with serum homocysteine in young boys with higher MMA and lower folate. Research is merited to evaluate Hg and amino acid metabolism in susceptible children.

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MENOPAUSE AND LEAD BODY BURDEN AMONG US WOMEN AGED 40-59, NHANES 1999-2008. *P Mendola, R Tandon, K Brett (CDC/NCHS, Hyattsville, MD)

Little attention has been given to environmental exposures and menopause compared with other women's reproductive health endpoints. Lead is a known reproductive toxicant that has been associated with delayed puberty in girls. We examined the lead body burden in the National Health and Nutrition Examination Survey (NHANES) in US women aged 40-59 to explore potential associations with menopause. Women who were still menstruating (sample n = 1403) were compared with women who reported a natural (not surgical/medical) menopause (sample n = 679) using logistic regression adjusted for age, race/ethnicity, poverty and smoking. Analyses used SAS/SUDAAN to adjust for survey sampling weights. Quartiles of blood lead (ug/dL) were based on all women 40-59 years old (Quartile (Q)1: 0.2 to < 1.0; Q2: 1.0 to < 1.4; Q3: 1.4 to < 2.09; Q4: greater than or equal to 2.09). Unadjusted lead levels were higher in menopausal women (mean (standard error (SE)) = 1.98 (0.05) ug/dL compared to women still menstruating (mean (SE) = 1.34 (0.03) ug/dL). In adjusted regression, increasing lead levels were associated with menopause as well. Using Q1 as the reference, adjusted odds ratios and 95% confidence intervals for Q2 through Q4 were 2.2 (1.3-3.7), 2.6 (1.4-4.8) and 6.1 (3.3-11.4), respectively. Similar relationships were observed using urinary lead measures. Many potential explanations for these findings remain to be explored and we plan to examine bone density as a key intermediate for those women with bone scan data available. Our findings suggest that lead exposure in women around the time of menopause may be associated with a shorter reproductive lifespan in addition to the previously demonstrated pubertal effects.

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MERCURY, THYROGLOBULIN AND THYROID PEROXIDASE AUTOANTIBODIES, AND URINE IODINE IN US WOMEN, NHANES 2007-2008. *C M Gallagher, J R Meliker (Stony Brook University, Stony Brook, NY)

Women are at increased risk for autoimmune disorders. Mercury accumulates in the thyroid gland, and mercury exposure has been associated with cellular autoimmunity. We evaluated the relationship between total blood mercury (Hg) and thyroid autoantibodies in a population-representative sample. Data on Hg, thyroglobulin autoantibodies (TgAb), thyroid peroxidase autoantibodies (TPOAb), and urine iodine (UI) were obtained from the 2007-2008 National Health and Nutrition Examination Survey files. We used multiple logistic regression to evaluate the association between Hg and TgAb and TPOAb positivity in women aged 20-49 and 50+ years, adjusted for demographic and lifestyle factors, nutrient intake, UI, and stratified by UI tertiles. Older women showed an association between Hg levels in the 5th quintile (Q5) (2.30-43.91 $\mu\text{g/L}$) and TgAb positivity (Odds Ratio (OR) = 3.0; 95% Confidence Interval (CI) = 1.95, 4.62; *p-value for trend* < 0.001), compared to the lowest quintile (0.20-0.46 $\mu\text{g/L}$). In analyses stratified by UI tertiles, younger women with the lowest UI levels ($\leq 111.9 \mu\text{g/L}$) also showed an association between Hg Q5 and TgAb positivity (OR = 3.49; 95% CI = 1.34, 9.12; *p-value for trend* = 0.011). Among older women with the lowest UI levels, TgAb positivity was significantly associated with Hg levels as low as the 2nd quintile (0.48-0.78 $\mu\text{g/L}$) (OR = 5.92; 95% CI = 1.66, 21.12; *p-value for trend* = 0.028). Results were less compelling for TPOAb. This is the first large study to show that Hg exposure is correlated with TgAb positivity among older U.S. women, and among older and younger US women with low UI levels. Further research regarding Hg and autoimmunity is merited.

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THE CONTRIBUTION OF LEAD IN DRINKING WATER ON BLOOD LEAD LEVELS OF YOUNG CHILDREN. *P Levallois, M Prevost, F Lemieux, D Gauvin, S Nour, M D'Amour, J St-Laurent, C Campagna, M Courteau (Institut National de Santé Publique du Québec, Quebec, QC, Canada)

To evaluate the contribution of residential sources (tap water, house dust, indoor paint) of lead to blood lead levels of young children, we conducted a cross-sectional survey in Montreal, Quebec, from September 2009 to March 2010. A total of 305 children aged 1-5 yrs, selected at random, participated in the study. Only participants who drank tap water from their home were considered for inclusion. During home visits, families answered relevant questionnaires, and the following samples were collected for lead analysis: tap water (one litre after 5 minutes flushing and 4 consecutive litres after 30 minutes stagnation), house dust, and indoor paint. In addition, a venous blood sample was collected from the child. All laboratory analyses for drinking water lead were done using US EPA Method 200.8. Lead in water and blood were analyzed using inductively coupled plasma mass spectrometry with detection limits of 0.01 $\mu\text{g/l}$ in water and 0.02 $\mu\text{g/dl}$ in blood. Tertiles of the arithmetic mean of the 5 tap water samples were used to categorize exposure to lead from water. Loglinear regression was used to estimate adjusted least squares geometric means (LSGMs). The geometric mean of blood lead levels (BLLs) increases from 1.20 $\mu\text{g/dl}$ for the first tertile of water lead concentration (< 0.75 $\mu\text{g/l}$) to 1.57 $\mu\text{g/dl}$ (p < 0.005) for the third tertile of lead concentration (> 3.3 $\mu\text{g/l}$). The difference of LSGMs remains statistically significant after adjusting for risk factors of elevated BLLs, as well as concentration of lead in house dust and indoor paint. Preliminary analysis of these residential sources suggests that drinking water may be a source of lead exposure for young children.

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METALS AND LIPID PEROXIDATION IN WOMEN.
*A Z Pollack, E F Schisterman, L R Goldman, S L Mumford, N J Perkins, M S Bloom, C B Rudra, R W Browne, J Wactawski-Wende (NICHD/NIH, Rockville, MD)

Cadmium, lead, and mercury exposures are associated with adverse health effects including cardiovascular disease, which may occur via lipid peroxidation. Thus, we examined cadmium, lead, and mercury in relation to plasma levels of F2-isoprostanes, 9-hydroperoxy-10,12-octadecadienoic acid (9-HODE), 13-hydroxy-9,11-octadecadienoic acid (13-HODE), thiobarbituric acid reactive substances (TBARS), and human serum paraoxonase 1 (PON1A) in the BioCycle Study in 252 healthy, premenopausal women followed for up to two menstrual cycles with up to 8 clinic visits/ cycle. Metals were measured at baseline in whole blood. Lipid peroxidation markers and PON1A were measured at each visit. Linear mixed models were used and pairwise interactions between metals were assessed. Median cadmium, lead, and mercury were 0.30 µg/l, 0.86 µg/dl, and 1.10 µg/l. Cadmium, lead, and mercury were not associated with increased isoprostanes, TBARS, 9-HODE, 13-HODE, or with decreased PON1A. Mercury was associated with decreased isoprostanes (beta -0.05; 95% confidence interval -0.07, -0.02), but effects persisted only for those with blood lead below the median. After adjusting for a simulated confounder, like fish intake but more strongly correlated to account for probable attenuation of the correlation coefficient from measurement error, mercury was not associated with isoprostanes, suggesting the observed association could be attributable to unmeasured confounding. In healthy premenopausal women, levels of cadmium, lead, and mercury were not associated with elevated lipid peroxidation or decreased PON1A.

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HEAVY METALS AND AUDIOMETRIC PURE-TONE THRESHOLDS IN ADOLESCENTS: NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY (NHANES), 2005-2008.
*K E Bainbridge, H J Hoffman (National Institute on Deafness and Other Communication Disorders, Bethesda, MD)

Elevated audiometric thresholds were observed with greater blood lead levels in the 1970s with the national health examination survey (NHANES II). The relationship between blood cadmium and audiometric thresholds has not been evaluated in a U.S. national survey. Our objective was to determine if current blood lead and cadmium concentrations were associated with audiometric thresholds in a nationally representative sample of 2860 adolescents aged 12-19 years who had audiometric testing during the 2005-2008 NHANES. Air conduction pure-tone thresholds were measured in both ears. Pure tone average (PTA) thresholds in decibels (dB) were computed over low/mid (500, 1000, 2000 Hertz (Hz)) and high frequencies (3000, 4000, 6000, 8000 Hz) for the right and left ear and then ranked according to better and worse ear. The authors used linear regression to assess if blood lead and cadmium concentrations expressed in quartiles were associated with low/mid and high frequency PTAs in the better or worse ear. Adolescents in the highest quartile of blood lead concentration (≥ 1.06 µg/dL) have greater unadjusted mean low/mid frequency PTAs in the worse and better ears, but no greater mean higher frequency PTAs. Those in the highest quartile of cadmium concentration (≥ 0.25 µg/L) have elevated low/mid and high frequency PTAs in the worse and better ears. Age was not associated with the pure-tone average thresholds after control for smoking, so models were adjusted for sex, race, income to poverty ratio, and smoking. Associations for the highest lead concentration quartile do not persist after adjustment. Controlling for covariates eliminated the cadmium association for three of the outcomes, but those in the highest quartile of cadmium concentration had significantly greater low/mid frequency PTA in the worse ear ($\beta = 1.37$, $p = 0.01$). The authors find evidence that cadmium, but not lead is independently associated with elevated pure tone average thresholds.

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INITIAL REACTIONS TO TOBACCO AND RISK OF FUTURE REGULAR TOBACCO USE AND DEPENDENCE. *E Zabor, H Furberg, L Thornton, C Bulik, P Sullivan, N Pedersen, P Lichtenstein (Memorial Sloan-Kettering Cancer Center, New York, NY)

Prior studies suggest that initial smoking pleasure influences future smoking behavior. We investigated how reactions to initial cigarette or Swedish smokeless tobacco (snus) use were associated with future regular use and nicotine dependence (ND) among 4,371 adults from the population-based Swedish Twin Registry. The Early Smoking Experience questionnaire captured eight physiologic reactions to initial cigarette or snus use: pleasant sensations, unpleasant sensations, nausea, relaxation, dizziness, pleasurable buzz, cough and difficulty inhaling. Logistic regression, adjusted for age at first use, estimated odds ratios (OR) and 95% confidence intervals (CI) separately for males and females. Among exclusive smokers ($n = 2,960$), 28% of males and 33% of females became regular smokers, while among exclusive snus users ($n = 1,411$), 78% of males and 47% of females became regular snus users. High ND was prevalent among 25% of males and 23% of females. Pleasant sensations, relaxation and pleasurable buzz during initial cigarette use increased risk of regular smoking (ORs ranged from 1.42-1.93 for males and 1.36-1.67 for females). Difficulty inhaling decreased risk of regular smoking only among females (OR: 0.86, CI: 0.78-0.95). Only pleasurable buzz was associated with higher ND but direction differed by sex (OR males: 0.64, CI: 0.44-0.95; OR females: 1.35, CI: 1.12-1.63). Remarkably similar patterns were observed for pleasant initial snus experiences and risk of regular snus use. Our findings support the hypothesis that those who progress to regular tobacco use may be more sensitive to the rewarding effects of nicotine, while those who do not may be more sensitive to its adverse effects.

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DNA METHYLATION CHANGES ASSOCIATED WITH EXPOSURE TO HG, PB AND BISPHENOL A. *M Bloom, C Hanna, W Robinson, A Steuerwald, P Parsons, J Taylor, F vom Saal, G Cheng, D Kim, V Fujimoto (University at Albany, Rensselaer, NY 12144)

This pilot study identifies candidate loci for a future study of pollutants and in vitro fertilization (IVF) outcomes. Blood and urine specimens were collected from 51 female IVF patients on the day of oocyte retrieval. Whole blood was analyzed for Hg and Pb, and urine for Cd using ICP-MS. Unconjugated bisphenol A (BPA) from serum was analyzed using HPLC with Coularray detection. Using an Illumina GoldenGate Methylation Assay, DNA methylation was assessed at 1505 CpG sites. Many of these loci are associated with cell replication or oxidative stress and thus may have relevance for reproduction. High and low exposure groups were defined by median concentrations for Hg (2.85 µg/L), Pb (0.77 µg/dL), Cd (0.30 µg/g creatinine), and BPA (2.39 µg/L). Illumina BeadStudio software was utilized to identify loci with a Difference Score > 13 ($P < 0.05$) and an absolute difference $> 10\%$, which were confirmed using pyrosequencing. Illumina probes containing single nucleotide polymorphisms were omitted. For women with high and low Hg, differences of 12.2% and 14.8% are detected for methylation at GSTM1_P363 and GSTM1_P266, respectively. However, no correlation is detected for Hg with methylation at these loci ($r = 0.24$ and $r = 0.23$, $P > 0.10$). For women with high and low Pb, a 20.3% difference in methylation is detected at COL1A2_P407. Pb is correlated to methylation at this locus ($r = -0.57$, $P = 0.006$). No association is detected for Cd. For women with high and low BPA, a 15.2% difference in methylation is detected at TSP50_P137. BPA is correlated to methylation at this locus ($r = -0.52$, $P = 0.002$). Methylation at these gene loci may be relevant to associations reported for Hg, Pb, BPA and IVF endpoints.

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A CASE-CONTROL STUDY OF GLIOMAS AND RESIDENTIAL PROXIMITY TO TOXICS RELEASE INVENTORY EMISSIONS. *J F M Lewis, S Erdal, B J McCarthy, D Il'yasova, D Bigner, F G Davis (University of Illinois at Chicago, Chicago, Illinois 60612)

The potential of environmental factors to increase brain tumor risk is unknown with the exception of ionizing radiation exposure. We assessed the association between residential proximity to industrial facilities that release toxic chemicals and metals into the air and the risk for gliomas, the most lethal brain tumor. A case-control study, conducted between 2005 and 2009, included 511 cases and 814 hospital controls recruited from the NorthShore University Health System (Illinois) and the Duke University Medical Center (North Carolina) (National Cancer Institute Grant P50 CA108786-01). Using geographic information systems, residential data obtained by survey were linked to emissions data retrieved from the U.S. Environmental Protection Agency's Toxics Release Inventory (TRI) database. Emissions included hazardous air pollutants (HAPs) as defined by the Clean Air Act of 1990 and metals and metal compounds. Emissions from ten years prior to diagnosis for cases and to study participation for controls were used to allow for latency. Logistic regression analyses, adjusted for age and gender, resulted in an odds ratio (OR) of 1.2 (95% confidence interval (CI):0.9-2.5) for living within a census tract with HAP emissions. Living within two miles of industrial facilities releasing HAPs also resulted in an OR of 1.2 (95% CI:0.9-1.5). Living within a census tract where metals and metal compounds were released resulted in an OR of 0.9 (95% CI:0.5-1.7). There is no evidence of any association. However, because the EPA data are not personal exposure data, an association cannot be dismissed.

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CIRCULATION OF INFLUENZA A(H3N2), BUT NOT A(H1N1) OR B, IS ASSOCIATED WITH AN INCREASE IN DEATHS DUE TO ACUTE MYOCARDIAL INFARCTION. *M Jackson, J Nelson, L Jackson (Group Health Research Institute, Seattle, WA 98101)

Background: Influenza infection has been hypothesized as a cause of acute myocardial infarction (AMI). However, consistent links between influenza and AMI incidence or mortality have not been found in either ecologic- or individual-level studies. We examined whether the possible association with AMI mortality varied by influenza type or subtype. Methods: We determined the monthly incidence rate of death due to AMI in each of the ten United States Health and Human Services regions from vital statistics data. We determined influenza circulation by region from national influenza surveillance. We estimated the association between influenza circulation and incidence of death due to AMI during 1997-2004 using autoregressive integrated moving average models to control for seasonality and account for autocorrelation of the time series data. We estimated associations for influenza overall and by type/subtype. Results: Neither influenza A(H1N1) nor influenza B circulation were significantly associated with AMI mortality in any of the ten regions after controlling for seasonality and circulation of influenza A(H3N2). Circulation of A(H3N2) was significantly associated with AMI mortality in eight of the ten regions. During the 1997/98 through 2003/04 influenza epidemics, A(H3N2) circulation was associated with anywhere from 24 AMI deaths (0.0% of all AMI deaths for the year) during a year of low A(H3N2) circulation to 2,391 AMI deaths (1.5% of AMI deaths for the year) during a year of high A(H3N2) circulation; the median was 1,110 AMI deaths per year. Discussion: Epidemics of influenza A(H3N2) may cause a modest but important number of deaths due to acute myocardial infarction.

* = Presenter; S = The work was completed while the presenter was a student

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SECONDHAND TOBACCO SMOKE:A SOURCE OF LEAD EXPOSURE IN U.S.CHILDREN AND ADOLESCENTS. *A Apostolou, E García-Esquinas, J J Fadrowski, P McClain, V Weaver, A Navas-Acien (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD)

To evaluate the relationship between secondhand tobacco smoke (SHS) exposure and blood lead levels in U.S. children and adolescents who participated in the National Health and Nutrition Examination Survey, 1999-2004. We analyzed data from 6,830 participants 3 to 19 years of age who were not active smokers and had SHS exposure information and blood lead measurements. Linear regression models on log-transformed blood lead levels were evaluated with progressive levels of adjustment for demographic, household characteristics and for year the family house was built. In children 3 to 5 years of age with house dust samples available (N = 791), we further adjusted for window and floor lead dust concentrations in the participant's home. After multivariable adjustment, participants in the highest quartile of serum cotinine ($\geq 0.44 \mu\text{g/L}$) had 28% (95% CI 21, 36%) higher blood lead levels compared to those in the lowest quartile ($< 0.03 \mu\text{g/L}$). Similarly, blood lead levels in children who lived with 1 and ≥ 2 smokers were 14% and 24% higher, respectively, compared to those living with no smokers. In participants with lead dust information available, the association between SHS and blood lead levels remained similar before and after adjustment for lead dust concentrations. SHS may contribute to increased blood lead levels in U.S. children. Lead dust does not appear to mediate this association, suggesting inhalation as a major pathway of exposure. Lead prevention programs need to incorporate strategies to prevent potential lead exposure from SHS, particularly in children who live with smokers. Smoke-free legislation initiatives in public places, motor vehicles and other environments where children are present could further prevent lead exposure. Eliminating exposure to SHS in children could result in lower lead exposure and fewer adverse lead-related health effects, including neurocognitive effects.

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UNDERSTANDING ENVIRONMENTAL MEDIATION OF PERSON TO PERSON TRANSMISSION. *J S Koopman, J N Eisenberg, I H Spicknall, J Zhao, S Li, N Plipat (University of Michigan, Dept. of Epidemiology, Ann Arbor, MI)

An environmental infection transmission system (EITS) modeling framework has been elaborated to advance the science that determines paths of infection transmission, how transmission along these paths can be stopped, and what constitutes a contact with potential to transmit infection. Except for STDs, infection transmission usually has the pathogen in the environment for varying periods of time. Models of infection transmission usually ignore this and use arbitrary contact definitions. To provide a clearer framework using more theoretically supportable data, we created a series of increasingly detailed differential equation and agent based EITS models that help us to infer how much transmission is taking place via droplet contaminated fomites, hand contaminated fomites, direct droplet spread, and aerosol spread. The contribution of each route to the basic reproduction number is derived. Comparisons of routes are made for influenza, rhinovirus, norovirus, and MRSA. Analysis of available data indicates that transmission routes have important differences from the way infection transmission modelers have been thinking about these. Droplet contaminated fomites are more important in influenza transmission than hand contaminated fomites under most conditions. While aerosol transmission is greater for influenza than the other agents, the conditions under which it dominates transmission are restricted and may vary by stage of the epidemic. The effectiveness of hand hygiene and surface decontamination in reducing transmission varies by agent, setting, and behaviors. The differences between influenza and MRSA in hospital settings will be discussed relevant to infection control policy implications and use of surface contamination in surveillance systems.

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MODELING INFLUENZA ROUTES OF TRANSMISSION TO INFORM OPTIMAL CHOICE OF ENVIRONMENTAL INTERVENTION. *I H Spicknall, J S Koopman, J N Eisenberg, J Zhao, S Li (University of Michigan, Dept. of Epidemiology, Ann Arbor, MI)

Most infections that are assumed to be directly transmitted have some environmental component between excretion and exposure, in which pathogens exist in the environment. In particular, influenza may be transmitted via the aerosol, droplet-spray, or contact-mediated transmission routes through the environment. It is unknown which of these routes is strongest. Traditional transmission models use an abstract and usually poorly defined concept of contact to transmit infection. In this work, we model detailed processes leading to influenza transmission that more closely resemble realistic processes by modeling the intermediate environmental stage of pathogen existence. This allows us to investigate unique issues that conventional transmission models are unable to address, such as examining factors that alter transmission route strength, as well as assessing the effect of environment-based interventions such as hand hygiene or surface decontamination. Using individual based and deterministic compartmental modeling frameworks, we model route-specific influenza transmission through the environment. We found that either the aerosol, direct droplet-spray, or contact mediated transmission routes are capable of causing high transmission either each on their own or in combination with one another, given realistic parameter values. We also found that increasingly non-random surface touching may either increase or decrease contact transmission, depending on the degree of shedding to one's own hands; hand hygiene was more effective when touching was performed preferentially on specific objects in the environment, while when touching was quite random, broad surface decontamination was more effective.

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SENSITIVITY AND SPECIFICITY OF PH1N1 SEROLOGICAL TESTS. *J Foisy, L Rosella, N Crowcroft (Ontario Agency for Health Protection and Promotion, Toronto, ON, Canada)

Seroepidemiology studies are key in understanding the epidemiology of infectious diseases, especially when the disease is novel and a subset of infected individuals exhibit subclinical illness. The accuracy and interpretation of the standard assays used to detect H1N1 antibodies during the 09 pandemic has been questioned, chiefly regarding past v. current infection and among important subpopulations (the elderly and those with chronic conditions). Blood specimens (N = 1397) were obtained from a prospective cohort of Ontario adults at the end of the 1st(T1) and 2nd(T2) waves. Sera were tested by hemagglutination inhibition assay (HAI) and microneutralization assay (MN) to determine titres against the pH1N1 influenza strain. Seropositive samples had a titre of $> = 1:40$. The Kappa statistic was calculated to determine agreement among assays. The sensitivity and specificity were calculated separately for T1, T2 and subgroups of interest. The agreement of the assays was moderate for T1 ($k = 0.56$) and higher for T2 ($k = 0.64$). The overall sensitivity of the HAI compared to the MN assay increased from 52.9% at T1 to 82.8% at T2; the specificity decreased from 96.7% to 82.9%. The sensitivity decreased with increasing age, from 65.5% in the 18-29 year age group to 27.5% in the 65+ age group. The specificity was stable: 95.5%-97.2%. When a chronic condition was reported the sensitivity of the HAI test was higher (55.8% v. 48.9%). The sensitivity was higher for those who had received the pH1N1 vaccination; the specificity was lower. Although HAI is an accepted method for the detection of antibodies it is not as sensitive as MN and may respond differently to subgroups. These differential test performances have implications on the interpretation of serological results for pH1N1.

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A SIMULATION STUDY QUANTIFYING THE BENEFITS OF EARLY INTERVENTION IN A CRYPTOSPORIDIUM OUTBREAK. *A Okhmatovskaia, A Verma, C Jauvin, B Barbeau, R Allard, D Buckeridge (Clinical and Health Informatics Research, McGill University, Montreal, QC, Canada)

OBJECTIVE: It is important to evaluate the effectiveness of outbreak interventions in preventing morbidity and mortality. In this work, we used simulation modeling to examine the potential of public health surveillance to trigger a timely boil-water advisory (BWA) to control a waterborne outbreak of cryptosporidiosis, and to quantify the potential benefits of earlier detection. METHODS: We developed an agent-based model for simulating realistic waterborne gastrointestinal disease outbreaks, and the effects of BWA on health outcomes. We simulated 2 scenarios of *C. parvum* outbreak resulting from a failure of a water treatment plant on the Island of Montreal with failure durations of 3 and 12 days. We varied the BWA compliance rate and timing relative to symptom onset. We measured the number of symptomatic cases, hospitalizations and deaths. RESULTS: The number of cases prevented by the BWA drops rapidly as a function of the delay for all compliance levels. There appeared to be little benefit in issuing a BWA five or more days after the beginning of symptoms under a long-impact scenario (two days in the short-impact scenario). The benefits of BWA declined faster with time than with deteriorating compliance: one day of delay was equivalent to about 20% decrease in compliance. CONCLUSION: The time window for effective prevention of morbidity through a BWA can be short under realistic outbreak scenarios. Timely triggering of a BWA will have to rely on a combination of human health surveillance and additional sources of information such as water quality surveillance, taking in account costs and the uncertainty of outbreak detection to ensure optimal decision-making.

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ESTIMATION OF THE HEALTH IMPACT AND COST-EFFECTIVENESS OF AN ADJUVANTED INFLUENZA VACCINE WITH ENHANCED EFFECTIVENESS AND DURABILITY OF EFFECT. *A Tuite, D Fisman (University of Toronto, Toronto, ON, Canada)

Emerging evidence suggests that the use of adjuvanted vaccines in older adults and young children results in enhanced protection against influenza infection and enhanced durability of effect. To evaluate the impact of introducing a seasonal adjuvanted influenza vaccine in these age groups, we constructed an age-structured compartmental model that simulates the transmission of influenza in the Canadian population over a ten-year period and compared the projected health outcomes and costs relative to the currently used unadjuvanted vaccine. Main outcome measures were: quality-adjusted life years (QALY), costs in 2009 Canadian dollars, and incremental cost-effectiveness ratios (ICERs). Use of adjuvanted influenza vaccine in children under 6 and adults ≥ 65 in the Canadian population, with continued use of unadjuvanted vaccine in the population aged 6-64, was projected to provide substantial health benefits, including aversion of deaths and hospitalizations. In the base case analysis, use of adjuvanted vaccine in older adults was highly cost effective (ICER: \$1970.25/QALY gained). Expanding adjuvanted vaccine coverage to include young children weakly dominated the vaccination of older adults only strategy (ICER: \$296.24/QALY). Sensitivity analyses showed that even small increases in adjuvanted vaccine efficacy were cost-effective. Small increases in durability of vaccine-induced immunity were projected to have a major impact on influenza dynamics via reduction in the frequency of epidemics. By reducing the number of influenza cases and health care resource use, adjuvanted influenza vaccine is projected to be an economically attractive intervention relative to currently available health interventions.

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GENERAL MODEL FOR CONTROLLING CO-EPIDEMICS INFECTIOUS DISEASE. *G K Vishwakarma (Vikram University, Ujjain, India)

The study of infectious disease co-epidemics is critical to understanding how the diseases are related and how prevention and treatment efforts can be most effective. A co-epidemic arises when the spread of one infectious disease stimulates the spread of another infectious disease. Basic models can provide insight into the complicated infection dynamics, and into effective control measures. Most epidemic models estimate a single disease. In present situation human immunodeficiency virus (HIV) and tuberculosis (TB) infection together form a very crucial public health hazard. It is also hypothesized that persons infected with the tubercle bacillus are at an increased risk of developing clinical disease if they become infected with HIV. WHO has given alarming estimates of HIV related tuberculosis in developing countries where tuberculosis is now recognized as one of the most common opportunistic diseases among persons seropositive for HIV. We present a general epidemic model of the two infectious disease co-epidemics that we use to explore the effects of hypothetical prevention and treatment scenarios. This model demonstrates that exclusively treating first infectious disease or second infectious disease may reduce the targeted epidemic, but can consequently intensify the other epidemic. This is useful for two synergistic infectious disease epidemics show the importance of including the effects of each disease on the diffusion and evolution of the other infection.

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SURVEILLANCE OF INFLUENZA ASSOCIATED PNEUMONIA IN THE DEPARTMENT OF DEFENSE. *A K McCabe (EpiData Center, Navy and Marine Corps Public Health Center, Portsmouth, VA)

During the 2009-2010 nH1N1 impacted influenza season, medical personnel were concerned with possible severe complications of influenza infections. Research on previous influenza pandemics showed that the majority of influenza-related deaths were caused by secondary bacterial infections; most frequently pneumonias. The EpiData Center performed a retrospective review of Department of Defense influenza-associated pneumonia cases to assess characteristics of patients at highest risk for adverse outcomes. Influenza positive laboratory tests during the impacted influenza season were matched to radiology records to identify possible pneumonia cases. Potential pneumonia cases were matched to additional data sources to describe the patient's overall clinical experience. During the 2009-2010 influenza season, 1.4% of influenza cases had radiological evidence of pneumonia within seven days of laboratory positive influenza testing. Of these cases, 99.3% had a clinical encounter diagnosis of respiratory illness within 14 days. Patient demographics were statistically different between influenza-only cases and those with both influenza and pneumonia. Ninety percent of influenza patients with pneumonia were treated with an antibiotic, antiviral, or a combination of both within 14 days of the influenza-positive laboratory testing. To ensure a comprehensive influenza surveillance system, additional surveillance of potentially severe complications due to pneumonia may be necessary to monitor the impacted population, provide guidance on immunization, and ensure mission readiness. Presentation will include surveillance data from the current influenza season, along with comparisons to the previous H1N1 impacted season.

719-S

INFECTIOUSNESS DURATION HETEROGENEITY IMPACTS NOROVIRUS OUTBREAK DYNAMICS. *M O Milbrath, J L Zelner, C L Moe, J N S Eisenberg (University of Michigan, Ann Arbor, MI)

Heterogeneity in infectiousness duration can affect epidemiological patterns and outbreak risk. Norovirus, a common cause of epidemic gastroenteritis, demonstrates this type of heterogeneity; some individuals asymptotically shed viral particles for much longer than the rest of the population. We reviewed the literature for human norovirus shedding duration data. These data were used to develop realistic infectious period distributions and to examine characteristics of individuals who shed for longer durations. Infants and those with compromised immune systems are more likely to shed longer, and are classified as long-shedders. With a mathematical model, increases in the proportion of long-shedders or in their average infectiousness duration results in longer outbreaks and a higher probability of outbreak occurrence. Long shedders can affect outbreak patterns similar to environmental reservoirs such as water, and should therefore be taken into account when developing control strategies and microbial risk assessment models.

721-S

THE EFFECT OF INCARCERATION ON INJECTION DRUG USE BEHAVIORS IN BALTIMORE, MARYLAND. *B L Genberg, B Lau, G D Kirk, S H Mehta (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD)

Since the 1980s in the United States, law enforcement approaches have been the mainstay of national policies designed to curtail drug use; however, incarceration rates have increased dramatically without attendant declines in drug use behaviors. The current study, based within the ALIVE (AIDS Linked to the IntraVenous Experience) prospective cohort study of injection drug users (IDUs) in Baltimore City, estimated the crude, adjusted, and inverse probability of exposure weighted associations between incarceration and the probability of injection drug use. The adjusted and inverse probability weighted model accounted for prior incarceration, drug use, and other individual socio-demographic and behavioral characteristics. Fifty-three percent of the 2,216 individuals contributing data semi-annually from 1988 through 2009 experienced incarceration over the course of follow-up. 70% were male, 92% African-American, and 49% injected daily or more frequently at their first follow-up visit. The weighted model showed that incarceration increased the odds of injection drug use by 20% (odds ratio = 1.19, 95% confidence interval: 1.10, 1.29). These results suggest that incarceration is not an effective strategy for curtailing drug use among IDUs. Future research should examine the impact of alternative interventions on injection drug use using appropriate methods to account for time-varying confounding.

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EVALUATION OF DIRECTLY OBSERVED THERAPY ON TUBERCULOSIS TREATMENT OUTCOMES IN TAIWAN. *E Bloss, P-C Chan, N-W Cheng, K-F Wang, S-L Yang, P Cegielski (Centers for Disease Control and Prevention, Division of Tuberculosis Elimination, Atlanta, GA)

Directly observed therapy (DOT) is recommended by the World Health Organization (WHO) as a core element of tuberculosis (TB) care and control efforts. In Taiwan, DOT was adopted as a national policy in 2006. We evaluated the association of DOT on TB treatment outcomes nationally in Taiwan. We analyzed data prospectively collected on all new, pulmonary TB cases reported to the national web-based registry between January 1, 2007 and June 30, 2008. We compared treatment outcomes and level of DOT in logistic regression analyses. Among 12,258 TB patients, the proportion of days on DOT was > 60% for 5,399 (44%) patients, whereas for 5,032 (41%) of patients the proportion was < 60%. For 1,827 (15%) patients, there were no recorded days during which an official DOT observer witnessed therapy. Being older, male, having positive bacteriology and a non-WHO recommended treatment regimen at baseline were independently related to poor TB treatment outcome. A dose-response effect was observed between treatment outcomes and proportion of therapy observed (> 60% DOT, adjusted odds ratio [aOR] 0.02, 95% confidence interval [CI] 0.01-0.02; < 60% DOT, aOR 0.2, 95% CI 0.1-0.2). Findings highlight the importance of ensuring universal, high-quality DOT in improving treatment outcomes among new, pulmonary TB patients in Taiwan.

724-S

USING NONLINEAR MATHEMATICAL MODELS TO CAPTURE HERD IMMUNITY EFFECTS IN ECONOMIC EVALUATION OF HUMAN PAPILLOMAVIRUS VACCINATION PROGRAMS. *S Tully, A Anonychuk, D M Sanchez, A Galvani, C Bauch (University of Guelph, Guelph, ON, Canada)

Human papillomavirus is the most prevalent sexually transmitted infection in North America. Traditionally, modelling studies employ a linear Markov model to assess vaccination programs and the cost-effectiveness of the HPV vaccine. By virtue of their linearity, these models do not capture nonlinear transmission processes and hence effects such as herd immunity. This thesis, however, examines a nonlinear system of ordinary differential equations that do capture transmission processes, as well as the costs of treatment and cervical cancer disease stages. This is used to estimate the cost-effectiveness of HPV vaccination and cervical screening programs. Moreover, few previous models look into considering catch-up programmes or taking cross-protection between similar HPV types into account, however these are included in the model studied in this thesis. The system of ordinary differential equations is analyzed numerically. Different scenarios are investigated to assess the best way to reduce cancer incidence in a cost-effective way. This includes implementing strategies such as a catch-up immunization program for older females, a booster dose program to prevent the effects of vaccine efficacy, and strategies altering the current screening frequency rates and initial screening ages of females to supplement a school-based 75% vaccination program. Many of these programs are found to be cost-effective. For instance, a catch-up vaccination program combined with current school-based vaccination is estimated to cost the health provider CAN \$9,779 (\$3,252, \$16,306) per QALY saved, which is well below established thresholds for cost-effectiveness.

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ANALYSIS OF THE ROLE OF CELLULOSE GENES BCSA, BCSB, AND BCSC IN BIOFILM FORMATION IN CRONOBACTER SPP. USING PCR ASSAY AND GENE MUTATION. *L Hu, C J Grim, A A Franco, G Gopinath, K G Jarvis, M H Kothary, B A McCardell, B D Tall (U.S. Food and Drug Administration, Laurel, MD)

Cronobacter species (Cs) are emerging foodborne pathogens that cause sepsis, meningitis, and necrotizing enterocolitis in neonates. Cs are capable of attaching to and forming biofilms on polycarbonate, stainless steel, and glass surfaces, which are commonly used in food preparation equipment and the manufacture of infant formula. Biofilm formation by *Salmonella* and *E. coli* is associated with the expression of cellulose. Cellulose has been shown to mediate interactions between bacteria and host tissues, or bacteria and environments. Genes required for cellulose biosynthesis are encoded by the *bcsABZC* operon. While *bcsA* encodes cellulose synthase, *bcsB* is the regulator of cellulose synthase, and *bcsC* is the cellulose synthase oxidase. In this study, the presence of cellulose genes in 69 *Cronobacter* strains including 37 clinical, 11 food, and 15 environmental isolates was investigated by using polymerase chain reaction (PCR) assays. PCR primers were designed from the *bcsA*, *bcsB*, and *bcsC* sequences of *C. sakazakii* strain BAA894. Using total genomic DNA as template, 49 strains (71%) were found to possess *bcsA*, 54 strains (78%) possess *bcsB*, and 54 strains (78%) possess *bcsC*. *bcsA*, *bcsB* and *bcsC* isogenic mutants were created in *C. sakazakii* BAA-894 and *C. turicensis* 3032. Biofilm formation was tested in glass tubes. The pellicles formed at the air-liquid interface and sediments from the bottoms of glass tubes were significantly reduced in *bcsA*, *bcsB*, and *bcsC* mutants compared to the wild-type strains. Our data confirmed that the cellulose *bcsA*, *bcsB*, and *bcsC* genes are involved in biofilm formation in *Cronobacter* spp.

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BORDETELLA PERTUSSIS OUTBREAK IN RURAL AMISH COMMUNITIES ILLINOIS, 2009-2010. *K Soyemi, D Rowe, C Finley, K McMahon S Hays, J Jones, J Harchous (Illinois Department of Public Health, Westchester, IL)

Background: Pertussis is a communicable vaccine-preventable disease caused by *Bordetella pertussis*. An outbreak among Amish communities in rural Illinois from December 2009 through March 2010 was investigated to identify contributing factors. Methods: To determine the extent of the outbreak, local health department staff conducted an initial interview using standardized case investigation forms. We classified cases using standard case definition, and conducted a retrospective cohort study using the public health surveillance data. To assess secondary household transmission, cases were asked whether anyone in their household was sick. Results: Forty-seven cases were identified; median (Inter quartile range) age was 7 (1-12) years. Males accounted for 19(40%) of cases; children and adolescents accounted for 83% of cases. Ten(21%) of cases compared with 16(53%) non cases ($P = < 0.001$) received vaccination. The linear trend in binomial proportions of cases compared with non cases across increasing levels of number of vaccine doses was statistically significant using the Cochran-Armitage trend test ($P = 0.02$). Antimicrobial treatment initiated greater than 14 days after cough onset (Relative Risk [RR], 1.9; 95% Confidence Interval [CI], 1.4 - 2.6) and cough duration greater than two weeks (RR, 3.1; 95% CI, 1.1 - 8.8) were associated with increased risk of secondary household transmission. Conclusions: Enhanced vaccination campaigns should be initiated during outbreaks in areas with historical low vaccination coverage as vaccination reduces the risk of the disease. To reduce secondary transmission, timely initiation of antibiotics among cases and household contacts should be encouraged.

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TUBERCULOSIS SCREENING AND DISEASE AMONG RESETTLED REFUGEES ILLINOIS, 1988–2009. A MEDINA-MARINO, *K Soyemi, J Aguirre, P Ward (Illinois Department of Public Health)

Introduction: Certain refugee populations have high rates of tuberculosis (TB) because of exposures in their country of origin. Upon resettlement in Illinois, refugees undergo postarrival medical examinations; results are maintained in the Illinois refugee health electronic (IRHE) database. We investigated “time-to-event” of developing TB disease (TBD) after resettlement in Illinois. **Methods:** Refugees were categorized based on TBD history, skin test induration size, and chest radiograph results. Using names, birth date, sex, and country of origin, the IRHE and the Illinois TB Registry were linked to identify refugees that developed TBD post-resettlement. Analysis of time-to-event was performed using Kaplan-Meier curves and log rank test. **Results:** During 1988–2009, 54,161 refugees were screened; 2310 were categorized as suspect for TB disease (STBD), 11,278 as latent TB infection (LTBI) and 20,777 as non-infected individuals (NI); 19,800 could not be classified due to incomplete results (NC). TBD was later diagnosed among 188/54,161 (0.3%) refugees, including 66 individuals (2.9%) categorized as STBD; 33 (0.3%) LTBI; 34 (0.2%) NI; and 55 (0.6%) NC. Intervals between screening and TB report dates were: < 3 months, 47 (25.0%); 3–24 months, 69 (36.7%); and > 24 months, 72 (38.3%). Median time to report date varied by group (STBD: 3.6 months [interquartile range *IQR*: 1.5–5.8]; LTBI: 24 months [*IQR*: 6.3–56.5]; NI: 37.4 months [*IQR*: 22.9–186.9]; NC: 7.2 months [*IQR*: 2.4–43.5]; $P < 0.001$). **Conclusions:** Refugees continue to be at risk for developing TBD after resettlement. Those classified as STBD and NC were more likely to develop TBD and developed it sooner than refugees identified as LTBI or NI. Complete screening of all refugees should be performed.

728-S

IDENTIFICATION OF DEVICE-ASSOCIATED INFECTIONS UTILIZING ADMINISTRATIVE DATA. *A L Cass, R McKeown, J W Kelly, C Addy, J Probst (Greenville Memorial Hospital, Greenville, SC 29605)

Healthcare-associated infections cause significant morbidity and mortality in U.S. hospitals. Recent regulatory changes have broadened the scope of surveillance data for use in public reporting and of administrative data for determining Centers for Medicare & Medicaid Services (CMS) reimbursement limitations. To investigate the ability of administrative data to identify cases meeting surveillance criteria we conducted a retrospective cohort study based on a source population of 28,761 hospital admissions. Infection control surveillance results for catheter-associated urinary tract infections (CAUTI), central line-associated bloodstream infections (CLABSI), and ventilator-associated pneumonia (VAP) were compared with infections identified by administrative data diagnosis codes and Present on Admission indicators. The sensitivity, specificity, and positive predictive value (PPV) of administrative data were calculated, with surveillance data the gold standard. The sensitivity of the diagnosis code for CAUTI was 0%. An expanded definition incorporating additional diagnosis codes increased sensitivity to 70%, with a specificity of 95%. Restricted and expanded definitions of CLABSI resulted in a sensitivity of 21% and 62%, respectively. Administrative data identified VAP with 25% and 61% sensitivity, using restricted and expanded definitions. PPVs for administrative data infections corresponding to CMS-defined hospital acquired conditions were 0% for CAUTI and 41% for CLABSI. Administrative data failed to identify the same cases that were detected by infection surveillance. Additional research is needed to understand the factors that drive the differences between these data sources in order to guide appropriate usage of each.

727-S

SPECIFIC COMBINATIONS OF INFECTIONS RATHER THAN NUMBER OF INFECTIONS PREDICTS MORTALITY IN THE U.S. *A M Simanek, A Zajacova, J B Dowd, A E Aiello (University of Michigan, Ann Arbor, MI 48109)

Increasing total pathogen burden has been associated with increased risk for chronic diseases and mortality. We hypothesize, however, that the specific combinations of pathogens to which individuals are seropositive, instead of the crude number, may be more important in determining risk for mortality. Data were from the National Health and Nutrition Examination Survey III, 1988–1994, for subjects ≥ 25 years of age at time of exam, with mortality follow-up and whom were tested for seropositivity to cytomegalovirus (CMV), herpes simplex virus-1 (HSV-1) and 2 (HSV-2) and *Helicobacter pylori* (*H. pylori*) ($N = 6513$). Cox proportional hazard models were used to estimate hazard ratios (HR) and 95% confidence interval (CI) for the association between summed pathogen burden (seropositivity to 0–4 pathogens) and all-cause mortality, as well as for each specific combination of pathogens to which individuals were seropositive and all-cause mortality, using interaction models. During the mean 15.0 years of follow-up from exam, the population estimate for the proportion dying from all causes was 21.0%. In the fully adjusted model, the effect of summed pathogen burden was not statistically significant. However, the joint effects of seropositivity for CMV and HSV-2 combined (HR 2.06, 95% CI 1.22, 3.47) as well as CMV, HSV-2 and *H. pylori* combined (HR 1.52, 95% CI 1.01, 2.31) on mortality were statistically significant. The specific combination of pathogens to which persons are seropositive may be more important than the crude number of pathogens for predicting risk for mortality in the US.

729-S

FACTORS ASSOCIATED WITH DRUG RESISTANT TUBERCULOSIS (DRTB) AMONG PATIENTS WITH TUBERCULOSIS (TB) AND DIABETES MELLITUS (DM) IN PERU. *M Magee, E Bloss, S Shin, C Contreras, H Arbanil Huaman, J Calderon Ticona, J Bayona, C Bonilla, M Yagui, O Jave, P Cegielski (Centers for Disease Control and Prevention, Atlanta, GA)

Background Patients with TB and DM have increased risk of DRTB, but little is known about factors associated with DRTB among TB-DM patients. In Peru, we examined demographic and clinical characteristics related to DRTB among TB-DM patients. **Methods** During 2005–2008, TB suspects with respiratory symptoms in Lima, Peru who met National TB Program guidelines to receive drug susceptibility testing (DST) were enrolled ($n = 1846$). Adult pulmonary TB patients with DM with complete DST results were analyzed ($n = 149$). Bivariate analyses and multivariable logistic regression determined factors associated with DRTB (resistance to any first-line anti-TB drug) at start of TB treatment. **Results** Most TB-DM patients were male (60%), aged 45–64 years (64%), and were treated previously for TB (83%). Forty-five (30%) patients had DRTB. No differences by DRTB were observed in bivariate analyses with respect to sex, age, BMI, alcohol and tobacco use, previous TB treatment, weight loss, blood in sputum, lung cavitation, or smear or culture load; patients with DRTB had longer duration of TB symptoms prior to enrollment (t -test = 5.1, $p < 0.01$). Controlling for age, sex, and prior TB treatment, having TB symptoms lasting > 16 weeks was independently associated with DRTB (odds ratio 6.3, 95% confidence interval 2.5, 15.9). **Conclusion** Public health efforts should focus on reducing the burden of TB symptoms and drug resistance among patients with DM and TB in this setting.

730-S

PREDICTING TRANSMISSION OF TUBERCULOSIS FROM ATTRIBUTES OF INFECTED CASES. *H Mamiya, K Schwartzman, C Jauvin, M A Behr, D L Buckeridge (McGill University, Montreal, QC H3A 2T5, Canada)

Purpose: A newly diagnosed tuberculosis (TB) case can be: 1) a source case for transmission leading to other, secondary active TB cases; 2) a secondary case, resulting from recent transmission; or 3) uninvolved in recent transmission, i.e. neither source nor recipient ("isolated case"). To aid effective management of TB transmission, we developed a multinomial logistic regression model to estimate the probability of a new case being in one of these three categories based on the case's clinical and demographic data, such as age, HIV status, and chest X-ray results. Methods: Among 1858 TB cases recorded between 1996 and 2007 in Montreal, the data from 1549 culture positive TB cases were used to train the model. According to DNA fingerprint analysis, response variable of the training data was classified as: 107(6.9%) source cases, 207(13.4%) secondary cases, and 1235 (79.8%) isolated cases. Model selection was performed by the Bayesian Model Averaging. To correct optimism bias due to overfitting, 10-fold cross-validation was performed. Discriminative ability of the model was assessed by the Area Under the Receiver Operating Curve (AUC), and the average prediction error was measured by the Brier Score. Results: AUC of the model to discriminate source cases from isolated cases was 0.62 (95% CI 0.52, 0.71), and the corresponding Brier Score was 0.07. AUC for the discrimination of secondary cases from isolated cases was 0.65 (95% CI 0.53, 0.77), and the Brier Score was 0.12. Conclusion: The results suggest that the predictive performance of the model with available predictor variables would be suboptimal, in a setting where proportions of source and secondary cases appear to be low.

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LOCATION-SPECIFIC PATTERNS OF EXPOSURE TO RECENT PRE-PANDEMIC STRAINS OF INFLUENZA A IN SOUTHERN CHINA. *J Lessler, D A T Cummings, J M Read, S Wang, H Zhu, G J D Smith, Y Guan, C Q Jiang, S Riley (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD)

Variation in influenza incidence between locations is commonly observed on large spatial scales. It is unclear whether such variation occurs on smaller spatial scales and, if it exists, whether it is the result of heterogeneities in population demographics or other differences in population structure and connectivity. To investigate whether differences in exposure to recent influenza A viruses not explained by population demographics exist between locations, we performed a study between July and September 2009 in 5 locations randomly selected from an area near Guangzhou, China. In each location households were randomly selected to answer a questionnaire on household and demographic information, and to provide a blood sample for serological testing against 5 recently circulating influenza viruses (A/Shantou/90/2003(H3N2), A/Shantou/806/2005(H3N2), A/Shantou/904/2008(H3N2), A/Shantou/104/2005(H1N1) and A/Shantou/92/2009(H1N1) [not the pandemic strain]). We found a significant reduction in the frequency of detectable neutralization titers with increasing age, leveling off in older age groups. There were significant differences between locations in age, employment status, vaccination history, household size and housing conditions. However, after adjusting for these characteristics significant variations in the frequency of detectable neutralization titers were still observed between locations. These results suggest that there are characteristics of locations or communities that drive influenza transmission dynamics apart from individual and household level risk factors, and that such factors have effects independent of strain.

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PREDICTION AND IMPUTATION OF SPATIO-TEMPORAL DATA: DENGUE SURVEILLANCE IN THAILAND. *J Lessler, N G Reich, S Iamsrithaworn, D A T Cummings (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD)

Surveillance systems are often plagued by delays in reporting and missing data. However, spatial and temporal correlations may exist between observations that provide information about the data that is missing. Predictive models such as hidden Markov models (HMMs) provide a unified framework in which to both impute missing observations and predict future observations while incorporating parameter uncertainty. Using dengue data from the Thai national notifiable disease surveillance system between 1999 and 2009 we used an HMM to estimate the posterior probability of being in periods of high dengue transmission given the observed case reports for each province and information from nearby provinces on previous weeks. This model can be applied prospectively to predict when a province is at risk of a major outbreak. The same framework allows for imputation of missing data in provinces that report late or not at all. We evaluate this model's ability to predict periods of high dengue transmission and the error in absolute case counts predicted. The model was cross-validated by holding out each year of data in turn and then predicting that year's data using a model fit to all other years. We compare the performance of our model with auto-regressive and seasonally-adjusted auto-regressive models. In short term forecasts for Buriram province, we identify periods of exceptionally high transmission with a positive predictive value of 84% and a negative predictive value of 99%. This framework provides a unified approach for prediction and missing data that can be applied to any health data where meaningful spatial and temporal correlations exist.

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ON THE RELATIONS BETWEEN EXCESS FRACTION, ATTRIBUTABLE FRACTION, AND ETIOLOGIC FRACTION. *E Suzuki, E Yamamoto, T Tsuda. (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Okayama, Japan)

It has been noted that there is ambiguity in the expression "attributable fraction" and epidemiologic literature has drawn a distinction between "excess fraction" and "etiologic fraction". These quantities do not necessarily approximate one another, and the etiologic fraction is not generally estimable without strong biologic assumptions. Previous studies have explained the relation between excess and etiologic fractions in the potential-outcome framework, and few studies have fully explained the relationships between these concepts by showing the correspondence between the potential-outcome (= counterfactual) model and the sufficient-cause model. This study aims to clarify the relation between excess and etiologic fractions in detail by explicating the correspondence between these 2 models. In so doing, we take into account the potential completion time of each sufficient cause, which contributes to further insight to clarify the 2 types of etiologic fraction, i.e., accelerating and non-accelerating etiologic fractions. These 2 measures cannot be distinguished in epidemiologic data, and the differences might be subtle. However, they are closely related to very fundamental issue of causal inference, i.e., how researchers define etiology. Further, this study also aims to clarify the relationship between 3 distinct assumptions - "positive monotonic effect", "no preventive action", and "no preventive sequence".

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IDENTIFICATION OF OPERATING MEDIATION AND MECHANISM IN THE SUFFICIENT-COMPONENT CAUSE FRAMEWORK. *E Suzuki, E Yamamoto, T Tsuda. (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Okayama, Japan)

The assessment of mediation and mechanism is one way to more deeply explore cause-effect relationships, providing a stronger test and explanation of the observed associations. Although most previous studies have explored mediation analysis in the counterfactual (= potential-outcome) framework, this study demonstrates that further insight can be given by elucidating the concepts of mediation and mechanism in the sufficient-component cause framework, distinguishing their operation from presence. The careful consideration of the concepts of mediation and mechanism can clarify the relationship between mediation and mechanism. Then, the present study describes how investigators can identify mediation as well as mechanism by showing their correspondence with direct and indirect effects in the counterfactual framework. This study also demonstrates how a researcher can decompose the total effect into the effect due to mediated paths and the effect due to non-mediated paths in terms of the probabilities of background factors of sufficient causes.

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INFORMATIVE PRIORS: A SIMPLE APPROACH FOR UTILIZING ANIMAL AND CELLULAR EVIDENCE IN OBSERVATIONAL RESEARCH VIA ORDER CONSTRAINED PRIORS. G Hamra, D B Richardson, R MacLehose (University of North Carolina, Chapel Hill, NC 27510)

Informative priors can be a simple and useful tool for epidemiologists to handle sparse data problems in regression modeling. It is sometimes the case that previous research may indicate the direction of effect or magnitude of one exposure's effect relative to another but may not provide enough information to specify the distribution of a prior in absolute terms. When considering human carcinogens, for example, an important source of knowledge is derived from toxicological studies and experimental research. Incorporating this knowledge as a prior in regression analysis of epidemiologic data often is difficult since the findings cannot be considered exchangeable across species or from cellular level outcomes to mortality and morbidity. We present a method to help bridge the gap between animal and cellular studies and epidemiological research by specification of an order constrained prior via truncation, illustrating how external information from toxicological and experimental research regarding parameter associations may be usefully incorporated. Our approach is illustrated using data from studies of the relative biological effectiveness of beta and gamma radiation on the excess relative rate of leukemia. When the prior is non-informative, the estimated ERR/10mSv due to beta radiation for leukemia and leukemia excluding chronic lymphocytic leukemia (CLL) are 0.141 (90% CI: -0.323, 0.649) and -0.281 (90% CI: -1.136, 0.548), respectively. When we truncate estimation of the ERR for beta radiation based on gamma radiation, the estimated ERR/10mSv for leukemia and leukemia excluding CLL are 0.298 (90% CI: 0.027, 0.702) and 0.344 (90% CI: 0.049, 0.817), respectively.

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A FEW RANDOM THOUGHTS ABOUT SYSTEMATIC ERRORS. *T Lash (Aarhus University Hospital, Aarhus 8200, Denmark)

In the decade since the first Congress of Epidemiology, the field has profited from steady advancements in methods to improve causal inference. Examples include development and more frequent implementation of graphical depictions of hypothesized relations between variables, marginal structural modeling and other longitudinal data analysis, bias analysis, and Bayesian statistical methods. Genetic epidemiologists, especially, have developed analytic strategies to reduce attention paid to likely false-positive associations. Nonetheless, non-null epidemiologic associations characterized initially as causal are often later re-characterized as non-causal, and often for reasons that could not have been solved by the aforementioned advancements. Rather, these initial and erroneous causal inferences seem to emerge from a combination of over-confidence, enthusiasm, and external pressures to promote research findings. This presentation will therefore focus on hard-learned lessons that temper these tendencies, illustrated with examples from the author's own research in the past ten years. Recommended strategies to combat over-confidence will include using the null as an anchor, using a prior as an anchor (incorporating epidemiologic and other evidence), and using the crude as an anchor. The author will recommend patience to allow a research topic to mature in the literature and fortitude to decline opportunities for media attention paid to a single study's results, no matter the external pressures. While these "methods" do not have the allure of sophisticated analytic approaches, the test of time has proved them to be effective strategies to dampen the human tendency toward over-interpretation that frequently afflicts causal inference.

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RESIDENTIAL MOBILITY OF CHILDREN AND THE POTENTIAL FOR CONTROL SELECTION BIAS. *A E Kalkbrenner, J L Daniels, C Poole, M Emch (Departments of Epidemiology and Geography, University of North Carolina, Chapel Hill, NC)

Demographic and lifestyle factors differ for groups that are residentially stable and those that relocate. We evaluated whether prevalence ratios (PR) between risk factors and autism spectrum disorders differed depending upon the residential criteria applied to the control population. We included a central North Carolina birth cohort identified from vital records (15% random sample born in 1994 and 1996, $n = 5558$) and children from the complete birth cohort subsequently identified as having autism spectrum disorders by active, records-based surveillance ($n = 206$). Continued residence within the 8-county surveillance catchment area at age 8 was required for a case to be identified. Previous studies included children that out-migrated and could not be identified as cases in the control group, introducing a potential bias. We traced residential trajectories, finding an address for at least one parent for 98%. About 90% remained in the surveillance catchment area; these were more likely to be African-American and with lower maternal education compared to those who out-migrated. We compared PRs from a closed cohort where residential criteria were applied at birth and age 8 to PRs that included controls that out-migrated, for available potential predictors of autism: demographic (e.g. maternal age), lifestyle (e.g. maternal smoking), and environmental (e.g. air pollutants). In our area, applying different residential trajectory criteria between cases and controls did not impact PRs; ratios between PRs ranged from 95-104%. The potential for bias remains for other areas with higher mobility. Our PRs may differ from the ideal PR that follows a birth cohort without geographic restriction at the end of follow-up.

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WITHDRAWN

740-S

TREATMENT EFFECT ESTIMATES VARY DEPENDING ON THE DEFINITION OF THE PROVIDER PRESCRIBING PREFERENCE-BASED INSTRUMENTAL VARIABLES. *R Ionescu-Ittu, M Abrahamowicz, L Pilote (McGill University, Montréal, QC H3A1A2, Canada)

The instrumental variable (IV) method can remove bias due to unobserved confounding, but it is unclear to what extent the choice of the IV may affect the results. In this empirical study we assessed to what extent the choice of the IV may affect the treatment effect estimates, by applying 9 different provider-based IVs in an observational database study that compares the effectiveness of rhythm versus rate control treatments in preventing 5-year mortality in atrial fibrillation (AF). We compared the IV treatment effect estimates obtained from 2-stage least square regression models with the 9 alternative provider-based IVs defined at either hospital or physician level. At either level, we considered both (i) 'binary IV' i.e. an indicator of the treatment prescribed to the most recent patient of the same provider; and (ii) 'continuous IVs', calculated as the proportion of subjects prescribed rhythm control drugs in a relevant subset of $k > 1$ most recent patients. Exploratory analyses of the strength of the instruments and of their ability to reduce the covariate imbalance suggested all 9 IVs investigated were reasonably valid. Yet, there were large variations in both the point estimates and the width of the confidence intervals of the alternative IV's. Relative to the physician-based IV, the hospital-based IV's were stronger, had smaller variance and produced less extreme point estimates. Additional exploratory analyses helped hypothesize the mechanisms that could possibly contribute to the discrepancies between the point estimates obtained with alternative IVs. In summary, in this empirical example, the IV estimates of treatment effect varied considerably depending on the IV definition.

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ASSESSING THE EFFECT OF EXPOSURE MISCLASSIFICATION ON CANNABIS-BIRTH DEFECT ASSOCIATIONS: AN APPLICATION OF FREQUENTIST AND BAYESIAN METHODS. M van Gelder, R Donders, O Devine, M Cleves, N Roeleveld, *J Reefhuis (Centers for Disease Control and Prevention, Atlanta, GA 30333)

Studies on the association between periconceptional cannabis exposure and birth defects have mainly relied on self-reported exposure; results may be biased due to exposure misclassification. The aim of this study was to quantify the potential effects of exposure misclassification by calculating odds ratios corrected for this source of bias for the association between periconceptional cannabis use and selected birth defects using data from the National Birth Defects Prevention Study from 1997-2005. We used information on sensitivity of self-report from the literature. Frequentist Monte Carlo simulations were used to assess the effects of non-differential misclassification (with assumed sensitivity of 50%, 65%, and 80%). Frequentist results showed an association between cannabis use and anencephaly (18 exposed cases, adjusted odds ratio [OR] 2.2, 95% confidence interval 1.3-3.7), which diminished after correction for non-differential misclassification in the Monte Carlo simulations (assumed sensitivity 65%; adjusted OR 1.8, 95% uncertainty interval(UI) 1.2-2.8). Initially, we did not find an association between cannabis use and any of the other 19 birth defect categories assessed, but after correction for non-differential misclassification, cannabis use was associated with gastroschisis (assumed sensitivity 65%; adjusted OR 1.8, 95% UI 1.4-2.3). Exposure misclassification may bias effect estimates of cannabis-birth defect associations. We will also use Bayesian models with different assumptions about sensitivity of self-report and prior estimates to assess the associations between cannabis and birth defects and relevant covariates.

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EFFECT OF MAKING INACCURATE ASSUMPTIONS WHEN CORRECTING FOR EXPOSURE MISCLASSIFICATION. *C Y Johnson, P P Howards, M A Honein, S A Rasmussen, M J Strickland, W D Flanders (Emory University, Atlanta, GA 30306)

Quantitative methods to correct for exposure misclassification, such as probabilistic bias analysis or Monte Carlo sensitivity analysis, have been suggested as improvements over qualitative assessments on the potential impact of bias. We evaluated how sensitive these quantitative methods are to incorrect assumptions about the sensitivity (Se) and specificity (Sp) of exposure classification. We used data for which both true (measured height and weight) and misclassified (self-reported height and weight) measures of exposure were available in a study of diabetes and body mass index (BMI ≥ 30 vs. < 30 kg/m²). We calculated odds ratios (OR) using BMI derived from both the measured and misclassified data, corrected the misclassified data using plausible estimates of Se and Sp, and compared the corrected OR to the true OR. The true and misclassified ORs were similar (OR 6.0 and 5.9, respectively). In our data, incorrectly assuming nondifferential misclassification using values of Se and Sp estimated through literature review (Se: 0.75-0.95, Sp: 0.97-1.00) resulted in a range of corrected ORs that did not include the true OR (corrected OR range 6.5-17.2). When assuming differential misclassification the range of corrected ORs included the true value (corrected OR range 4.4-25.3); however, most of the corrected ORs were more biased than the misclassified OR. Even when using plausible ranges of Se and Sp, results from sensitivity analyses may not be any less biased than those from the original analysis.

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MEASURING PERFORMANCE OF PROGNOSTIC MODELS FOR SURVIVAL DATA: SOME HEURISTICS. *Z Liu, J Hanley (McGill University, Montreal, QC H3A 1A2, Canada)

An increasingly common data-analysis task is to quantify the improvement in prognostic performance achieved by sequentially adding – possibly costly to obtain – items of information to the profile used for risk functions derived from binary or survival outcome data. Possible measures are re-classification probabilities, introduced by Pencina and D’Agostino (2004), and sequential improvements in older indices, such as the *c* and other statistics that are linked to receiver operating characteristic (ROC) curves. When survival data involve censored observations, the latter set of measures becomes more difficult to work with. We focus on the area under the ROC curve (AUC) measure introduced by Heagerty and Zheng (2005) for survival data, and, using small worked examples, provide some heuristics to make the measure easier to explain and interpret. We also propose another measure, based on percentiles within each riskset, that may have a simpler and more direct interpretation. We illustrate the work using variables in a published subset of data from the Framingham Heart Study.

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FLEXIBLE ASSESSMENT OF SKEWED EXPOSURE IN CASE-CONTROL STUDIES WITH POOLING. *B Whitcomb, N Perkins, Z Zhang, A Ye, R Lyles (University of Massachusetts, Amherst, MA 01003)

Pooling based strategies, including the hybrid pooled-unpooled design, for epidemiologic investigations of biomarkers have been proposed to address issues including cost, efficiency, detection, and when minimal sample volume is available. A set-based logistic regression model has been previously described for use with pooled data; however, analysis has been limited by assumptions regarding exposure distribution and logit-linearity of risk (i.e., constant odds ratio). We were motivated by a nested case-control dataset of miscarriage and inflammatory factors that take highly skewed distributions, and have developed a more flexible model for analysis of pooled data. Using characteristics of the gamma distribution and the relation between models of binary outcome conditional on exposure and of exposure conditional on outcome, we use a modified logistic regression to accommodate non-linearity corresponding to removal of the restriction of equal shape parameters in the gamma distributed exposure for cases and controls. Using a simulation study, we compare our approach with the dose-invariant set-based logistic regression while considering: 1. Constant and dose-dependent effects; 2. Varying effect sizes, and; 3. Varying proportions of biospecimens pooled. We show that our flexible approach allows for estimation of an odds ratio that varies with exposure level yet has minimal loss of efficiency compared to the dose-invariant set-based logistic regression model when exposure effects are dose-invariant. Our model performed similarly to a maximum likelihood estimation approach regarding bias and efficiency, and provides an easily implemented approach for estimation with pooled biomarker data when effects may not be constant across dose.

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ANALYSIS OF RANDOMLY POOLED CASE-CONTROL DATA. *N J Perkins, B Whitcomb, R Lyles (Eunice Kennedy Shriver National Institute of Child Health and Human Development, Rockville, MD 20852)

Pooling designs have been proposed for epidemiologic studies involving biomarkers for a variety of benefits over analysis of individual samples. These benefits include reducing assaying costs and/or increasing efficiency. The majority of the pooling literature relies on pooling biospecimens based on the outcome of interest, so that pools are homogeneous with regard to outcomes. However, most studies hope to address secondary hypotheses on outcomes for which the samples would not be pooled by case status. Existing methods for analyzing pooled data are based on homogeneous pools, thus heterogeneous, mixed pools for a secondary outcome would be discarded. This omission of data would surely reduce the efficiency of secondary analysis and could possibly lead to insufficient data to perform such analysis at all. Using parametric assumptions, normal and gamma distributions, common to those in the existing pooling literature, we develop techniques to analyze data that contain pools both homogeneous and heterogeneous with regard to outcome status. Including heterogeneous pools allows for increased efficiency of parameter estimation and subsequent analyses which these estimators are sufficient over relying solely on homogeneous pools. We perform a simulation study to quantify the magnitude of the benefit from including mixed pools and examine the relation of proportion mixed to matched pools, a reflection of the correlation of the primary pooling outcome and the secondary outcome. Pooled cytokines under gamma distribution assumptions are used to illustrate these methods. A reduction in the standard error of both shape and scale parameters is displayed by including the heterogeneous pools versus using only homogeneous pools.

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A SIMPLE DEVICE FOR TEACHING CAUSAL CONCEPTS. *G Maldonado (University of Minnesota, Minneapolis, MN 55455)

We present a simple device for teaching causal concepts in epidemiology. Originally developed for a lay audience, it has proven to be illuminating for graduate students also. We use a simple, non-health example so that: (1) “truth” is known, and (2) the conditions that cause valid and invalid results can be easily understood. Let the total study group consist of 4 flashlights. The question we ask is, “Does moving the switch from the ‘off’ position to the ‘on’ position cause a flashlight to light?” We know that the simultaneous occurrence of the following conditions is sufficient to produce light in a flashlight (when switched “on”): (1) good battery; (2) good bulb; (3) unbroken circuit from switch to battery to bulb to switch; and (4) good switch. Let one of the flashlights have all four of these component causes in place; let the other three be missing one or two of these component causes. We vary the definition of the target population to illustrate different concepts. We show how, with this device, it is easy to illustrate the following: what is a causal contrast; the importance of the target population in causal inference; what is effect-measure modification; counterfactuals; that confounding results from imperfect substitution for a counterfactual outcome frequency; and the combined impact of confounding, selection errors and measurement errors on study results. In addition, we show with this device the following, which some find surprising: an observed effect measure can be simultaneously confounded and unconfounded, matching on causal factors does not guarantee that confounding is absent, absence of perfect matching on causal factors does not guarantee that confounding is present, and in some situations it appears that a DAG can give the wrong indication about the presence of confounding.

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STRUCTURAL APPROACH TO ECOLOGIC ANALYSES IN HEALTH DISPARITIES RESEARCH. *W R Robinson, K J Hoggatt, J S Kaufman (University of North Carolina Gillings School of Global Public Health, Chapel Hill, NC 27599)

Ecologic analyses that examine variation in disparities across populations can improve causal inference in health disparities research. Here, we focus on gender disparities. We propose that covariates that are set before conception and that are similarly distributed by gender (X) in the target population are also similarly distributed by gender within subpopulations defined by variables (Z) that are statistically independent of gender in the target population. For example, if Z were mother's educational attainment, the distributions of factors that are the same for males and females in the target population, e.g., mother's childhood lead exposure or father's ethnicity, would also be the same for males and females in the same strata of mother's education. In contrast, for a variable (I) like occupation that is not statistically independent of gender in the target population, factors that do not differ by gender in the target population may differ by gender within strata of occupation. These differences confound ecologic associations between occupation and gender disparity. Variation in gender disparity across strata of Z could be caused by (1) exposure differences in post-conception factors, (2) differential effects of post-conception factors, or (3) differential effects of pre-conception factors – but not (4) exposure differences in pre-conception factors. No similar rule holds for variables associated with gender. Further, lack of gender disparity across strata of Z provides evidence that differential exposure to or effects of Z did not cause disparities observed in the target population. Ecologic analyses by factors independent of gender narrows the range of plausible hypotheses about the causes of health disparities.

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CONFIDENCE INTERVALS ABOUT DISCRETE-TIME SURVIVAL/CUMULATIVE INCIDENCE ESTIMATES USING THE DELTA METHOD. *A Dinno, J-S Kim (Portland State University, Portland, OR 97207)

Background: Event history analysis (also 'survival analysis') models whether and when an event is likely to occur. Discrete time event history models typically apply logit regression models to the probability of an event during a discrete time period data sets with observations in a specific time period nested in individuals, with no observations in those periods subsequent to right-censoring or event occurrence. The resulting conditional hazard function estimates the probability that an individual at risk in a given time period will experience an event conditional on not having experienced it previously, and characterize risk over time. The resulting cumulative incidence function (the compliment of the survival function) estimates the proportion of individuals at risk at baseline expected to have experienced the event by a given period, and describe the burden of an event in a population over time. Proposal: There are no broadly accepted variance estimators hazard or cumulative incidence functions, and naïve transformations of estimated parameter variances produce incorrect estimates. Applying the delta method, we derive approximate variance estimators for both the conditional hazard and cumulative incidence functions. Application: We create 95% confidence intervals on cumulative incidence curves of adolescent smoking initiation using the National Longitudinal Surveys of Youth 1997 cohort for different models. Free software implementing these methods is described. Conclusions: We detail our assumptions, describe future research directions, including application to adolescent cigarette smoking initiation and progression in a health disparities/tobacco control policy context. We describe future extensions for multilevel models, and to for complimentary log-log event history models.

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WORKING WITH SMALL NUMBERS: PERILS AND TOOLS TO USE. *J Marko (Saskatoon Health Region, Public Health Observatory, Saskatoon, SK, Canada)

Background: Epidemiologists working in regional health authorities and public health agencies are responsible for reporting health information on their populations. Rare health events, combined with relatively small populations, produce figures that can sometimes be too small to report reliably or pose privacy concerns. These issues prompted a review to determine best practices when analyzing and reporting small numbers. A secondary purpose of the review was to examine confidence interval calculations and age standardization when comparing rates in small areas to ensure accurate comparisons. Methods: An internet search was conducted to examine the topic of small cell sizes. Google terms "small numbers", "epidemiology", and "statistics of small numbers" were used, as well as a manual search of epidemiology textbooks was performed. A further search on confidence intervals and age standardization was conducted using author resources. Results: Having a minimum of 20 events is an important concept for analyzing health events with areas of small population (Baines, 2009; National Center for Health Statistics, 1999). If less than 20 health events are evident, then it is recommended that techniques such as clustering geographical areas or more than one time period should be used. It is important to consider standardizing rates when comparing rates between areas with small populations. To determine if rates are statistically significant, hypothesis testing or the use of confidence intervals is recommended. Conclusions: While there are clear guidelines when reporting small numbers, it is unknown how many epidemiologists actually use them in practice. Many epidemiologists should find the tools presented here of value to help increase the reliability of their analysis.

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THE EROSION OF CAUSAL INFERENCE. *D L Weed, D Alexander, V Perez (DLW Consulting Services LLC, El Prado, NM 87529-1632)

The conceptual and methodological foundations of causal inference in epidemiology have remained remarkably stable for 50 years. The same cannot be said for the practice of causal inference, where investigators make claims about causal relationships between exposures and diseases in peer-reviewed publications. We examined examples of questionable causal claims and practices in causal inference. By "questionable" it is meant "not consistent with good methodological practice." These examples include: 1.Lack of systematic methods when reviewing a body of literature; 2.Causal claims from meta-analysis alone; 3.Calculation of causal attribution without a causal claim; 4.Causal claims without epidemiology—relying solely on case reports and putative biological mechanisms; 5.Causal claims in the absence of statistically significant elevated risks; 6.Causal claims from cherry-picked positive associations; 7.Confusing causality with public health recommendations; 8.Overgeneralization: causal claims for groups of diseases (e.g. all lymphopoietic cancers) or for a general category of exposure (e.g. pesticides). No specialty area within epidemiology is immune. These examples can be found in studies (and editorials, commentary, reviews, and meta-analyses) in occupational and environmental epidemiology, nutritional epidemiology, pharmacoepidemiology, and cancer epidemiology. Although there is room for judgment in making causal claims, these examples reveal a troubling trend, what we believe represents erosion in the practice of causal inference. The implications, possible origins, and recommendations for the future of the practice of causal inference are discussed.

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THE QUALITY OF REVIEWS ON SUGAR-SWEETENED BEVERAGES AND HEALTH OUTCOMES. *D L Weed, M A Althuis, P J Mink (DLW Consulting Services LLC, El Prado, NM 87529-1632)

We systematically assessed the quality of published reviews on a controversial topic important to public health: sugar-sweetened beverages (SSB) and health. We performed a search of Pubmed and Cochrane databases and a hand search of reference lists. Studies selected were published reviews and meta-analyses (2000-2010) of epidemiologic studies of the relationship between SSBs and obesity, type 2 diabetes, metabolic syndrome, and coronary heart disease. A standardized data abstraction form was used. Review quality was assessed using a validated instrument: AMSTAR, a one-page tool with 11 questions. Results revealed that 17 reviews met our inclusion/exclusion criteria: obesity/wt (16), diabetes (3), metabolic syndrome (3), and coronary heart disease (2). Authors frequently employed a strictly narrative style review (8 of 17). Only 5 (of 17) reviews reported quantitative data in a table format. Overall, reviews of sugar-sweetened beverages and health outcomes received low quality scores by AMSTAR, (mean of 3.7; median = 3.0; range 0-8, out of a possible 11 points). AMSTAR scores were not related to the authors' conclusions (9 reviews reported an association, mean AMSTAR = 3.3; 8 reviews with equivocal conclusions scored 4.1; p -value = 0.50). Less than 25% of published reviews reported a comprehensive literature search, listed included/excluded studies, or employed duplicate study selection/data abstraction. We conclude that comprehensive reporting of epidemiologic evidence and use of systematic methodologies is underutilized in published reviews of SSBs and health. We recommend that authors, editors, peer reviewers, and those who train our students insist upon methodologically systematic reviews.

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LONG-TERM EFFECTS ON HUMORAL IMMUNITY AMONG WORKERS EXPOSED TO 2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN (TCDD). *F Saberi Hosnijeh, D Boers, L Portengen, H B Bueno-de-Mesquita, D Heederik, R Vermeulen (Institute for Risk Assessment Sciences, Utrecht University, Utrecht, The Netherlands)

Epidemiological studies have shown inconsistent effects on immunological parameters in subjects exposed to 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). In this study we investigated changes in humoral immunity and prevalence of atopic diseases among workers from a Dutch historical cohort occupationally exposed to chlorophenoxy herbicides and contaminants including TCDD. 45 workers who had been exposed to high levels of TCDD in the past and 108 non-exposed workers (39 from the same factory as the exposed subjects (internal control group) and 69 from a comparable factory but without TCDD exposure (external control group)) were included in the study. Blood immunoglobulin (Ig) and complement factor (C) concentrations and specific IgE antibodies to a panel of common allergens were measured using quantitative nephelometry or ELISA. TCDD plasma levels were measured and back-extrapolated to the time of last exposure (TCDDmax) using a one-compartment first order kinetic model. A borderline significant negative association between both current and predicted TCDD levels and C4 was found in multivariate analyses (β = -0.020; 95% CI = -0.040-0.010 and β = -0.020; 95% CI = -0.030-0.00, respectively). History of eczema was significantly associated with current TCDD levels in both crude (OR = 1.5; 95% CI = 1.03-2.2) and adjusted models (OR = 1.7; 95% CI = 1.08-2.7). Our results do not support an association between TCDD exposure and markers of humoral immunity except possibly C4. Interestingly, decreased levels of C4 have been linked to lymphoma risk, which provides some support to the putative link between TCDD and non-Hodgkin lymphoma.

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EPINOMICS: AN APPROACH TO INTEGRATE EPIDEMIOLOGY AND ECONOMICS. *H Sohn (McGill University, Montreal, QC, Canada)

Assessment of health care interventions and technologies has long been relying on epidemiologic methods and findings as adequate evidences of effectiveness, feasibility, and acceptability. However, as we have to face the reality of scarce resources, we cannot ignore the question of what level of effective is brought at what cost? Thus, sound decision-making process in the health care field must simultaneously incorporate epidemiologic and economic evidences to adequately assess epidemiologic evidence weighed against the economic 'costs'. As epidemiologic research focuses on regression methods, traditional economic evaluations in health care has taken rather distinct stance from epidemiologic research and methods partly due to the fact that key outcome parameter of interest in economic evaluations, incremental cost-effectiveness ratio, is not amenable to regression methods. Nonetheless, this phenomenon can be attributed to the lack of adequate knowledge of epidemiological research methods and its similarities to econometric methods (same would apply for epidemiologists often lacking understanding of economics). Concurrently, economic evaluation studies have heavily relied on utilization of 'end products' of epidemiological research as key data parameters rather than simultaneously assessing epidemiological data along with cost parameters. Person-level cost-effectiveness analysis utilizing net-benefit regression methods allows for simultaneous inclusion of epidemiologically important parameters as part of cost-effectiveness analysis. Concurrently, this method provides an important opportunity to integrate epidemiologic and economic evaluation methods to provide complete evidence to decision makers to better understand effectiveness, feasibility, and acceptability of new health care intervention or health care technology.

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PREVIOUSLY UNREPORTED RISKS OF BIRTH DEFECTS AND CHILDHOOD NEOPLASMS IN A COHORT OF SEMICONDUCTOR WORKERS. *S Moller Hikel, D Hinds, S Kramer (Epidemiology International, Hunt Valley, MD 21224)

The semiconductor industry fabricates silicon microchips in a process involving intensive exposures to physical and chemical agents including glycol ethers, toxic gases, acids, and radiation. Despite the known reproductive toxicities of many of these agents, and the fact that the fabrication workforce is largely of reproductive age, epidemiologic studies of these workers have chiefly been limited to spontaneous abortion. One of the largest semiconductor cohort studies collected data on reproductive outcomes from all pregnancies between 1980 and 1989 at two U.S. fabrication facilities. The peer-reviewed publication of this study only reported on risks of spontaneous abortion and subfertility (Correa et al., 1996. *Am J Epidemiol* 143: 707-17), though data on congenital malformations and childhood neoplasms were collected on the 1,814 live births in the cohort. We analyzed these data, and found the relative risk (RR) of major malformations and childhood neoplasms was elevated for manufacturing compared to non-manufacturing workers (RR = 2.29, 95% confidence interval [CI]: 0.71-7.41). In the total cohort, higher than expected rates were observed for Wilms' tumor (standardized incidence ratio [SIR] = 137, 95% CI: 27.7-402; n = 3), Hirschsprung's disease (SIR = 11.0, 95% CI: 2.96-28.2; n = 4), and Tetralogy of Fallot (SIR = 4.35, 95% CI: 0.87-12.7; n = 3). These data demonstrate the importance of publishing all of the outcomes identified in a study as a means of potential signal detection, small sample sizes and limited statistical power notwithstanding. They further illustrate the need to more comprehensively collect, evaluate, and report on the full spectrum of reproductive risks in the semiconductor industry in the future.

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CANCER RISKS OF POLICE OFFICERS: THE RETROSPECTIVE COHORT MORTALITY STUDY OF POLICE, BUFFALO, NY, 1950 TO 2005. *J E Vena, J Violanti, E Smith, J Burch, L E Charles, J K Gu, M E Andrew, D Fedekulegn, C M Burchfiel (University at Buffalo, Buffalo, NY 34215)

Little is known about the long term cancer risks police officers face. Police officers work long, irregular shifts which often include stressful situations. In 2007, the International Agency for Research on Cancer listed shift work that involves circadian disruption as a probable carcinogen to humans. The police cohort consisted of male officers ($n = 3,049$) who worked a minimum of 5 years for the Buffalo Police Department, New York, between January 1, 1950 and December 31, 2005. Female officers ($n = 298$), officers who did not have either birth data or hire date ($n = 44$), and officers who worked < 5 years ($n = 33$) were excluded from this analysis ($N = 3,424$). As of December 31, 2005, 50% of the population had died, 46% were alive, 4% were lost to follow-up. Mortality from all causes of death combined for police officers was significantly higher than expected (SMR = 1.20; 95% confidence interval (CI) = 1.14-1.26). Significantly increased mortality was also seen for all malignant neoplasms combined (SMR = 1.32; 1.19-1.46), all benign neoplasms combined (SMR = 2.48; 1.17-4.89), and all diseases of the circulatory system combined (SMR = 1.10; 1.02-1.19). The elevated mortality for all malignant neoplasms was primarily due to statistically significant excesses in cancers of the esophagus (SMR = 1.93; 1.08-3.18), colon (SMR = 1.83; 1.35-2.42), respiratory system (SMR = 1.24; 1.03-1.48), as well as Hodgkin's disease (SMR = 3.38; 1.23-7.36) and leukemia (SMR = 1.77; 1.08-2.73). Differences in cancer risk are noted for years employed and latency and other factors. Implications for future research on the effects of shift work and stress and prevention will be discussed.

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OCCUPATIONAL LUNG CANCER MORTALITY SURVEILLANCE USING EMPIRICAL BAYES ADJUSTMENTS. *J M Symons, H Q Le, K H Kreckman, W M Lednar (DuPont Epidemiology Program, Newark, DE 19711)

PURPOSE: A cornerstone of occupational health programs is epidemiologic surveillance of employee cohorts. Workers encounter varying exposures to agents and physical conditions, therefore, a standard strategy to assess mortality outcomes potentially associated with multiple occupational factors is used. Moreover, occupational surveillance data rarely contains information on confounders (e.g., tobacco smoking) related to specific mortality risks such as lung cancer. Appropriate methods must be applied to adjust for numerous statistical comparisons and potential unmeasured confounders. METHODS: A longitudinal registry of 270,000 U.S.-based workers included more than 4,400 lung cancer deaths from 1960 through 2006. Standardized mortality ratios (SMRs) compare observed to expected lung cancer mortality during 5 time periods for 50 site-based cohorts. Empirical Bayes (EB) methods are applied to adjust the resultant 250 lung cancer SMRs. RESULTS: Site and period-specific excess estimates above and below an SMR of 1.0 with greater uncertainty (i.e., wider confidence intervals) were more influenced by EB adjustment. This typically resulted in attenuation towards the null of the unadjusted SMR estimate. EB adjustment reduced the proportion of statistically significant results by nearly 25%. CONCLUSION: Comprehensive mortality and morbidity surveillance programs are beneficial for identifying potential occupational health risks among large employee cohorts. Challenges exist when analyzing numerous mortality ratio statistics since multiple comparisons may include spurious false-positive results. Mortality analyses using EB adjustment provide a data-based inferential approach to assess the significance of surveillance risk estimates.

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RISK OF LUNG CANCER AFTER EXPOSURE TO WELDING FUMES IN TWO POPULATION-BASED CASE-CONTROL STUDIES. *E Vallières, J Pintos, J Lavoué, M-E Parent, J Siemiatycki (CRCHUM, Université de Montréal, Montreal, QC, Canada)

Objective: To investigate the relationship between occupational exposure to gas and arc welding fumes and the risk of lung cancer among workers exposed to these agents at various concentrations and over a wide range of occupations. Methods: We conducted two population-based case-control studies in Montreal (1979-1986 and 1996-2001), including 857 and 736 cases respectively and frequency-matched controls. Detailed job histories were obtained by interview and evaluated by an expert team of chemist-hygienists to estimate intensity, duration and cumulative exposure to multiple substances for each job. Gas and arc welding fumes were among the agents evaluated, and we estimated odds ratios (ORs) and 95% confidence intervals (CIs) for lung cancer using logistic regression, adjusting for smoking history and other relevant covariates. Results: The results from both studies were similar, so a pooled analysis was conducted. No significant association was found between lung cancer and gas welding fumes (OR = 1.09, 95%CI = 0.86-1.37) or arc welding fumes (OR = 0.94, 95%CI = 0.74-1.18). However, when restricting attention to non-smokers, we found an increased risk of lung cancer in relation to gas welding fumes (OR = 2.28, 95%CI = 1.45-3.61) and arc welding fumes (OR = 1.83, 95%CI = 1.15-2.90). When we further narrowed attention to workers with the highest cumulative exposures, we found even higher risk of lung cancer for gas (OR = 3.35, 95%CI = 1.61-6.96) and arc welding fumes (OR = 2.75, 95%CI = 1.31-5.79). Discussion: There was no detectable excess risk due to welding fumes among smokers; but among non-smokers there were excess risks related to both types of welding fumes.

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MATERNAL OCCUPATIONAL EXPOSURE TO POLYCYCLIC AROMATIC HYDROCARBONS (PAHS) AND CONGENITAL HEART DEFECTS (CHDs) IN OFFSPRING. *P J Lupo, E Symanski, P H Langlois, S M Gilboa, S Malik, C C Lawson, A Agopian, A Correa, T Desrosiers, P A Romitti, G M Shaw, L E Mitchell and the National Birth Defects Prevention Study (University of Texas School of Public Health, Houston, TX 77030)

CHDs are a commonly occurring group of defects with a birth prevalence that approaches 1 per 100. In addition, CHDs have a major impact on pediatric morbidity and mortality. PAHs are a group of chemicals formed during the incomplete burning of organic substances (e.g. oil, coal); therefore exposure can occur in several occupational settings. PAHs may be reproductive toxicants, but there have been no studies assessing the association between PAHs and CHDs. We analyzed data from the National Birth Defects Prevention Study – a population-based, case-control study of birth defects – to assess maternal occupational exposure to PAHs and the risk of various CHDs (e.g. conotruncal defects, septal defects). Industrial hygienists assigned PAH exposure (yes/no) based on maternal report of occupation one month prior to pregnancy and during the first trimester. We used logistic regression to calculate odds ratios adjusted (aOR) for maternal age, race/ethnicity, education, smoking and folic acid supplementation. The prevalence of occupational PAH exposure was 3.9% in case mothers ($n = 1,909$) and 3.6% in control mothers ($n = 2,857$). Exposure was not associated with conotruncal defects (aOR = 1.04, 95% confidence interval [CI] = 0.61, 1.78) or septal defects (aOR = 1.15, 95% CI = 0.76, 1.73). In fact, there were no substantial increases in risk for any CHD subtype. Increases that were observed were imprecise. Our findings do not support an association between maternal occupational exposure to PAHs and various CHDs in a large, population-based study.

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MATERNAL OCCUPATIONAL EXPOSURE TO POLYCYCLIC AROMATIC HYDROCARBONS (PAHS) AND GASTROSCHISIS IN OFFSPRING. *P J Lupo, P H Langlois, E Symanski, R H Finnell, J Reefhuis, A Agopian, C C Lawson, K N Duwe, C A Moore, P A Romitti, G M Shaw, L E Mitchell and the National Birth Defects Prevention Study (University of Texas School of Public Health, Houston, TX 77030)

PAHs are a group of chemicals formed during the incomplete burning of organic substances (e.g. oil, gas, coal, garbage); therefore exposure can occur in several occupational settings. Although there is evidence from animal models linking maternal PAH levels with gastroschisis (a birth defect of the abdominal wall), there have been no human studies examining this association. We analyzed data from the National Birth Defects Prevention Study – a population-based, case-control study of birth defects – to assess the association between maternal occupational exposure to PAHs and gastroschisis in offspring. Industrial hygienists assigned PAH exposure based on maternal report of occupation one month prior to pregnancy and during the first trimester. We used multiple logistic regression to calculate adjusted odds ratios (aOR) and 95% confidence intervals (CI). The prevalence of occupational PAH exposure was 9.0% in case mothers (n = 301) and 3.6% in control mothers (n = 2,997). There was a significant association between occupational PAHs and gastroschisis (aOR = 1.9, 95% CI = 1.1, 3.1) after adjusting for maternal age, BMI, race/ethnicity and smoking. The effect was greater in women 20 years or older (aOR = 2.6, 95% CI = 1.4, 5.2) compared to women younger than 20 years (aOR = 1.2, 95% CI = 0.6, 2.4), a notable finding since young maternal age is the strongest known risk factor for gastroschisis. This is the first study indicating that maternal occupational exposure to PAHs may be associated with an increased risk of gastroschisis in offspring.

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BODY MASS INDEX (BMI) AND PESTICIDE EXPOSURE IN A COHORT OF PESTICIDE APPLICATORS. *N L LaVerda, D F Goldsmith, K Hunting (George Washington University School of Public Health and Health Services, Washington, DC 20037)

Background: Organochlorine and phenoxy herbicide pesticides have been hypothesized to play a role in obesity. Using data from a longitudinal cohort study of pesticide applicators, we are testing these associations among males using BMI obtained at 3 time periods (age 20, enrollment and follow-up [FUP]) as the outcome variable. Methods: Our investigation required developing variables to control for diet (energy input) and exercise (energy output) since no direct measures were available. Diet histories completed at 5-year FUP were used to calculate total calories/day (energy input). Consumption of meats, vegetables and fruits were obtained at baseline and FUP. A regression model was developed to calculate energy input at baseline based on intake of fruits, vegetables and meats at baseline. For energy output, specific questions were identified from the baseline and FUP questionnaires to create a representative variable. Final regression models examined pesticide exposure as a continuous variable in relation to BMI. Potential confounders were identified: age, smoking, education, energy input, energy output, non-farm occupational exposures, alcohol use and total years of farming. Findings: From age 20 to enrollment, significant positive associations were identified for crop insecticides, fumigants, herbicides, organochlorines, organothiophosphates, phenoxy herbicides and triazines. From age 20 to FUP, significant positive estimates were identified for similar pesticide classes except animal insecticides were also included and organophosphates replaced organothiophosphates. Summary: Further analyses are examining exposure categorically to determine if there is an exposure-response.

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MATERNAL OCCUPATIONAL EXPOSURE TO ORGANIC SOLVENTS AND SELECTED CONGENITAL ANOMALIES. *T A Desrosiers, A F Olshan, C C Lawson, J L Daniels, R E Meyer, D B Richardson, A Correa, P H Langlois, P A Romitti and the National Birth Defects Prevention Study (North Carolina Birth Defects Monitoring Program, State Center for Health Statistics, Raleigh, NC 27699)

Though experimental models demonstrate the teratogenicity of organic solvents, epidemiologic studies have reported inconsistent results. Using data from the population-based National Birth Defects Prevention Study from 1997 to 2002, we examined the relation between maternal occupational exposure to aromatic solvents (benzene, toluene, xylene), chlorinated solvents (carbon tetrachloride, chloroform, methylene chloride, perchloroethylene, trichloroethane, trichloroethylene) and Stoddard solvent during early pregnancy and neural tube defects (NTDs) and orofacial clefts (OFCs). Exposure was estimated by industrial hygienist review of self-reported occupational histories in combination with a literature-derived measurement database. Data were analyzed using logistic regression to estimate adjusted odds ratios (aORs) and 95% confidence intervals (CI) for the association between solvent class and each defect adjusting for maternal age, race/ethnicity, education, body mass index, folic acid supplement use and smoking. The prevalence of exposure to any solvent among mothers of NTD cases (n = 511), OFC cases (n = 1163) and non-malformed controls (n = 2997) was 13.1%, 9.6% and 8.2%, respectively. Exposure to chlorinated solvents was associated with increased odds of NTDs (aOR = 1.96; 95%CI = 1.34, 2.87), especially spina bifida (aOR = 2.26; 95%CI = 1.44, 3.53). No other solvent class was associated with NTDs. No solvent class was associated with OFCs. Our study provides evidence of an association between maternal occupational exposure to organic solvents and NTDs.

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ENVIRONMENTAL-WIDE ASSOCIATION STUDY METHOD APPLIED TO OCCUPATIONAL MORTALITY SURVEILLANCE. *H Q Le, K H Kreckmann, W M Lednar, J M Symons (E.I. du Pont de Nemours and Company, Newark, DE)

Background: An environmental-wide association study (EWAS) provides a useful surveillance tool to evaluate environmental and occupational risk factors. The EWAS analytic approach is especially applicable to mortality surveillance studies of occupational cohorts employed at multiple manufacturing sites with varying potential exposures. We evaluate lung cancer mortality using five decades of observed deaths among U.S.-based employees of a large manufacturing company. Methods: Cross-sectional analyses were performed for employee cohorts with work histories at over 40 manufacturing and non-manufacturing sites. The odds ratio (OR) is estimated for period-specific lung cancer mortality using adjusted logistic regression models. For over 200 ORs obtained, multiple comparisons were controlled using an a priori false discovery rate, and statistically significant associations were systematically validated. Results: The surveillance population comprises 238,429 employees with work histories from 1958 through 2006. During this period, 61,833 deaths with known cause of death have occurred in this population, and 4,414 lung cancer deaths were recorded with 90% occurring among male employees. For all surveillance periods, lung cancer ORs were significantly elevated for 7 manufacturing cohorts. Decreased ORs were significant for four manufacturing and two non-manufacturing cohorts. Conclusion: The EWAS offers a comprehensive and systematic tool for screening, validating and assessing environmental and occupational risk factors at a large scale. Despite limitations to causal inference, EWAS is a valuable first strategy for conducting epidemiologic surveillance studies of populations categorized by multiple exposure factors.

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OCCUPATIONAL EXPOSURE TO FORMALDEHYDE AND RISK OF LUNG CANCER. *A Mahboubi, A Koushik, J Siemiatycki, J Lavoué, M-C Rousseau (Research Centre of CHUM, University of Montreal, Montreal, QC H2W 1V1, Canada)

Formaldehyde is a widely used industrial chemical. There has long been suspicion of its carcinogenicity, though the epidemiologic evidence remains controversial, in particular regarding its possible effect on lung cancer risk. Our purpose was to explore the possible association between formaldehyde exposure and lung cancer risk, using data from two population-based case-control studies conducted in Montreal, Canada. Interviews for the two studies were conducted in 1979-1986 and 1996-2002, using a virtually identical questionnaire to obtain detailed lifetime occupational history, smoking history and several other covariates. The detailed work history for each participant was reviewed by experts to assess exposure to a number of occupational agents, including formaldehyde. In the two studies combined, 2060 lung cancer cases and 2046 population controls were interviewed and assessed for exposure. About 25% of all subjects had ever been occupationally exposed to formaldehyde. After adjusting for lifetime smoking and other covariates, compared with unexposed subjects, those ever exposed to formaldehyde had an odds ratio for lung cancer of 1.06 (95% confidence limits: 0.89-1.27). Analyses taking into account age at first exposure, duration, average and peak intensity of exposure, as well as the experts' degree of certainty that exposure actually occurred, also suggested that there was no association between formaldehyde exposure and lung cancer risk for most exposure metrics. Slightly elevated odds ratios were estimated for early age at first exposure and for high intensity peak exposure. In conclusion, we observed no marked increases in lung cancer risk related to workplace formaldehyde exposure.

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A POOLED ANALYSIS OF BENZENE-EXPOSED PETROLEUM WORKERS. *R Schnatter, D Glass, L Rushton, G Tang (ExxonMobil Biomedical Sciences, Annandale, NJ 08801)

There are few quantitative studies on the effect of relatively low benzene concentrations on risks of specific lymphohematopoietic (LH) cancer subtypes. Three such studies were nested case-control studies among petroleum workers in Australia, Canada and the UK, though each was limited in size. These studies have been updated and pooled to provide greater precision of potential risks for leukemia subtypes and two myeloid disease disorders: myelodysplastic syndrome (MDS), and myeloproliferative disease (MPD). Before pooling, the studies were updated with cases that accrued since the studies were published. To improve disease subtype classification, pathology records were obtained from hospitals, doctor's offices and medical files. Two pathologists reviewed source records and classified every case according to traditional and the World Health Organization classification schemes. Both exposure and disease classifications were graded by certainty, allowing sensitivity analyses that included only high quality information. Statistical analyses employed conditional logistic regression models with flexible penalized cubic regression spline components. Dose response relationships for MDS, MPD, acute and chronic myeloid leukemia, and chronic lymphoid leukemia will be presented. This pooled study benefited from careful reconsideration of benzene exposure estimates and disease classification procedures, improving the precision of risk estimates of benzene exposure for leukemia and other disease subtypes.

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CANCER INCIDENCE AMONG NORDIC FIREFIGHTERS. *P A Demers, J I Martinsen, K Kjaerheim, E Lynge, P Sparén, E Pukkala (Occupational Cancer Research Centre, Toronto, ON, Canada)

Firefighters are potentially exposed to known and suspected carcinogens, including fire combustion products, vehicle emissions, and shift work. However, the risk of cancer among firefighters remains controversial. We examined their risk of cancer using data from the Nordic Occupational Cancer (NOCCA) study. The study population consisted of 16,223 men, age 30-64, who reported being firefighters in the 1960, 1970, 1980 and/or 1990 censuses in Denmark, Finland, Norway and Sweden and was linked with national tumour registry data. Altogether 2,470 cancer cases were observed in the follow-up up to 2005. Standardized incidence ratios (SIRs) and 95% confidence intervals (CIs) were calculated with expected numbers based on country, sex, age, and period. Excesses of non-melanoma skin cancer (SIR = 1.33, CI = 1.11-1.59), lung adenocarcinoma (SIR = 1.31, CI = 1.04-1.63), malignant melanoma (SIR = 1.25, CI = 1.03-1.51), colon cancer (SIR = 1.15, CI = 1.00-1.32), prostate cancer (SIR = 1.14, CI = 1.05-1.23), and mesothelioma (SIR = 1.56, CI = 0.91-2.50) were observed. Risks of mesothelioma (SIR = 2.61, CI = 1.25-4.80), lung adenocarcinoma (SIR = 1.92, CI = 1.35-2.65), and non-melanoma skin cancer (SIR = 1.41, CI = 1.11-1.77) were highest among firefighters over 70. SIRs for prostate cancer (SIR = 2.61, CI = 1.35-4.56) and melanoma (SIR = 1.63, CI = 1.15-2.24) were highest among those under age 50. The small overall excesses for most sites are consistent with recent meta-analyses, with the exception of mesothelioma and lung adenocarcinoma, which may not have been observed because of a lack of power and histologic data in previous studies.

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FOLLOW-UP ANALYSIS OF LUNG CANCER INCIDENCE IN CANADIAN PETROLEUM WORKERS. *R Schnatter, M Nicolich, J Lewis, L Thompson, H Dineen, I Drummond, D Dahlman, A Katz, G Thériault (ExxonMobil Biomedical Sciences, Annandale, NJ 08801)

To follow up on previously inconclusive findings regarding lung cancer incidence, we collected additional data on 25,292 Canadian petroleum workers employed in a single large company. Company clinical data was used to collect further information on smoking habits, while quantitative retrospective exposure estimates for petroleum coke dust and asbestos were also developed. Standard life-table analyses as well as regression splines were used to assess exposure-response patterns. Results showed that lung cancer risk was strongly related to age and smoking, and to a lesser extent to province of last residence. When controlling for these covariates, there is suggestive evidence that maintenance work is also associated with lung cancer risk. Some analyses also indicate that asbestos exposure may be associated with lung cancer risk, although a clear exposure-response pattern is not seen for asbestos nor petroleum coke dust. These data suggest that maintenance work in the petroleum industry may be associated lung cancer incidence. While coke dust and asbestos were not strongly related to lung cancer, maintenance work may be a surrogate for general exposure to several agents, including metals, welding fumes, radiation, and polycyclic aromatic compounds. Alternatively, socio-demographic factors unique to maintenance workers may also plausibly explain these results.

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FATHERS' PRECONCEPTIONAL EXPOSURE TO IONIZING RADIATION AND CONGENITAL ANOMALIES IN THEIR OFFSPRING. *S Nahm, L Marrett, P Corey, D Chambers, J McLaughlin (University of Toronto, Toronto, ON M4Y1B2, Canada)

Ionizing radiation (IR) induces adverse pregnancy outcomes in human fetuses exposed in utero, but its transgenerational effect through paternally-mediated exposure is less clear. A population-based case-control study was conducted to determine if paternal exposure to ionizing radiation shortly before conception is associated with risk of congenital anomaly (CA) in offspring. Cases were infants with CAs recorded in the Canadian Congenital Anomalies Surveillance System and born alive in Ontario 1979-86; controls were liveborn infants without CAs identified from Ontario birth certificates over the same period. Fathers of cases and controls were linked to a cohort of men who had worked in Ontario uranium mines in 1952-86. Odds ratios (ORs) were estimated using the conditional logistic regression. There was a decreased risk of a child having a CA if the father was a uranium miner during the three and six month windows before conception (OR = 0.70, 95% confidence interval [CI] = 0.53-0.92 for both) or if the father was exposed to radon in the six months before conception (OR = 0.59, 95% CI = 0.38-0.90). There was a statistically significant decreasing linear trend in risk with increasing gamma dose during the three- and six-months before conception (OR = 0.88 per unit increase in \log_e gamma dose, [95% CI = 0.77-0.99]; OR = 0.87 per the unit change [95% CI = 0.77-0.97], respectively). Although it is reassuring that the risk of CA in the offspring of uranium miners is not increased, this result is contrary to the evidence from experimental studies. This surprising result may be explained in part by inability of the current study to include stillbirths because fetuses with CAs may be more likely to be spontaneously aborted.

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PERCEIVED SURVIVAL EXPECTATIONS: POTENTIAL EFFECTS ON SOCIOECONOMIC STATUS IN YOUNG ADULTHOOD. *Q C Nguyen, C T Halpern, A Siddiqi, S Marshall, A Villaveces, J M Hussey, C Poole (UNC Gillings School of Global Public Health, Chapel Hill, NC 27599)

Expectation of an early death may reduce human capital investments. We examined the effects of perceived chances of living to age 35 (perceived survival expectations; PSE) on future socioeconomic status attainment. The importance of socioeconomic status is highlighted by pervasive health inequities and dramatic differences in life expectancy among income and education groups. We utilized the National Longitudinal Study of Adolescent Health (Add Health) initiated in 1994-95 among adolescents in grades 7-12 with follow-up interviews in 1996 (Wave II), 2001-02 (Wave III) and 2008 (Wave IV; ages 24-32). At Wave I, 14% reported \leq 50% chance of living to age 35. Lower PSE predicted lower education attainment and personal earnings at Wave IV in multinomial logistic regression models controlling for previous family SES, age, sex, race/ethnicity, foreign-birth, family structure and Wave I/III values for self-rated health, depression symptoms, substance use and violence involvement. Compared to reporting "almost certain" of living to age 35, Wave I PSE \leq 50% was linked to higher odds of less than high school (odds ratio (OR) = 1.73, 95% confidence interval (CI) = 1.23-2.44) versus \geq college at Wave IV, and high school (OR = 1.62, 95% CI = 1.20-2.17) versus \geq college at Wave IV. Wave III PSE \leq 50% was similarly linked to less than high school (OR = 2.76) and high school (OR = 1.94) versus \geq college at Wave IV. A deeper understanding of the risk perceptions of youth and greater knowledge of the implications of these beliefs may encourage the development of interventions designed to identify cognitive-affective responses to adversity and provide guidance for navigating adolescence.

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COMPARING CHARACTERISTICS OF UNINTENTIONAL, NON-ILLICIT AND ILLICIT DRUG OVERDOSE DEATHS: UTAH 2008-2009. *A Sloan, R M Merrill, E Johnson (Brigham Young University, Provo, UT 84604)

This study compared the characteristics of individuals who died of illicit and non-illicit drug overdoses in Utah from 2008-2009. Decedent cases were Utah residents aged 18 years or older, with at least one drug implicated as their primary cause of death, who died in Utah between October 26, 2008 and October 25, 2009. Of the 374 decedent cases, 92 (25%) involved illicit drugs only, 244 (65%) involved non-illicit drugs only, and 38 (10%) involved a combination of illicit and non-illicit drugs. Men, Hispanics, unmarried, less educated, and underweight individuals represented a higher proportion of illicit compared with non-illicit drug overdose deaths. A history of both alcohol drinking and illicit drug use was more common among illicit drug overdose decedents. All decedent cases with no history of alcohol drinking or illicit drug use died from a non-illicit drug overdose; 10% of those dying of a non-illicit drug overdose had no history of alcohol and/or illicit drug use. Most decedent cases had a history of acute/chronic pain (52% illicit, 90% non-illicit, and 76% both). The majority of cases had a history of anxiety, sadness, pain, insomnia, mood swings, irritability, hopelessness, and excessive daytime sleepiness. Past impulsive tendencies and mood swings were associated with a greater chance of an illicit drug overdose death. Several psychological maladies characterized both illicit and non-illicit decedent cases. Characteristics of non-illicit drug overdose deaths differed from illicit drug overdose deaths. Any drug overdose prevention efforts should consider that these are two distinct populations.

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EFFECT OF RACE, SEX AND INCOME ON THE ASSOCIATION OF OPTIMISM/PESSIMISM AND CHRONIC INFLAMMATION: THE CARDIA STUDY. *B Roy, C E Lewis, AV Diez-Roux, K E Matthews (University of Alabama at Birmingham, Birmingham, AL 35294)

Objective: To examine associations of optimism/pessimism and inflammation. Method: This was a cross-sectional study of 3500 black and white men and women, participants in the Coronary Artery Risk Development in Young Adults study examined in 2000-1, except fibrinogen (fib) and interleukin-6 (IL-6) in 2005-06. The Life Orientation Test—Revised assessed optimism/pessimism. Regression analyses estimated associations of optimism/pessimism with IL-6, C-reactive protein (CRP) and fibrinogen (fib) before and after adjustment for sociodemographics, depression, health behaviors, body mass index (BMI), hypertension (HTN) and diabetes (DM). Significant interaction terms were found for race, sex and income, so stratified analyses were performed. Results: Pessimism was associated with low income, inactivity, smoking, DM, HTN, and BMI. Among white women, a 2-standard deviation increase in pessimism was associated with 5.24% higher IL-6 ($p < 0.001$), 8.53% higher CRP ($p < 0.001$) and 1.13% higher fib ($p = 0.003$), magnitudes similar to those associated with DM. Associations were partly explained by socioeconomics, depression, and behaviors; after full adjustment, 4.77% ($p = 0.023$) higher levels of CRP persisted. Black women and white men had similar but weaker associations. For low-income black men, optimism was associated with 4.23% ($p = 0.048$) higher CRP and 1.27% ($p = 0.005$) higher fib in the fully adjusted model. Conclusion: Pessimism was associated with chronic inflammation, except in low-income black men, for whom optimism was associated with inflammation, perhaps due to greater goal-striving stress in this subgroup.

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RECENT AND LONG-TERM INCOME MEASURES AND CARDIOVASCULAR DISEASE MORTALITY. *V Johnson-Lawrence, S Galea, G Kaplan (University of Michigan, Ann Arbor, MI 48105)

Lower socioeconomic position is associated with increased risk for cardiovascular disease mortality. However, few studies have compared the strength of associations between recent, long-term, or trajectories of income over time and cardiovascular disease mortality. Using proportional hazards models, three household income measures were studied in relation to 6-year (1994-2000) cardiovascular disease mortality: recent income (1994), average income (1965-1994), and income trajectory patterns (1965-1994). Alameda County Study data from the 2691 ($n_{\text{men}} = 1157$, $n_{\text{women}} = 1534$) of the 2729 respondents to the 1994 questionnaire with age, race/ethnicity, marital status, and income data were used in these analyses. Income trajectories were categorized as persistently low, moderately low, increasing, and high-U-shaped. Controlling for age, race/ethnicity, marital status and gender, membership in the lowest (Hazards Ratio (HR) = 3.2, 95% Confidence Interval (CI) = 1.6-6.3) and third (HR = 2.3, 95% CI = 1.1-4.6) quartiles of income in 1994 compared to the highest quartile was associated with greater hazards of cardiovascular disease mortality. Adults with average income in the lowest (HR = 1.7, 95% CI = 1.1-2.8) compared to highest quartile and the persistently low (HR = 2.2, 95% CI = 1.1-4.2) compared to high U-shaped trajectory group had increased hazards of cardiovascular disease mortality. While associations were present between each income measure and cardiovascular disease mortality, effect size was largest for income in 1994, followed by the trajectories and average income measures respectively. Studies investigating income effects on health should be selective and purposeful when determining the income measure for analysis.

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IS SOCIAL CAPITAL IN THE WORKPLACE ASSOCIATED WITH WORK-RELATED INJURY AND DISABILITY? A SYSTEMATIC REVIEW OF THE EPIDEMIOLOGIC LITERATURE. V L Kristman, *A Vafaei (Department of Community Health & Epidemiology, Queen's University, Kingston, ON, Canada)

Introduction: Social capital in the workplace may include social support, interpersonal trust, respect, and reciprocity; and may occur at both the worker and workplace level. The objective of this study was to determine if social capital in the workplace is associated with work-related injury or disability. Methods: A systematic review of the epidemiologic literature was conducted. Studies were identified from 1990 to 2008 relevant to social capital in the workplace and work-related injury or disability. Identified studies were critically appraised for methodological quality by two qualified independent reviewers to represent a best evidence of the literature. Results: 66 studies were reviewed. 42 were excluded due to poor quality. The remaining 24 consisted of 14 studies examining the association between social capital in the workplace and injury, 8 focused on disability, and 2 studied both injury and disability. Only two studies included workplace-level social capital. Limitations of the literature include unclear social capital, injury and disability definitions, limited study populations, and weak study designs. Conclusions: Limitations preclude stating consistent conclusions. The evidence suggests an association between individual worker social capital and work disability. Group-level social capital may be important in the development of injury and disability. We summarized the literature, highlighted its strengths and weaknesses, and provided suggestions for future work.

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AN IMMUNE AND INFLAMMATORY PATHWAY BY WHICH FOOD INSECURITY IMPACTS CHRONIC DISEASES IN THE U.S. POPULATION. C Gowda, C Hadley, *A E Aiello (University of Michigan School of Public Health and School of Medicine, Ann Arbor, MI 48104)

Household food security reflects access to enough food for an active, healthy life by all people in a household at all times. Food insecurity has been repeatedly linked to adverse health outcomes including diabetes and cardiovascular disease. The goal of this study was to investigate whether food insecurity leads to shifts in dietary intake and immune function. We conducted a cross-sectional analysis of the National Health and Nutrition Examination Survey (1999-2004) using 9,753 participants for whom complete data was available. Food insecurity was measured using the USDA food insecurity scale module. Clinical biomarkers including C-reactive protein (CRP), white blood cell count (WBC), folate, vitamin B12, and vitamin A were measured from blood samples obtained during participants' visits to mobile examination centers. In 1999-2004, 20.8% of the study population was food insecure. Those who were food insecure were more likely to have lower levels of serum folate (adjusted β -coefficient = -1.08, 95% CI = -1.85, 0.31). Food insecurity was associated with higher levels of CRP (adjusted OR = 1.41, 95% CI = 1.10, 1.81) and of WBC (adjusted OR = 1.37, 95% CI = 1.07, 1.74). Taken together, these findings suggest that food insecurity predisposes individuals to physiological alterations that may lead to the development of chronic diseases, including lower folate levels, altered immune responses and increased inflammation. Programs aimed at reducing the prevalence of food insecurity could help prevent morbidity and mortality in the US.

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THE SOCIAL DETERMINANTS OF HEALTH AND pH1N1 INFLUENZA SEVERITY. *B Lowcock, L Rosella, J Foisy, N Crowcroft (Ontario Agency for Health Protection and Promotion, Toronto, ON, Canada)

Pandemic H1N1 affected a large proportion of the population; however it is unclear if social determinants of health affected the severity of H1N1 illness. A case control study was conducted in Ontario during waves 1 and 2 of the pandemic to investigate the effect of the social determinants of health on severity of H1N1 illness. Individuals with confirmed pH1N1 were identified through laboratory reporting. Those requiring hospitalization were considered to have severe illness and ascribed case status. Non-hospitalized individuals served as controls. Telephone interviews were conducted, with response rates of 63% and 66% for waves 1 and 2 respectively. Logistic regression was used to derive the relationships between pH1N1 severity and the following social indicators: education level, household density and non-white ethnicity. A total of 462 (168 hospitalized) individuals were included in wave 1 and 694 (214 hospitalized) in wave 2. Neither non-white ethnicity nor household density were associated with hospitalization. When education level among adults (≥ 18 y, $n = 496$) ill during waves 1 and 2 was examined it was found that individuals with some post-secondary education were 36% significantly less likely to be hospitalized than individuals with a high-school education or less, when age and co-morbidities were controlled for (OR 0.64, 95% CI 0.42-0.97). A similar result was observed when individuals from wave 2 were analyzed separately (OR 0.55, 95% CI 0.31-0.96); however, a non-significant association was observed for wave 1 (OR 0.57, 95% CI 0.28-1.17). These findings suggest that level of education is an important predictor of pH1N1 severity in adults. Analyses examining hierarchical structures of socioeconomic position are currently underway.

POPULATION SEX RATIOS AND ADOLESCENT SEXUAL EXPERIENCE ACROSS RACIAL/ETHNIC GROUPS. *E R Pouget, T C Green (NDRI, New York, NY 10010)

To examine associations of adolescent sexual experience with male-female sex ratios we used aggregated response data collected in 1991-2009 from students in grades 9-12 from 31 local sites of the Youth Risk Behavior Survey, matched with county-level Census data. We compared results of race/ethnicity- and sex-stratified adjusted binomial regression models for non-Hispanic Black (NHB), non-Hispanic White (NHW) and Hispanic students. NHB and NHW male (Estimate (Est.) = -0.38, standard error (SE) = 0.06, $p < 0.0001$; Est. = -0.19, SE = 0.02, $p < 0.0001$; respectively) and female students (Est. = -0.13, SE = 0.04, $p < 0.01$; Est. = -0.24, SE = 0.04, $p < 0.0001$; respectively) who lived in counties with higher sex ratios among residents of the same race/ethnicity as the students were less likely to have had sex. For NHB male students, the effects were non-linear and waned at balanced sex ratio values (Quadratic Est. = 0.07, SE = 0.02, $p < 0.01$). In addition, NHW female students and Hispanic male and female students who lived in counties with higher sex ratios among residents in racial/ethnic groups other than that of the students were less likely to have had sex (Est. = -0.19, SE = 0.05, $p < 0.001$; Est. = -0.12, SE = 0.02, $p < 0.0001$; Est. = -0.06, SE = 0.02, $p < 0.01$; respectively). For NHW female students, the effects were non-linear (Quadratic Est. = 0.12, SE = 0.03, $p < 0.0001$). Results of analyses of 3 other sexual behavior items were similar. Balanced sex ratios may facilitate delay in adolescent sexual debut. Since early debut is associated with increased risk of sexually transmitted infections, and other adverse health outcomes, it is important to determine if a community's shortage of men leads to early sexual debut or if low sex ratios reflect other social determinants.

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MENTOR SELF-EFFICACY AS A HYPOTHESIZED MEDIATOR BETWEEN ENVIRONMENT AND MATCH RELATIONSHIP QUALITY IN CANADIAN BIG BROTHERS BIG SISTERS (BBBS) PROGRAMS. *A Ferro, D DeWit D, S Wells S, K Speechley K (University of Western Ontario, Department of Epidemiology and Biostatistics, London, ON, Canada)

Theory suggests mentor self-efficacy may mediate the association between environment (mentor training, parent and caseworker support) and match relationship quality (global and instrumental). However, a rigorous examination of this association has not been conducted. The study objectives were to examine the following associations: 1) environment and match relationship quality; 2) environment and mentor self-efficacy; and 3) mentor self-efficacy and match relationship quality, adjusting for environment. A cross-sectional analysis involving a subset of 404 mentors from a longitudinal study of Canadian BBBS programs was performed using structural equation modeling. Models were adjusted for demographic and match variables. Parent support was associated with match relationship quality (global: $\beta = 0.42$, $p < 0.01$; instrumental: $\beta = 0.51$, $p < 0.01$). Caseworker support and mentor training were not significantly associated with match relationship quality. Parent support was associated with mentor self-efficacy ($\beta = 0.63$, $p < 0.01$). Mentor self-efficacy was associated with match relationship quality when adjusted for parent support ($\beta = 0.28$, $p < 0.01$). By nested comparisons, mentor self-efficacy was found to partially mediate the association between parent support and match relationship quality (global: indirect effect = 0.19, $p < 0.01$; instrumental: indirect effect = 0.22, $p < 0.01$). Results will assist to augment BBBS policy to facilitate higher match relationship quality among participants.

DETERMINANTS OF SELF-REPORTED HEALTH IN YOUNG ADULTS: FINDINGS FROM THE FLASH COHORT. *A Nazmi, S Roy, K J McGaughy, H Smith, K Jankovitz, A Y McDermott. (California Polytechnic State University, San Luis Obispo, CA 93407)

Self-reported health status (SRH) in adults is associated with sociodemographic factors such as sex, race, and socioeconomic status but also with several endpoint measures such as obesity, mortality, and utilization of health care services. Studies examining determinants of SRH in younger age groups are lacking. Cross-sectional data from the Cal Poly FLASH Longitudinal College Health Study were used to investigate sociodemographic and behavioral determinants of SRH among students at a California public university. Logistic regression models for "low SRH" (very bad/bad/good vs. very good/excellent) included a range of sociodemographic and behavioral variables. Mean (SD) age of the sample (N = 1325, 34% of the freshman class) was 18.2 y (0.4). Females comprised 55% of the sample, which was 69% white, 17% Hispanic, and 14% Asian. Men in the overall sample rated their health as very good/excellent more often than women (63% vs. 49%, $p < 0.001$), and these patterns were evident across all racial/ethnic groups. Very good/excellent SRH was also observed more often in whites (60%) compared Hispanics (52%) and Asians (35%) ($p < 0.001$) and these racial/ethnic differences were consistent between the sexes. A graded, inverse dose-response association between family income and SRH was observed in unadjusted models ($p < 0.001$) and maintained after adjusting for age, sex, and race (odds ratio, OR, for low SRH 0.91 95%CI 0.85-0.98 per income category). In fully adjusted logistic regression models, risk for low SRH was higher in women (OR 1.67; 95%CI 1.30-2.16), Hispanics (OR 1.48; 95%CI 1.06-2.07) and Asians (OR 2.70; 95%CI 1.83-3.99). Behavioral variables including sedentary lifestyle, overweight, and poor sleep quality also contributed significantly to low SRH risk. Studies that collect and interpret data on SRH in young adults should consider sociodemographic and behavioral patterning as possible sources of bias.

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MOBILITY LIMITATIONS AND CAR TRAVEL AS DETERMINANTS OF RESTRICTION IN OUT-OF-HOME ACTIVITIES FOR INDIVIDUALS WITH ACTIVITY LIMITATION ATTRIBUTED TO ARTHRITIS. H Ansari, C Tosevski, *E M Badley (Toronto Western Research Institute, Toronto, ON M5T2S8, Canada)

To study the impact of mobility limitations on participation in out-of-home activities in those with arthritis disability using data on arthritis reported as a cause of disability (N = 4,471) in the 2001 Participation and Activity Limitation Survey (N = 20,710). Variables included frequency of participation in out-of-home activities (e.g. shopping, visiting family/friends, physical activity), difficulty or being prevented in traveling by car, severity of mobility and agility activity limitations, pain, age, sex, education, and income. Predictors of frequency of out-of-home activities were assessed using a series of multivariable logistic regressions. A quarter of disabled Canadians attributed their activity limitations to arthritis. Of these 20% had difficulty or were prevented from car travel. 28% of those prevented never engaged in activities outside the home, compared to 3% of those able to travel by car. Controlling for demographics, regression modeling indicated that severe mobility limitation (odds ratio OR = 6.84) and being prevented from car travel (OR = 3.68) were significantly associated with low frequency of out-of-home activities. With both variables in the final model, the OR for car travel (OR = 2.51) was reduced, suggesting partial mediation. The results suggest that severity of mobility limitations and inability to travel by car contribute to low frequency of out-of-home activities for those with arthritis disability.

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SOCIOECONOMIC DETERMINANTS OF EARLY MENARCHE IN A POPULATION-BASED SAMPLE OF U.S. ADOLESCENT FEMALES. *M K Courey, J Y Lo (University of Wisconsin-Madison, Department of Population Health Sciences, Madison, WI)

Age at menarche, an established breast cancer and asthma risk factor, shows both a descending secular trend and significant racial and ethnic disparities. Studies researching the determinants of racial disparities in age at menarche have examined a range of factors such as anthropomorphic measurements, physical activity, early environment, and family structure, yet no prior study has examined these risk factors for early menarche simultaneously while also exploring race by socioeconomic status interactions. In our preliminary analysis, we use the first wave of the National Longitudinal Study of Adolescent Health (Add Health) to research the determinants of early menarche, defined as the onset of menses before age eleven. A logistic model was run, modeling early menarche on self-reported weight, family structure, family income, receipt of unemployment, maternal education, physical activity, birth weight, urbanicity, median census block group income, and race. Our preliminary results indicate that, in this sample, racial disparities in early menstruation are mediated by family and contextual socioeconomic status. We find no significant effect of family structure, physical activity, and birth weight on early menarche, after controlling for multiple dimensions of socioeconomic status. Future analyses will use the expanded restricted wave 1 data from Add Health to examine contextual level socioeconomic interactions with early menarche using a random effects Cox proportional hazard model.

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MANUFACTURING PLANT SOCIAL CHARACTERISTICS AND INCIDENT HYPERTENSION, 2006-2008. *D Rehkopf, E Eisen, M Slade, L Cantley, M Cullen (Stanford University, Palo Alto, CA 94305)

Prior research into the role of social aspects of the work environment in contributing to cardiovascular disease (CVD) has generally focused on individual measures. Studies have been either population cohorts that did not collect exposure data, or occupational cohorts that do not have enough variation in exposures to examine occupational contextual factors. Individual measures of ratings of the work environment are problematic for understanding causes due to the fact that prior illness and individual characteristics may confound the associations with health outcomes. Our current study addresses these limitations by using aggregated ratings of the work environment across a large, racially diverse occupational manufacturing cohort (n = 10,454). The key predictor variables are from a factor analysis of data from a yearly survey with the primary factors capturing: 1) general job satisfaction, 2) positive perceptions of management, 3) workplace involvement, and 4) stressfulness of job. We examine these as aggregated exposures in separate models at both baseline and as change between 2006 and 2008. Our outcome is incidence of hypertension based on medical claims data after two years free of disease and two diagnoses. Individual level covariates in our models include gender, race, age, job grade and employment type. We find that there is an association ($p < 0.05$) between baseline higher levels of workplace involvement with lower incident hypertension. We also find an association between increasing levels of positive perceptions of management and lower incident hypertension. The results from this analysis shed light on how workplace social context may play a role in the etiology of hypertension.

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ECONOMIC HARDSHIP AND HEALTH: RESULTS FROM THE SURVEY OF THE HEALTH OF WISCONSIN (SHOW). *F J Nieto, K Malecki, M Walsh, E Friedman, A Bersch, C Engelman, L Galvao, P Peppard (University of Wisconsin, Madison, WI)

Economic hardship is known to affect myriad aspects affect mental and physical health. The goal of this study is to examine the association of health with both individual and community-level economic hardship measures. The SHOW is an annual survey of representative samples of adult (21-74 years old) residents in Wisconsin. Households are selected using two-stage cluster sampling; recruitment and initial interviews are done at the household; additional interviews and physical exams (including collection of blood samples) are conducted at permanent or mobile examination centers. Between 2008 and 2010, 1,550 participants have been recruited. Households are geocoded for linkage with existing contextual data including community level measures of the social and physical environment. Economic hardship at the individual level was evaluated using per capita family annual income; at the neighborhood (census block group) and at the county level was measured using the Economic Hardship Index, a composite measure of Census 2000 data on income, education, employment, crowded housing, and dependency. Both individual and community level economic hardship were strongly and consistently associated with poor health outcomes, determinants and behaviors. Individual hardship was more strongly associated to self-reported health and other determinants; however, economic hardship at the neighborhood level was more strongly associated with frequency of use of fast-food restaurants and with low physical activity. These data underscore the importance of examining community-level socioeconomic conditions as determinants of population health and health disparities.

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IMPACT OF SOCIO-ECONOMIC FACTORS ON MORTALITY OF CABG/PTCA PATIENTS: RESULTS FROM A PRINCIPAL COMPONENTS ANALYSIS. *Y Zhou, N Dendukuri, J Brophy (Division of Clinical Epidemiology, McGill University Health Centre, Montreal, QC, Canada)

Objective: To study the impact of socio-economic inequities on mortality in the group of CABG/PTCA patients. **Methods:** Using administrative databases from Quebec, we linked together information on socio-economic and clinical variables in a cohort patients aged 65 years or more who received their first CABG/PTCA intervention during the period 1995 to 2004. We identified two neighbourhood-level variables (average socio-economic status and physician density) and four patient-level variables (age, average physician visits per month, average hospitalizations per year, Charlson comorbidity score) as being of primary interest. To better understand the inter-relation between these variables, we carried out a principle component analysis. A Cox proportional hazards model was fit with the resulting components. **Results:** The principal components analysis identified six independent constructs: 1) high comorbidity and healthcare utilization, 2) high socio-economic status and access to healthcare, 3) elderly with infrequent health care utilization, 4) healthy and frequent hospitalization, 5) high comorbidity and high socio-economic status, and 6) infrequent physician visits but a frequent hospitalization. Constructs 1, 3 and 5 were associated with increased mortality, while 2, 4 and 6 were associated with decreased mortality. **Conclusion:** Our analysis shows that both clinical and socio-economic variables predict mortality among CABG/PTCA patients in Quebec. The inter-relation between these variables needs to be better understood to improve healthcare outcomes in this population.

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EFFECTIVENESS OF PELVIC FLOOR MUSCLE TRAINING IN REDUCING THE RISK OF URINARY INCONTINENCE DURING PREGNANCY. L C Assis, *A Dias, A M P Barbosa, A C M Santini, V O Sousa, L S Vianna, I M P Calderon (Botucatu Medical School, Botucatu, Brazil)

The purpose of this study was to develop and test the effectiveness of a perineal exercise protocol on pelvic floor muscle function and urinary continence during pregnancy. Thus, a protocol of four exercises for the strengthening of pelvic floor muscles was developed. This pragmatic randomized clinical trial included 87 primigravidas who were assessed over 6 visits starting at 18 weeks of gestation. Subjects were allocated into three groups of 29: supervised group (SG)—daily exercising under the monthly supervision of a physiotherapist; observational group (OG)—unsupervised daily exercising as instructed; control group (CG)—no exercising. Perineometry showed that muscle function in SG and OG improved up to visit 4, and decreased (though not < baseline levels) at visits 5 and 6. In CG, muscle function reduced since visit 2. At visit 1, urinary loss was reported by 58.6% in SG, 51.7% in OG, and 48.3% in CG, whereas at visit 6 it was reported by 6.9%, 6.9%, and 96.6% in SG, OG, and CG, respectively. Risk ratio analysis revealed increasing statistically significant confidence intervals, i.e., protection against urinary incontinence, between visits 4 (RR = 0.6316, CI95% = 0.4215-0.9463) and 6 (RR = 0.07143, CI95% = 0.02768-0.1843) in the exercising groups. Intervention performance was assessed by NNT (visit 4 = 4.14, visit 6 = 1.11) which demonstrated that, by the end of gestation, nearly all women benefited from the intervention used. Given the high prevalence of gestational urinary loss, the use of this preventive strategy is highly feasible and cost-effective, especially during pregnancy.

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INTRA-INDIVIDUAL VARIATION IN SERUM 25-HYDROXYVITAMIN D MEASURES 5 YEARS APART AMONG POSTMENOPAUSAL WOMEN. *J Meng, J Wactawski-Wende, C A Andrews, M J LaMonte, K M Hovey, R L Horst, A E Millen. (University at Buffalo, Buffalo, NY 14214)

Background: Current literature examining associations between blood vitamin D and chronic disease generally use a single assessment of 25-hydroxyvitamin D (25(OH)D) and assume an individual's 25(OH)D concentration is consistent over time. Few studies have assessed intra-individual variability of 25(OH)D status over extended periods of time. Purpose: We investigated the intra-individual variability between two measures of plasma 25(OH)D concentrations collected ~5 years apart (1997-2000 to 2002-2005) in 672 postmenopausal women participating in the Women's Health Initiative. Methods: Plasma 25(OH)D was assessed using the DiaSorin LIAISON® chemiluminescence method from July-October 2010. The within pair CV was 4.9% using blinded controls. Mean plasma 25(OH)D concentrations at the two time points were compared using a paired t-test. A within-person coefficient of variation (CV) and an intra-class correlation coefficient (ICC) were used to assess intra-individual variability and a Pearson correlation coefficient was used to assess the strength of the linear association between the two measures. Results: Mean 25(OH)D concentrations significantly ($p < 0.05$) increased from time 1 (60.0 nmol/L; SD, 22.2) to time 2 (67.8 nmol/L; SD, 22.2). We observed a moderate amount of intra-individual variability over five years (within-person CV = 22.6% and ICC = 0.59). The Pearson correlation coefficient was 0.64. Conclusion: This study suggests that a single 25(OH)D measurement is moderately representative of status over ~5 years.

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ASSOCIATIONS BETWEEN DEPRESSION AND METABOLIC SYNDROME BY AGE AND SEX: FINDINGS FROM THE NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY, 2005-2008. *A Keddie, S Pamnani (Northern Illinois University, DeKalb, IL 60115)

The purpose of this study was to examine associations between depression and metabolic syndrome (MetS) within sex and age groups in a recent, nationally representative, ethnically diverse sample. The analysis sample consisted of 2,867 fasting adults (1,380 women and 1,487 men) from the 2005-2008 National Health and Nutrition Examination Survey. Stratified analyses were conducted among men and women without diagnosed diabetes, cardiovascular disease or pregnancy in four age and sex groups (20-49 and ≥ 50 years). Binary logistic regression models were run to test associations between depression, as measured by the Patient Health Questionnaire (PHQ-9) and MetS as a single entity, defined by the 2005 National Cholesterol Education Program criteria. To determine which components of MetS may be responsible for any associations found, additional models were run for each component. Ordinal logistic regression was used to test for associations between the number of components and depression. The odds of depression among women between 20 and 49 years old with MetS were three times that of women of similar age without MetS (odds ratio: 3.01, 95% confidence interval: 1.58, 5.72). No single component accounted for the association independently of the others. Depression was associated with a progressive increase in the number of components (0-4+) among women in this age range. There were no significant associations between depression and MetS among men of any age or women aged ≥ 50 . It is possible that this association is hormonally mediated. These results should be confirmed with precise indicators of menopausal status.

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ACUPUNCTURE AND FEMALE SEXUAL DYSFUNCTION: A LONGITUDINAL STUDY OF SYMPTOM RELIEF. M Wellhoner, *J Smith-Gagen, A Running (University of Nevada, Reno NV 89557)

When female sexual dysfunction (FSD) is not relegated as a normal sign of aging, standard pharmaceutical treatment includes unwanted side effects and cardiovascular risks. Although acupuncture has shown promise as a treatment for a variety of women's health concerns, little research has focused on the potential efficacy of acupuncture as a treatment for FSD. This study quantitatively assesses the impact of acupuncture in 17 consecutively recruited women aged 40-66 diagnosed with FSD at a private women's health clinic. Using internal controls, 5 validated instruments measuring symptoms related to sexual function were assessed at baseline, just before (short-term) and three weeks after (long-term) the final treatment. The acupuncture points of needling were: spleen (4,6,9), stomach (29,30,36,43), gallbladder 41, heart (3,7,9) triple heater (5,10), large intestine 4, and conception vessel (3,4,6). Repeated Measures Analysis of Variance assessed changes in symptoms over time. There were no non-responders and no patients lost to follow-up. Acupuncture promoted improvements in symptoms related to female sexual dysfunction. Physiological symptoms, measured by the Greene Climacteric Scale and the Menopause Rating Scale, improved over the short ($p = 0.04$) and long-term ($p = 0.008$). Sexual dysfunction was reduced over the long-term ($p = 0.03$). Sexual desire was improved as measured by the Sexual Interest and Desire Inventory ($p = 0.01$ for short and long-term) and the desire subscale in the Female Sexual Function Index, short ($p = 0.002$) and long term ($p = 0.04$). The Quality of life scale was non-significant. These findings quantitatively support the use of acupuncture as a non-pharmaceutical alternative for specific symptoms related to FSD.

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BACTERIAL VAGINOSIS AND RISK FOR TRICHOMONAS VAGINALIS INFECTION: A LONGITUDINAL ANALYSIS. *S D Rathod, K Krupp, J Klausner, A Arun, A Reingold, P Madhivanan (University of California, Berkeley, CA 94720)

Background: Bacterial vaginosis (BV) and *Trichomonas vaginalis* (TV), have been estimated to affect one-quarter to one-third of sexually active women worldwide, and are often found concurrently. Few studies have examined this relationship longitudinally to better understand the direction and temporality of this association. Methods: A cohort of 853 young, sexually active, women was followed up in Mysore, India; participants were interviewed and tested for BV and TV at baseline, and at three- and six-month visits. Generalized estimating equations were used to estimate how between-visit alterations in vaginal flora - defined by Nugent diagnostic criteria for BV - were related to the risk of TV infection, adjusted for sociodemographic and behavioral covariates. Treatment was offered to women with TV and/or symptomatic BV. Results: After adjustment for covariates, participants with abnormal flora at two consecutive visits had nine times higher risk of TV (95% CI 4.1, 20.0), relative to those with normal flora. An increased risk of TV was also observed for participants whose flora status changed from normal to abnormal (aRR 7.11, 95% CI 2.8, 18.2) and from abnormal to normal (aRR 4.50, 95% CI 1.7, 11.8). Conclusions: Women experiencing abnormal flora during a three-month span appear to have significantly increased risk of TV infection. Using the Nugent diagnostic criteria, reproductive-age women in low-resource settings found to have abnormal vaginal flora should be assessed for TV.

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INDIVIDUAL AND COMMUNITY LEVEL DETERMINANTS OF DIET QUALITY DURING PREGNANCY. *D Nash, J Gilliland, S Evers, P Wilk, M K Campbell (The University of Western Ontario, London, ON, Canada)

Pregnant women in Canada are consistently failing to meet the food and nutrient recommendations for pregnancy. To our knowledge, there have been no Canadian studies that assess determinants of diet quality during pregnancy using a diet quality index. Furthermore, there is a lack of literature regarding community level determinants of pregnant women's diet quality. The objective of this study was to identify the individual and community level determinants of diet quality during pregnancy. Subjects were a cohort of 2282 pregnant women in London, Ontario who participated in the Prenatal Health Project (PHP). Dietary intake was measured using a validated food frequency questionnaire and diet quality was assessed using the Diet Quality Index for Pregnancy (DQIP). The DQIP consisted of six components: recommended servings of grains and fruit/vegetables according to Canada's Food Guide; percent energy from fat; and recommended intake of folate, calcium, and iron based on dietary reference intakes. Participants of the PHP were linked by home address to a geographic dataset to determine the community level variables, which included proximity and density of supermarkets, convenience stores, and fast food restaurants in relation to participants' homes. A small proportion of the variance in DQIP was found between communities so individual level multivariable linear regressions, rather than multi-level analyses, were conducted in SAS. Findings indicated that pregnant women who were more likely to have lower diet quality were born in Canada, not married, nulliparous, less active, and lacking partner social support. Number of fast food restaurants may have an effect on diet quality in pregnancy but it does not appear to be a major contributor.

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THE INFLUENCE OF DEPRESSION AND ANXIETY ON RISK OF ADULT-ONSET VULVODYNIA. *M Khandker, S S Brady, A F Vitonis, R F MacLehose, E G Stewart, B L Harlow (University of Minnesota School of Public Health, Minneapolis, MN 55454)

Although studies have shown that women with vulvodynia are more psychologically distressed than women without vulvodynia, we sought to effectively determine the temporal associations between diagnosed psychiatric disorders and vulvodynia. The Structured Clinical Interview for DSM-IV Axis I Disorders (SCID) was administered to 240 case-control pairs of women with and without vulvodynia. Interviews established age at first onset of diagnosed mood and anxiety disorder. Age information was used to determine whether first episode of mood and/or anxiety was antecedent or subsequent to first onset of vulvodynia symptoms. Conditional logistic regressions tested whether antecedent depression or anxiety was more likely among women with or without vulvodynia. Cox proportional hazards modeling was then used to estimate risk of subsequent new or recurrent onset of mood and/or anxiety disorder. After adjusting for education, race, age at menarche, age at first tampon use and age at first sexual intercourse, odds of vulvodynia were 4-times more likely among women with antecedent mood or anxiety compared to women without (95%CI 2.1-7.5). Vulvodynia was strongly associated with new or recurrent onset of mood or anxiety disorder after adjustment (HR = 1.7, 95%CI 1.1-2.6), and did not significantly change after including history of mood or anxiety disorder prior to onset of vulvodynia or reference age in controls in the models. This is the first community-based epidemiological study demonstrating that DSM-IV-diagnosed antecedent depression and anxiety disorders strongly influence the risk of vulvodynia, and that psychiatric morbidity may have a direct effect on immunoinflammatory response mechanisms.

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FREQUENCY OF PERFORMING HIV TEST AND REASONS OF NOT-TESTING AMONG FEMALE SEX WORKERS. *A Sayarifard, A Kolahi, M H Hamedani (Department of Community Medicine, Faculty of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran)

The objective of this study is to determine the percentage of female sex workers in Tehran/Iran who have performed HIV test and know its result during the last 12 months. This study was performed in 2009, by participation of 128 female sex workers. The sampling was a combination of available samples from who worked in the streets, visitor passes to Drop-in Centers and those who were introduced by young men and introduced by female sex workers through respondent driven sampling. The data were collected through an anonymous information form, without any identifying mark. Their average age was 26.8 ± 6.2 years. Their education level was 48% elementary and secondary education, 20% tertiary education, 30% diplomas and higher diplomas. 42/9% of them were never married. The first and second questions were: have you ever been tested for HIV and do you know the result? Only 32 persons (25%) in the past year had HIV test and 30 persons knew its result. eleven persons through blood transfusion centers, eleven people in private clinics, nine persons through Drop-in centers and one person in prison were tested. Third question was about the reasons of not performing a test and the mentioned answers were as follows: 35 persons (36.5%) fear of results disclosure, 35 (36.5%) no need, 11 (11/5%) high prices, 9 (9/4%) lack of knowledge, and 6 persons fear of positive answer. The study showed that although the majority of female sex workers perceive themselves at risk, but the rate of HIV testing among them is low. Considering the reasons of not performing test, it is recommended to implement comprehensive training programs for vulnerable groups in Iran.

FREQUENCY OF UNPROTECTED SEXUAL BEHAVIORS REGARDING HIV/AIDS TRANSMISSION IN AT-RISK WOMEN. *A Sayarifard, A A Kolahi, M A Hajjar Hamedani (Department of Community Medicine, Faculty of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran)

Considering the lack of information about the frequency of anal intercourse, this study aimed to determine the frequency of anal intercourse and the use of condom amongst a sample of female sex workers in Tehran/Iran in 2009. We conducted a cross-sectional study and obtained data from 128 female sex workers in Tehran. The sampling was a combination of available samples from who worked in the streets, visitor passes to Drop-in Centers and those who were introduced by young men and introduced by female sex workers through respondent driven sampling. Data from interviews were collected by trained personnel. Mean age of participants was 26.8 ± 6.2 (16-45) years. 51 (39.8%) of the female sex workers in the study said they never had anal intercourse, 13 (10.1%) reported sometimes, only 8 (6.3%) of whom always used condom and 56 (43.8%) never used condom. In other words, from the total of 77 participants who had anal intercourse, only 22 (28.6%) always or sometimes used condom and 71.4% never used condom. Lack of using condoms during anal intercourses was more common among elder or addicted female sex workers and those who worked in south of the city and also those who used a type of contraceptive. This study showed that the behavior of female sex worker in Iran towards preventing the transmission of HIV/AIDS is not satisfying at all. Continuing this situation puts themselves and the society in higher risk of damage.

DO BMI, WAIST CIRCUMFERENCE AND BODY COMPOSITION PREDICT MORTALITY IN MULTIETHNIC OLDER WOMEN? *Z Chen, J S Nicholas, L Arendell, N Wright, R Jackson, S Going, C Thomson (University of Arizona, Tucson, AZ)

Mortality is significantly associated with body mass index (BMI). However, the shape and age variations of this association are still important subjects for investigation. Whether body composition measurements and waist circumference have a stronger association with mortality than BMI does is unclear. These questions were examined in the Women's Health Initiative (WHI). At baseline, BMI was assessed for 157,589 postmenopausal women; waist circumference and percent body fat (% fat) were measured using a tape measure and dual-energy x-ray absorptiometry in a WHI subsample ($n = 11,020$). Mortality during an average of 7.8 years of follow up was adjudicated in the WHI. Hazard ratios (HR) and 95% confidence intervals (95% CI) were computed with Cox proportional hazards model. Using the normal BMI category ($18.5-24.9 \text{ kg/m}^2$) as the reference, the HR (95% CI) were 1.80 (1.53, 2.12), 0.95 (0.90, 0.99), 1.16 (1.09, 1.23), 1.61 (1.49, 1.74) and 2.28 (2.07, 2.51), for underweight, overweight, obesity I, II and III categories, respectively after adjusting for age and ethnicity. This J-shape relationship was observed in all age groups (50-59, 60-69 and 70-79); however, the small protective association of being overweight with mortality was only statistically significant in the 70-79 years category. In comparison to BMI, % fat and waist circumference did not show a stronger association with mortality. This study suggests that being either underweight or obese is associated with an increased mortality in postmenopausal women, and that being overweight appears to not increase risk of mortality. Overall, BMI is a fairly robust predictor for mortality in older women.

ACCULTURATION DRIVES OBESITY AND DIABETES IN MEXICAN-AMERICAN WOMEN. *L Garcia, E B Gold, L Wang, X Yang, M Mao, A V Schwartz (University of California-Davis School of Medicine, Davis, CA 95616)

Latinos in the US are a heterogeneous population and results have not been consistent regarding the relationship between acculturation and obesity or diabetes for Mexican-American women. The relation between acculturation and pre-diabetes for Mexican American women is unknown. This study examined whether different levels of acculturation among Mexican American women were associated with differing prevalences of overweight, obesity, pre-diabetes and diabetes. The National Health and Nutrition Examination Survey (NHANES) continuous 1999-2008 datasets were used. To assess the relationships of acculturation with obesity, overweight, pre-diabetes and diabetes, binomial regression models were used to compute prevalence ratios (PRs) and their respective 95% confidence intervals (CIs). Obesity was more prevalent among the more acculturated Mexican American women. In contrast, the least acculturated Mexican American women had the highest prevalence of overweight. In adjusted analysis, the less acculturated Mexican American women were less likely to be obese than the more acculturated women (adjusted PR = 0.80, 95% CI = 0.70-0.92). The more acculturated Mexican American women had a higher prevalence of diabetes and pre-diabetes than the less acculturated. The less acculturated Mexican American women were less likely than the more acculturated women to have diabetes (adjusted PR = 0.62, 95% CI = 0.39-0.98). No statistically significant associations were observed for the relation of acculturation to pre-diabetes. Our results suggest that obesity and diabetes are less prevalent in the less acculturated Mexican American women.

DOES PERCEIVED STIGMA AFFECT SEEKING CARE FOR CHRONIC VULVAR PAIN? *R H N Nguyen, M van Ryn, R F MacLehose, S Rydell, B L Harlow (University of Minnesota, Minneapolis, MN)

Prevalence estimates of vulvar pain from clinic-based samples are dramatically lower than population estimates. Clinic underrepresentation may explain much of this difference but it is unknown why many women do not seek care for their vulvar pain. Using a population-based sample, we sought to determine whether stigma was a determinant of seeking care for chronic vulvar pain. Data were from an on-going study of the etiology of vulvodynia. Women aged 18 - 40 years were enrolled from a healthcare organization regardless of gynecologic care. Asked if "Doctors think that people with chronic pain exaggerate their pain", and "People believe that vulvar pain is used as an excuse to avoid having sex", women responded using 5-point Likert scales; categories were collapsed into 2 groups, agree (including strongly agree) or not. Women were considered to have a history of chronic vulvar pain if they reported vulvar burning or pain on contact lasting more than 3 months. Binomial regression models were used to estimate the association between vulvar pain and stigma. 13.6% of 2898 women had a history of chronic vulvar pain. Overall, 30.1% agreed that doctors hold this negative stereotype, and 16.7% perceive that people think vulvar pain is an excuse. Adjusted for age, education, marital status, race and obesity, women with a history of vulvar pain were 1.4x more likely to perceive stereotyping from doctors (95% CI: 1.26, 1.64) and 2.1x more likely to perceive stigma by others (95% CI: 1.8, 2.5). 179 of 387 (46.3%) women with a history of vulvar pain sought care. Perceived stereotyping from doctors was not associated with seeking care (adj. RR = 1.17, 95% CI: 0.94 - 1.44), nor was stigma by others (adj. RR = 1.11, 95% CI: 0.89 - 1.39). Our findings indicate that although women with vulvar pain experience higher rates of perceived stereotyping and stigma, it may not be a barrier to seeking care for vulvar pain.

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REPRODUCTIVE MORBIDITY AMONG FEMALE FACTORY WORKERS IN TIANJIN CHINA. *K King, W Yanrang, H Cheng, L Jing, S Harlow (University of Michigan, Ann Arbor, MI)

China's Economic Development Areas offer low cost factory labor and have played a major role in China's recent economic gains. Previous research has shown associations between occupational strain and reproductive morbidity among female factory workers. This pilot study documents the prevalence of self-reported pelvic pain and reproductive tract infections among 529 female workers in 3 electronics factories in China's Tianjin Economic Development Area (TEDA). Among the study participants, 62% identified as laborers, the mean age was 28 years, 23% were migrants, 66% were married, and 95% had a high school education or above. Out of the 529 women surveyed, 41% reported working overnight and 27% reported working overtime in the last year, of which 61% reported not having a choice to work overtime. Forty-three percent of women in the study were classified as having high job strain according to the Karasek Job Content Questionnaire. Of those who reported ever having a menstrual period (95%), 78% reported having an irregular period, and 78% reported usually or often having painful periods in the previous 12 months with 7% reporting severe pain. Regarding reproductive infection in the last 12 months, 16% of women reported having yellow, green, or grey discharge, 3% reported sores in their genital area, and 6% reported pain with urination. Nineteen percent reported having pelvic pain without sex or menstruation. After controlling for age, factory, hormonal contraceptives, and migrant status, women who reported feeling more overworked on a Likert scale (0-10) were more likely to report pelvic pain without sex or menstruation and report symptoms of reproductive infection ($\alpha < 0.05$). This research underlines the importance of addressing the reproductive health of female workers in TEDA and provides epidemiologic data relevant for China's national health policies.

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PREGNANCY: A RISK FACTOR FOR SOCIAL INEQUALITIES IN OBESITY? *E Renahy, A Quesnel-Vallée (McGill University, Montreal, QC H3A1X9, Canada)

Objectives: Strong socioeconomic disparities in obesity and overweight exist, to which pregnancy-related weight gain could contribute. The aims of the study are 1. to estimate the average time to return to pre-pregnancy BMI and reach a "healthy" BMI (18.5-24.9) post-pregnancy and 2. identify socioeconomic characteristics placing women at risk of not meeting these outcomes. Methods: Using data from the National Longitudinal Survey of Youth (NLSY79), we estimated Cox proportional hazard models on 1947 parous women who were followed over the bulk of their reproductive lives, from 1979 to 2008. Results: Following their first birth, 63.5% of women returned to their pre-pregnancy BMI after 2.0 years on average, while 73.7% reached a healthy BMI after 1.8 years. However, given that 18.8% of women who returned to their pre-pregnancy BMI were overweight or obese, the higher proportion of women reaching a "healthy" BMI must be due in part to underweight women transitioning into this "healthy" category. The hazard of return to a "healthy" BMI was lower among black or Hispanic (hazard ratio (HR) = 0.86, 95% confidence interval (CI) = [0.78-0.94]) and for women that gained more than the official recommendations during their pregnancy (HR = 0.82 95%CI = [0.74-0.90]), while it marginally increases with higher education level (HR = 1.08 95%CI = [0.99-1.19]). Conclusions: These analyses highlight the existence of social disparities and the importance of pregnancy-related weight gain in the likelihood of returning to pre-pregnancy and healthy BMI. Further analyses are needed to assess the effect of prenatal care service use, breastfeeding, tobacco and alcohol consumption during pregnancy and physical activity.

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NEIGHBORHOOD EFFECTS ON SEXUAL AND REPRODUCTIVE HEALTH: A REVIEW OF THE LITERATURE. *D Karasek, U Upadhyay (University of California, San Francisco, CA)

Social and contextual conditions of the neighborhood environment may affect sexual health behavior, reproductive intentions, and pregnancy risk. This review assesses the quality, quantity, methodological variation, and consistency of quantitative evidence examining neighborhood effects on sexual and reproductive health outcomes. We identify articles published between January 1985 and December 2010 that contain multilevel social constructs and organize them according to sexual and reproductive outcomes of interest, neighborhood definition used, neighborhood level variables and data source, and analytic technique. Sexual and reproductive health outcomes as those related to sexual behavior, condom use, sexually transmitted infections, contraceptive use, unintended pregnancy, and abortion. The majority of the 30 studies examined found evidence of the relationship between some group level factors and sexual and reproductive outcomes. However not all findings were internally or externally consistent. Associations between neighborhood level conditions and individual sexual and reproductive health outcomes remain inconclusive due to lack of appropriate data and methodological technique. Further research should examine the complex interactions of neighborhood contextual factors and individual sexual behavior.

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VALIDITY OF POLICE-REPORTED DRUG INVOLVEMENT IN FATAL MOTOR VEHICLE CRASHES. *J E Brady, C J DiMaggio, S P Baker, G W Rebok, G Li (Columbia University, Department of Epidemiology, New York, NY 10032.)

With rising morbidity and mortality from prescription drug overdoses in the United States, drug-impaired driving has become a major safety concern. Using data from the Fatality Analysis Reporting System for the years 2006–2008, the authors examined the prevalence of drug involvement in fatal motor vehicle crashes and the validity of police-reported drug use by comparison to toxicological testing results. Of the 164,051 drivers involved in fatal crashes in the United States during 2006–2008, 54,211 (33.0%) were tested for drugs, with 15,346 (28.3%) being positive for at least one drug. Police-reported drug use data were available for 55,508 (33.8%) drivers, of whom 5,947 (10.7%) were judged positive. Based on data for 21,150 drivers with both police reports and toxicological tests, the sensitivity and specificity of police-reported drug use were 70.2% (95% confidence interval (CI) 69.1–71.3%) and 97.3% (95% CI 97.0–97.6%), respectively. Sensitivity varied significantly with geographic regions, ranging from 55.2% (95% CI 51.7–58.7%) in the Northeast to 86.6% (95% CI 85.4–87.8%) in the South. Results of this study indicate that police-reported drug use is fairly accurate, but may underestimate the prevalence of drug use by drivers involved in fatal crashes.

POPULATION ATTRIBUTABLE RISK OF UNINTENTIONAL CHILDHOOD POISONING, IN KARACHI, PAKISTAN. *B Ahmed, Z Fatmi, R Siddiqui (Aga Khan University, Karachi, Pakistan)

The percentage of unintentional childhood poisoning cases in a given population attributable to specific risk factors (i.e., the population attributable risk) can be calculated; determination of such risk associated with potentially modifiable risk factors, are necessary to focus prevention strategies. We calculated PARs by using 120 cases with unintentional poisoning and 360 controls in a multi center hospital based matched case control study. The risk factors were accessibility to hazardous chemicals and medicines due to unsafe storage, child behavior reported as hyperactive, storage or kerosene and petroleum in soft drink bottles, low socioeconomic class, less mother education, and history of previous poisoning. Among all subjects, the following attributable risks for the indicated risk factors were observed: 12% (95% confidence interval [CI] = 8% - 16%) for both chemicals and medicines stored unsafe, 19% (95% CI = 15% - 23%) for child reported as hyperactive, 40% (95% CI = 38% - 42%) for storage of kerosene and petroleum in soft drink bottles, 48% (95% CI = 42% - 54%) for low socioeconomic status, 38% (95% CI = 32% - 42%) for no formal mothers education and 5.8% (95% CI 2% - 10%) for history of previous poisoning. 48% of cases of overall study population could be attributed to at least one of the six risk factors. Among girls, this proportion was 23 percent and it rose to 43 percent among boys. Exposure to a few selected and potentially modifiable risk indicators explained about half of the cases of unintentional poisoning among children under five years of age in this Pakistani population, indicating the theoretical scope for prevention of the disease.

EPIDEMIOLOGIC ASPECTS OF DELIBERATE SELF-POISONING IN ADOLESCENTS: A HOSPITAL-BASED STUDY IN TEHRAN. *N Mohammadi, M Karbakhsh, A Pajoumand (Sina Trauma Research Center, Tehran University of Medical Sciences, Shahid Beheshti Universities of Medical Sciences, Tehran, Iran)

The objective of this study was to determine the epidemiological characteristics of deliberate self-poisoning in adolescents (13-19 years old) had been referred to the only poisoning center in Tehran. In a cross-sectional study, all cases of acute poisoning at the Loghman Hakim Hospital from May to December 2005 were reviewed. Data were analyzed by SPSS 13 and STATA 8. From a total of 2626 cases, the male/female ratio was 1/2.2. Mean of age was 17.31 ± 1.46 . Approximately 87% were single and 56% were students, while a total of 4859 different drugs/agents were used for self-poisoning (average of 1.85 for each case). The majority of patients was from urban areas (98.7%) and had no history of attempted suicide. History of chronic somatic and psychiatric diseases was observed in 6.5%, and 11.8%, respectively. There was no difference between males and females regarding history of psychiatric and somatic disorders, though there was a significant difference in the average of age between male and female adolescents (18.17 ± 1.51 for females and 18.61 ± 1.32 for males [$p < 0.001$]). Among adolescents, self-poisoning is more common in girls while the mean of age is higher in boys. Although the prevalence of psychiatric disorders in adolescents appeared to be less than the general population in other studies, this might be related to differences in their situations or due to underestimation of their frequencies. Psychiatric care should be a necessary component of the care administered to adolescents who attempt suicide and must be based on the needs and basic assessment of the patient's status.

PREDICTORS OF UNINTENTIONAL POISONING AMONG CHILDREN UNDER 5 YEARS OF AGE IN KARACHI: A MATCHED CASE CONTROL STUDY. *B Ahmed, Z Fatmi, R Siddiqui (Aga Khan University, Karachi, Pakistan)

Poisoning is the 4th leading cause of unintentional injury in children under 5 years of age. The study objective was to determine the factors associated with unintentional poisoning among children under-5 years of age reporting to emergency rooms of tertiary care hospitals in Karachi, Pakistan. A matched case-control study was conducted on 120 cases and 360 controls. Children with definite diagnosis of unintentional poisoning by attending ER physician were included in the study as cases. For each case three (3) control children matched for age and gender with complaints and diagnosis other than poisoning were selected from the same hospitals ER within 48 hours of case identification. Parents were interviewed by using structured questionnaire containing information on socio-demographic factors, child's behavior, and storage practices of hazardous substances of caregivers inside homes. Conditional logistic regression was performed to analyze the data. Accessibility to hazardous chemicals and medicines due to unsafe storage (matched odds ratio = 5.6, [95% CI 1.9,16.7]), child's behavior reported as usually aggressive (mOR = 8.2, [95% CI 4.6,16.1]), storage of kerosene oil and petrol in soft drink bottles (mOR = 3.8, [95% CI 2.0,7.3]), low socioeconomic status (mOR = 9.2, [95% CI 2.8,30.1]), low mothers education (mOR = 4.2, [95% CI 1.8,9.6]) and history of previous poisoning (mOR = 8.6, [95% CI 1.7, 43.5]) were independently related to unintentional poisoning. The factors are potentially modifiable, key health messages focusing on the safe storage of chemicals and medicines and the use of child resistant containers may play a role in decreasing the burden of childhood poisoning in Karachi, Pakistan.

EPIDEMIOLOGIC ASPECTS OF OCCUPATIONAL PERCUTANEOUS INJURIES AMONG NURSES IN QAZVIN, IRAN. *N Mohammadi, A Allami, R Malek Mohamadi (Tehran and Qazvin Universities of Medical Sciences, Tehran and Qazvin, Iran)

Nurses are at risk of needle stick injury (NSI), which may lead to serious or fatal blood-borne infections. This study conducted to determine the prevalence and some possible associate factors to needle stick injury and mucocutaneous exposures among nurses. A cross-sectional study was conducted throughout 138 nurses in surgery and gynecology/obstetrics services of Qazvin University of Medical Sciences. Chi-square and student's t-test were used to find out the differences between two wards. Overall prevalence of NSI and direct exposure to body fluids were 52.9% and 65.4%, respectively. The prevalence of episodes of NSI was 63% (95% CI: 49-76%) in the obstetrics/gynecology and 47% (36-58%) in general surgery wards (not significant). Repeated NSI (number per each year ≥ 3) and mucocutaneous exposures were significantly higher in surgery setting (13.4% in surgery and 0.0% in obstetrics/gynecology wards [Odds Ratio: 1.55; 95% CI: 1.08-2.22]). The overall prevalence of direct contact with body fluids was 65.4% (95% CI: 57.4 - 73.8%); it was significantly higher in general surgery ward (91.46%) than obstetrics/gynecology ward (39.21%) (Odds Ratio: 2.20; 95% CI: 1.50-3.25). Knowledge, attitude, and practice of nurses in many aspects were not appropriate (accuracy rates $\leq 50\%$). Nurses are still at significant risk of NSI and mucocutaneous exposure. Continuous educational programs are necessary for improving this situation because inadequate education might increase unsafely practice. Every hospital should have an established protocol that describes where and how their personnel should seek medical investigation and treatment after an occupational percutaneous injury.

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NON-COMBAT INJURY SURVEILLANCE IN THE CANADIAN FORCES. *E Payne, M-N Vallée, M Carew (Department of National Defence, Ottawa, ON, Canada)

Introduction: Military personnel are vulnerable to injury due the nature of their work and training. Injuries reduce operational readiness and are leading causes of morbidity and mortality in military populations. The Canadian Forces 2008/9 Health and Lifestyle Information Survey found a 12 month prevalence of 23% for repetitive strain injury and 21% for acute injury. Most injuries were associated with sports, physical and adventure training. A pilot injury surveillance system was initiated in 2010 at Valcartier Army Base (Quebec) to collect information about injuries (at the point of medical contact) to inform local prevention policies and programs. Methods: Univariate and bivariate analyses are completed on a quarterly basis to describe injuries in terms of person, place and time as well as contributing modifiable factors such as injury mechanism, equipment use and associated activities. Injury rates are calculated using estimates of Canadian Forces personnel in the catchment area at risk during this time period. Hypotheses are generated in collaboration with local stakeholders to guide more detailed analyses and to identify priority areas for injury prevention. Results: The injury surveillance pilot program was operational in all Valcartier medical and physiotherapy clinics as of November 2010. The process and implementation of the system will be described along with the results from the first quarter of data. Conclusion: Success of this system depends on providing timely, relevant data and recommendations to stakeholders in order to facilitate targeted injury prevention initiatives. This requires overcoming challenges in implementing an injury surveillance system in an extremely busy clinical environment while addressing a variety of stakeholder needs.

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POSITIVE INCOME SHOCKS AND ACCIDENTAL DEATHS AMONG CHEROKEE INDIANS: A NATURAL EXPERIMENT. *T A Bruckner, C Margerison-Zilko, R Brown (University of California at Irvine, Irvine, CA 92697)

Several studies in low-income populations report the somewhat counterintuitive finding that positive income gains adversely affect adult health. The literature posits that receipt of a large portion of annual income increases, in the short term, risk-taking behavior and/or the consumption of health-damaging goods. This work implies the hypothesis that persons with an unexpected gain in income will exhibit an elevated risk of accidental death—the fifth leading cause of death in the United States. We test this hypothesis directly by capitalizing on a natural experiment in which Cherokee Indians in rural North Carolina received discrete lump sum payments from a new casino. We applied Poisson regression with robust standard errors to the monthly count of accidental deaths among Cherokee Indians over 204 months spanning 1990 to 2006. Methods controlled for temporal dependence in accidental deaths (e.g., seasonality, trend) as well as changes in population size. As hypothesized, the risk of accidental death rises above expected levels during months of the large casino payments (relative risk = 2.62; 95% confidence interval = 1.54 – 4.47). Exploratory analyses of ethnographic interviews and behavioral surveys support that increased vehicular travel and consumption of health-damaging goods may account for the rise in accident proneness. Although long-term income gains may improve health in this population, our findings indicate that acute responses to large income gains, in the short term, increase risk-taking and accident proneness. We encourage further investigation of natural experiments to identify causal economic antecedents of population health.

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MARIJUANA USE AND MOTOR VEHICLE CRASHES: A META-ANALYSIS. *M Li, C DiMaggio, J Brady, A Lusardi, K Tzong, G Li (Columbia University, New York, NY 10032)

As marijuana is increasingly permissible and accessible in the United States, its impact on driving safety has become a major concern. Although marijuana is known to be involved in about 28% of fatal motor vehicle crashes, its role in crash causation remains moot. We conducted a meta-analysis to assess the epidemiologic evidence for the association between marijuana use and crash risk. A systematic search of the bibliographical databases yielded nine epidemiologic studies examining the association of marijuana use with crash risk that were published in English and after 1989. Information about the study design, the characteristics of the study population, and the study result was extracted from each study and was entered into a database for analysis using the Comprehensive Meta Analysis software (Biostat Inc., Englewood, NJ). These nine studies included a total of 93200 drivers (4207 involved in crashes and 88993 not involved crashes) from 6 countries. Estimated odds ratios relating marijuana use to crash risk reported in these studies ranged from 0.85 to 7.16. Pooled analysis based on the random effects model yielded a summary odds ratio of 2.66 (95% Confidence Interval 2.07–3.41). Analysis of individual studies indicated that the heightened risk of crash involvement associated with marijuana use persisted after adjustment for confounding variables and that the risk of crash involvement increased in a dose-response fashion with the concentration of tetrahydrocannabinol detected in the urine or blood and the frequency of self-reported marijuana use. The results of this meta-analysis suggest that marijuana use by drivers is associated with a significantly increased risk of being involved in motor vehicle crashes.

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DESIGNING A NEUROTRAUMA SURVEILLANCE SYSTEM FOR PREVENTION: WHAT ARE THE KEY COMPONENTS, CHALLENGES, STRENGTHS AND WEAKNESSES? *A Chen, A Colantonio, D Parsons (Toronto Rehabilitation Institute, Toronto, ON M5G2A2, Canada)

The purpose of a neurotrauma surveillance system is to identify high risk populations, support the planning and evaluation of prevention programs, increase awareness of neurotrauma as a public health issue, and support research by providing rich data and identifying priorities. To investigate the incidence of neurotrauma in Ontario we developed an International Classification of Diseases-version 10 (ICD-10) definition for use in administrative emergency room [National Ambulatory Care Registry System (NACRS)] and hospitalization [Discharge Abstract Data (DAD)] data using a systematic review of codes used internationally and personal communication with experts in the field. In Ontario, the data between NACRS and DAD can be linked by a scrambled ID per patient and as a result we were able to discern incident cases of neurotrauma. Current results include the incidence rates in males and females by age groups with two peaks in the 10-19 and over 70 age groups. Falls were the most prevalent cause of neurotrauma in Ontario followed by struck by/against. Each cause is coded by the percentage of that population that are above 65. As a result, falls and pedestrian motor vehicle collisions are significant causes of neurotrauma in the elderly population. In comparing sport causes, hockey composed the largest relative portion of ER visits, but ski/snowboard and baseball injuries composed the largest relative portion of hospitalizations.

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POST-TRAUMATIC STRESS DISORDER (PTSD), SEVERE DEPRESSION AND TRAVEL PHOBIA THREE MONTHS AFTER ROAD TRAFFIC ACCIDENTS. Z Shivapour, *S A Motevalian, M Soleimani-Dodaran, J Bolhari (Tehran University of Medical Sciences, Tehran, Iran)

Objectives: The aim of this study was to estimate the prevalence and determinants of PTSD, severe depression and travel phobia 3 months after road traffic accidents. Methods: The study subjects were 246 patients who have been admitted in two university hospitals because of traffic injuries during August and September 2009. PTSD Symptom Scale – Interview (PSS-I), Beck Depression Inventory and Travel Phobia Questionnaire were asked from them by phone 3 months after the accident. Results: The mean age of the subjects was 29.9 (SD = 9.43) and 77.6% of them were male. The prevalence of PTSD, severe depression and travel phobia were 38.6% (95% Confidence Interval: 32.8-44.8), 23.3% (95% CI: 18.4-29.1) and 43.8% (95% CI: 37.5-50.3) respectively. Logistic regression analysis showed that female sex, fear of dying in the accident, having had at least 3 stressful life events during the last 5 years, being a driver, hospitalization longer than one week after the accident, and involvement in financial or job difficulties after the accident were risk factors for developing PTSD in three months after the accident. Age younger than 45 years, lower literacy (less than 12 years) and having had at least 3 stressful life events during the last 5 years were factors associated with severe depression. Risk factors of travel phobia were female sex, fear of dying in the accident and being a motorcycle rider. Conclusion: The burden of psychological consequences of traffic accidents is very high. There is an obvious need for designing and implementation of mental health packages for survivors of traffic accidents.

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CHARACTERIZATION OF THE SEVERITY OF TRAUMATIC BRAIN INJURY EMERGENCY DEPARTMENT VISITS AMONG OLDER ADULTS. *W S Pearson, D E Sugerman, L C McGuire (Division of Injury Response, Centers for Disease Control and Prevention, Atlanta, GA 30346)

Traumatic brain injury (TBI) is a leading cause of injury-related morbidity and mortality among older adults (≥ 65 years of age) in the United States. Therefore, the 2007-2008 National Hospital Ambulatory Medical Care Survey-Emergency Department data were used to examine Emergency Department (ED) visits for TBI among older adults. TBI was identified using International Classification of Diseases, 9th Revision Clinical Modification codes collected in the ED. Estimates of triage immediacy, receipt of a head computed tomography (CT) scan and admission to the hospital were used to characterize the severity of the injury and stratified by visits made by persons < 65 years of age and those made by persons ≥ 65 years of age. During the study period, an estimated total of 3.8 million visits were recorded for TBI, of which, 14.8% were made by persons ≥ 65 years of age. Of ED visits made by persons ≥ 65 years of age, 29.1% were triaged as requiring attention from a physician within 15 minutes of arrival, 82.1% required a head CT, and 20.9% required hospitalization. A multivariate logistic regression model controlling for sex and race was constructed to compare TBI visits between those ≥ 65 years of age and those < 65 years of age. Persons ≥ 65 years of age were nearly three times more likely to receive a head CT compared to younger patients presenting with TBI (adjusted odds ratio [aOR] 2.8; 95% confidence interval [CI], 1.4-5.3) and were four times more likely to be hospitalized (aOR 4.2; 95% CI, 2.2-8.1) compared to younger patients presenting with TBI. Further exploration into the clinical management of TBI in older adults is warranted.

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SUPERVISION AND RISK OF UNINTENTIONAL INJURY IN YOUNG CHILDREN. *P G Schnitzer, M D Dowd, B Morrongiello, R L Kruse (University of Missouri, Columbia, MO)

Despite advances in prevention, injuries remain a leading cause of morbidity and mortality among children. Supervision is often cited as an important determinant of child safety. We sought to assess the association between caregiver supervision and acute unintentional injury in young children. Parents of children ≤ 4 who were treated in an emergency department or admitted to an urban children's hospital for an acute unintentional injury were recruited for study. Information on supervision (proximity, attention, continuity) at the time of injury and two control times (1 and 24 hours before the injury) was collected via interview. Case crossover analyses were conducted to assess the association between supervision and injury risk. Complete interviews were obtained on 222 participants. The majority were mothers (90%), Caucasian (73%), married (64%), had a high school education (87%), and were employed full (42%) or part-time (15%). Annual household income was $< \$10,000$ for 11% of participants and $> \$50,000$ for 28%. Mean age for injured children was 2.1 years; most were boys (58%). Falls were the leading cause of injury (49%); lacerations (33%) and contusions (22%) were the most common type. Most (63%) respondents were distracted (e.g., cooking, doing laundry) when the injury occurred. The majority (69%) of children were beyond their parent's reach, but only 30% were out of view, when injured. Supervision was intermittent for 49% and absent for 4%. Children were more likely to be beyond reach of their caregiver at the time of injury when compared to both 1 hour (Odd Ratio [OR] 4.0, 95% CI 2.3-7.0) and 24 hours before the injury occurred (OR 2.7, 95% CI 1.6-4.7); caregivers were more likely to be distracted at the time of injury rather than attending to the child (OR 1.6, 95% CI, 0.8 – 3.4). Most parents (53%) agreed that "closer supervision probably would have prevented their child from getting hurt," yet 69% attributed the injury to "bad luck." Proximity (within vs. beyond reach) and attention (attending to vs. distracted) may be important dimensions of supervision for assessing child injury risk.

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PROTON-PUMP INHIBITOR USE AND HIP FRACTURE IN MEN, 1997-2006. *A L Adams, J L Zhang, J M Shi, S J Jacobsen (Kaiser Permanente Southern California, Pasadena, CA 91101)

To study the association between proton-pump inhibitor (PPI) use and hip fracture in a large integrated health care organization, we conducted a case-control study of 6774 pairs of men, aged 45 years or older, optimally matched on age, race, medical center, and enrollment status. Cases sustained incident hip fractures occurring 1997-2006. PPI use, identified from electronic pharmacy dispensing records 1991-2006, was measured in 4 ways: 1) ever vs. never use; 2) adherence, measured by the medication possession ratio (MPR); 3) duration, the total days of use prior to index date; and 4) recency, the time in days between last use and the index date. Duration and recency of use were each categorized by tertiles (most recent/longest duration, intermediate recency/duration, least recent/shortest duration vs. no use). Omeprazole and pantoprazole were analyzed separately using conditional logistic regression. In all analyses, non-users were the referent group. All models were adjusted for comorbidity using the Charlson Index. Overall, 896 (13.2%) of the cases and 713 (10.5%) of the controls used omeprazole prior to index date (matched odds ratio (OR) 1.13; 95% Confidence Interval (CI) 1.01-1.27). Greatest adherence (MPR $> 80\%$) (OR 1.33; CI 1.09-1.62), longest duration of use (OR 1.23; CI 1.02-1.48), and most recent use (OR 1.22; CI 1.02-1.47) were all associated with hip fracture. For pantoprazole, 694 (10.2%) of the cases and 576 (8.5%) of the controls had used the medication (OR 1.10; CI 0.97-1.24). Longest duration (OR 1.25; CI 1.02-1.53) and most recent use (OR 1.38; CI 1.12-1.71) were associated with hip fracture. Our study suggests that PPI use and hip fractures are associated, with risk increasing with longer duration and more recent use.

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SURGICAL OUTCOMES IN TOTAL HIP AND KNEE REPLACEMENT PATIENTS BY DIABETES STATUS AND GLYCEMIC CONTROL, 2001-2009. *A L Adams, E W Paxton, J Q Wang, E S Johnson, E A Bayliss, A Ferrara, C Nakasato, S A Bini, R S Namba (Kaiser Permanente Southern California, Pasadena, CA 91101)

Poor glycemic control in patients with diabetes may be associated with adverse surgical outcomes. To study the association of diabetes status and pre-surgical glycemic control with revision and deep infection, we conducted a two parallel retrospective cohort studies in 5 regions of a large integrated health care organization. Eligible subjects, identified from the Kaiser joint replacement registry, had a first primary total hip (THA) or total knee arthroplasty (TKA) surgery during 2001-2009. Data on demographics, diabetes status, pre-surgical hemoglobin A1c levels, comorbid conditions came from electronic medical records. Subjects were classified as: without diabetes, diabetes and A1c < 7% (good A1c), diabetes and A1c ≥ 7% (poor A1c). Outcomes, within 1-year post-surgery, were revision surgery and deep infection. For all analyses, those without diabetes were the referent group. All models were adjusted for age, sex, body mass index, and Charlson index score. Of 23,416 THA subjects, 350 (1.5%) had revision surgery and 110 (0.5%) had deep infection. Of 40,577 TKA subjects, 465 (1.2%) had revision surgery and 288 (0.7%) had deep infection. We did not observe an association between poor A1c and risk of revision [Odds Ratio (OR) 1.46, 95% Confidence Interval (CI) 0.86-2.49] or risk of deep infection (OR 1.36, CI 0.57-3.26). No association between poor A1c and risk of revision (OR 1.02, CI 0.68-1.54) or deep infection (OR 0.55, CI 0.29-1.06) was observed. Within our population of patients selected for elective THA/TKA, we found no significant increased risk of revision or deep infection in patients with diabetes based on pre-surgical A1c levels.

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PEER PASSENGERS: HOW DO THEY INCREASE TEEN DRIVER CRASH RISK? *A E Curry, J Mirman, M Kallan, D R Durbin (Children's Hospital of Philadelphia, Philadelphia, PA 19104)

Although peer passengers are known to increase teens' crash risk, little is known about the specific pathways by which they do so. To gain insight into hypothesized pathways for male and female teen drivers, we analyzed a nationally-representative sample of 677 16-18 year old drivers (weighted n = 277,484) in serious crashes from the National Motor Vehicle Crash Causation Survey (2005-07). Via on-scene crash investigation, researchers determined whether a critical driver error was the primary reason for the event preceding the crash and documented the presence of driver-related pre-crash factors. We compared teens who crashed with peer passengers (i.e. all passengers were 14-20 years old) to teens driving alone. Similar proportions of teens with passengers and those driving alone made a critical driver error (75.0% vs. 72.1%). However, among teens who made an error, those with passengers were nearly twice as likely to have made an internal or external distraction error (risk ratio (RR) = 1.9, 95% confidence interval (CI): 1.2, 3.2). Compared to male solo drivers, males with passengers were more likely to have acted aggressively (RR = 2.4 [1.3, 4.3]), made an illegal maneuver (RR = 5.9 [1.8, 19.1]), and been distracted by an external factor (e.g. looking at traffic) (RR = 1.7, [1.2, 2.5]). Compared to female solo drivers, females with passengers were more likely to have engaged in an interior non-driving activity (e.g. adjusting radio) (RR = 3.9 [1.4, 11.1]). Results support peer passenger restrictions for teen drivers and interventions to reduce distractions. Gender-specific pathways by which passengers increase crash risk may exist, and prevention programs should consider this when developing strategies to manage the influence of peer passengers on teen drivers.

811-S

SIGNAL DETECTION OF ADVERSE MEDICAL DEVICE MALFUNCTIONS AND SAFETY EVENTS IN THE FDA MAUDE DATABASE, 2000-2008 *D Olaleye (Center for Clinical Epidemiology and Biostatistics, Philadelphia, PA 19104)

This study was designed to investigate whether medical device reports and narratives could be used to generate hypotheses and assess rate of reported device malfunctions and clinical adverse events (injury/death) associated with exposure to coronary and drug-eluting stents (DES) with the product codes: FAD, FGE, MAF, MIH, MQR, NIM, NIO, NIP, NIQ, and NJE. We analyzed reports of adverse medical device (AMD) reports collected in the FDA-MAUDE database from 2001 to 2008 (N = 28738). We employed a text mining (TM) algorithm to analyze case narratives in order to detect the sequence of events that may predict timely recognition of unanticipated safety problems following exposure to stents. To minimize the effect of confounding by device indication, a logistic regression-propensity score model was used to obtain estimated probability of occurrence of a DES agent, relative to the reference NIM stent code, based on a vector of cluster factor values obtained from the TM model. The predicted exposure probabilities were incorporated into a logit model used to estimate the relative reporting ratios for death and injury versus malfunction event. TM analysis of the case narratives revealed ten clusters, with clusters 2 and 10 profiles showing higher proportion of adverse device reports for DES compared to coronary stents. Logistic model results showed about twenty-two fold and eight-fold increase in the odds of death/injury event for NIQ stents when adjusted by the propensity scores for the exposure variable. For ADE signal detection, we recommend using a hybrid analytic model that combined structured with unstructured data to better characterize different types of device safety issues that may increase the patient's risk of experiencing unexpected adverse device event.

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THE ASSOCIATION BETWEEN PREVIOUS TRAUMATIC INJURY AND HOMICIDE. *R Griffin, G G Davis, E B Levitan, P A MacLennan, D T Redden, G McGwin, Jr. (University of Alabama, Birmingham, AL 35294)

Background: Having a previous traumatic injury (PTI) is a strong risk factor for traumatic injury is. Research suggests that the rate of PTI is higher among urban populations and individuals injured intentionally; however, research is limited on whether PTI is associated with subsequent death from traumatic injury (particularly intentional injury). To date, the only study examining the relationship between PTI and homicide reported strong associations, but included both homicide victims and offenders as cases. Methods: This case-control study included all homicides (i.e., cases) and non-homicide deaths (i.e., controls) examined by a trained pathologist at the Jefferson County Coroner's Office from 2006-2008. A control was matched to each homicide case by age, race, sex, year of death, and county of residence. Cases and controls were linked to inpatient admissions to a large trauma center to determine occurrence of at least one PTI between 1996 (the first year of admission data) and the date of death. Conditional logistic regression estimated odds ratios (ORs) and associated 95% confidence intervals (95% CIs) for the association between homicide and any PTI, with a subanalysis of intentional PTI. Results: PTI rates were 9.9% among cases and 3.7% among controls. Homicide risk was increased two-fold for any PTI (OR 2.20, 95% CI 1.04-4.65) and a nearly three-fold for intentional PTI (OR 2.80, 95% CI 1.01-7.77). Conclusions: These results suggest an association between homicide and PTI. The current study is limited by inclusion of admissions from one trauma center. Trauma centers may be an efficacious setting for secondary prevention efforts of homicide through violence prevention programs.

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EFFECTIVENESS OF BREED-SPECIFIC LEGISLATION IN DECREASING THE PREVALENCE OF DOG-BITE INJURIES IN PEOPLE IN THE CANADIAN PROVINCE OF MANITOBA. *M Raghavan, C Burchill, D Chateau, P Martens (University of Manitoba, Winnipeg, MB R3E3P5, Canada)

Three jurisdictions in Manitoba (MB), Canada, introduced breed specific legislation (BSL) by banning pit bull type dogs: City of Winnipeg (in 1990), rural municipality of Macdonald (1992), city of Thompson (1994). To study the effectiveness of BSL, we compared temporal differences in prevalence (PR) of hospitalized dog-bite injuries within and across MB jurisdictions with and without BSL. Since being bitten by a dog is cause for seeking rabies post-exposure prophylaxis (PEP), trends in PEP were also studied. Data sources used were: *Hospital Separation Abstracts*; physician billing claims in *Medical Services and Manitoba Immunization Monitoring System*; population database. Period-specific PR was calculated as the number of hospitalized cases of dog-bite injuries (ICD-9-CME-code of E906.0 and ICD10CA code of W54) or PEP in a given time period divided by the total population in that period, and expressed as the number per 10,000 population. In years 1984 to 2006, 838 unique dog-bite injuries required hospitalizations; 1,903 PEP series were begun. There were 453 hospitalizations in no-BSL jurisdictions or in pre-implementation period in BSL jurisdictions (PR (95% confidence interval (CI)) = 0.345 (0.313, 0.377)); 385 hospitalizations occurred post-implementation in BSL jurisdictions (PR (CI) = 0.292 (0.264, 0.322)). There were 1,279 PEP in no-BSL jurisdictions or during pre-implementation in BSL jurisdictions (PR (CI) = 0.975 (0.921, 1.028)); 624 PEP were in post-implementation years in BSL jurisdictions (PR (CI) = 0.475 (0.437, 0.512)). Findings suggest a lowered prevalence of dog-bite injury hospitalizations (-15% change in PR) and PEP (-51% change) post-BSL implementation.

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ECOLOGICAL ASSOCIATIONS BETWEEN ALCOHOL OUTLET DENSITY AND HOSPITALIZATIONS FOR VIOLENT ASSAULT INJURIES. *C Mair, P Gruenewald (University of California-Berkeley, Berkeley, CA 94704)

A greater density of alcohol outlets, especially bars, can lead to the formation of core groups of problem drinkers. A social ecological perspective on drinking and violent behavior predicts core groups form in areas with excessive alcohol outlet density, economic competition, and a high prevalence of problem drinking. We analyzed associations between alcohol outlet density and assault-related hospitalizations in California between 1995 and 2008. Assaults were measured by yearly zip code counts of resident hospital discharges due to total assault injuries (E-codes 960-969) for each of the 23,213 space-time units. Alcohol outlet density (outlets per roadway mile) was calculated separately for bars, off-premise outlets and restaurants. Census-based neighborhood demographic characteristics included % Black, % Hispanic, % white, median income and unemployment. Quintiles of population density were used to define zip codes as rural, exurban, suburban and urban core. Recently-developed Bayesian space-time models were used to account for spatial misalignment. These models control for spatial variation in geographic unit definitions over time and account for spatial autocorrelation using conditional autoregressive priors. Models included neighborhood demographics, alcohol outlet densities, population density quintiles and bar density interactions. A greater density of bars was associated with an increase in assault injuries. Bar densities interacted with measures of at-risk populations to account for greater proportions of assaults across zip codes, accelerating risks in these areas. Geographic assessments of the impacts of alcohol markets on violent assaults are essential to the identification of their full public health impact.

815-S

EFFECT OF DRUG TESTING PROGRAMS ON INJURY RATE AND SEVERITY IN SMALL AND MEDIUM SIZED CONSTRUCTION COMPANIES. *K Schofield, B H Alexander, S G Gerberich, A D Ryan (University of Minnesota, Minneapolis, MN 55455)

Construction work is hazardous and construction workers consistently rank in the top of all occupations and industries for illicit drug use and heavy alcohol use. We evaluated workers' compensation claims data covering (1,360) construction companies from 2004-2009 to determine association between active company drug testing programs, injury rate, and severity. Presence of a testing program was obtained from the compensation carrier. Four types of drug testing were done by companies: pre-employment; post-accident; random; and reasonable suspicion. Hours at-risk, estimated from payroll and injury claims, were used to determine injury rates. Rate ratios (RR) and 95% confidence intervals (CI) were estimated as a function of injury rate using a Poisson regression model and accounting for time dependent factors. Generalized estimating equations are used to account for correlated observations within companies over time. Models include confounding covariates of company size, union status, and industry code. We observed modestly lower injury rates in companies with any drug testing; all claims: RR = 0.93 (CI = 0.84-1.04) and lost time claims: RR = 0.94 (CI = 0.81-1.09). The second model divided drug testing into two groups; pre-employment/post-accident only and all four testing types combined, respectively, compared to no testing; all claims RR = 0.85 (CI = 0.72-1.0) and RR = 0.97 (CI = 0.86-1.10), and lost time claims RR = 0.78 (CI = 0.60-1.03) and RR = 1.01 (CI = 0.86-1.19). From results, drug testing programs do not appear to reduce injury rates in this population; however, limitations may include testing programs had inadequate access to targeted employees or inadequate time to have an effect.

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PATTERNS AND TRENDS IN INJURY MORTALITY IN NATIVE AMERICAN CHILDREN AND ADOLESCENTS UNDER AGE 20, 1999 – 2007. *C Liu, G Li (Columbia University, New York, NY)

Background: Injuries, from both unintentional and intentional causes, represented a serious public health problem, and the leading cause of death in Native American Children. However, there is a scarcity of information on the recent status and time trends. Objectives: The purpose of this study was to examine the epidemiologic patterns and time trends in injury mortality in Native Americans aged 0 to 19 years. Methods: We used injury mortality data in the WISQARS database for 1999-2007. We estimated rates of overall injury mortality and cause-specific mortality from the eight leading injury mechanisms (motor vehicle crashes, pedestrian injury, firearm-related injury, suicide, homicide, drowning, fire/burns and suffocation). Mortality rates for Natives were compared with the US national rates. Results: For male Native American children and adolescents, the overall injury mortality rate decreased from 42.3 per 100,000 in 1999-2000 to 40.1 in 2006-2007, while the national rate declined from 29.6 to 27.3 during the same time period. For females the rates remained unchanged at 19.7 between 1999-2000 and 2006-2007 for Natives, but decreased significantly from 13.2 in 1999-2000 to 11.7 in 2006-2007 for all Americans. Mortality rates from motor vehicle crashes, pedestrian injury, suicide and suffocation for Natives were 1.2 to 3.3 times the national rates. During the study period, death rates for Natives declined slightly from motor vehicle crashes and pedestrian injury, and increased from suicide and suffocation. Conclusions: Overall injury mortality in Native children and adolescents declined slightly from 1999 to 2007, due mainly to the reduction in traffic injury fatalities, but remains substantially higher than the US national rates.

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ARE MALES REALLY AT GREATER RISK FOR DOG BITES THAN FEMALES? *L L McV. Messam, H Y Weng (University of California-Davis, Davis, CA 95616)

It is received wisdom that males are more likely to be bitten by a dog than females. While this is consistent with a greater perceived tendency towards risk-taking behavior in males, previous studies investigating the gender-dog bite relationship have been limited either by an improperly chosen comparison group or a lack of a comparison group. To test the hypothesis that males are at higher risk for dog bites than females, we conducted a hospital-based case-control study in Kingston, Jamaica. Cases were all (120) dog bite victims (56 males, 64 females) seen in the outpatient department of St. Andrews Memorial Hospital in Kingston, from Jan. 1, 2002 to June 30, 2003. Three control groups were selected from among outpatients seen during the same time period: (a) 180 persons presenting for reasons other than dog bites (b) 121 persons presenting with non-dog bite injuries and (c) 126 persons presenting with non-injury conditions. Persons with conditions having known associations with gender were excluded from each control series. In comparing males to females, none of our estimates ((a) Odds Ratio (OR) = 0.8, 95% Confidence Interval (CI): 0.5 to 1.3, (b) OR = 0.6, 95% CI: 0.4 to 1.0 and (c) OR = 1.2, 95% CI: 0.7 to 1.9) support a hypothesis of a higher dog bite risk for males. We discuss these results in the context of the type of injury under consideration, the different research questions implicit in each choice of control group and potential bias, in particular as it relates to problems inherent in hospital based case-control studies. Finally we entreat investigators to re-evaluate the prevailing consensus on the gender-dog bite relationship using appropriate epidemiologic study designs.

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COMPARING TWO MULTIVARIATE MODEL FOR ADJUSTING IN-HOSPITAL MORTALITY FROM CORONARY ARTERY BYPASS. JUAN GOICOECHEA. *A Nieto, J Hierro, V Cantó (School of Medicine, University of Seville and Andalusian Health Service, Ministry of Health, Seville, Spain)

In-hospital mortality from coronary artery bypass may be used as an indicator of quality of care, but in order to suitably compare mortality figures between health centres or geographical areas we need to take into account and adjust by some characteristics of patients. After analysing discharge reports of 4,989 patients of coronary bypass who underwent surgery during five years (2002-06) we compared two adjusting mortality risk models using logistic regression techniques. Both models included age, sex, year of intervention, type of admission to the hospital, clinical group and risk level. One of the models included Charlsson index (ChI) while the other used the mortality risk (MR) categories of DRG classification. Cox Snell and Nagelkerke R² values were 0.19 and 0.40 in MR model and 0.06 and 0.13 in ChI model. Chi squared of Homer Lemeshow values were not statistically significant ($p = 0.6$ in MR model and 0.68 in ChI model). AROC values were 0.884 and 0.732 for MR and ChI respectively. RM model fitted better to the data than ChI model. Year of intervention, type of admission to hospital, and level of risk (MR or ChI) were the best predictors of mortality in both models.

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USE OF LOGISTIC REGRESSION AND RECEIVER OPERATING CHARACTERISTIC CURVES TO DISCRIMINATE BETWEEN BLOOD DONORS AND NON-DONORS AMONG NORTH AMERICAN MEDICAL STUDENTS IN GRENADA, WEST INDIES. *L L McV. Messam, A Gomez, L E Toner (St. Georges University, Grenada, West Indies)

The World Health Organization estimates that 50 units of blood per 1,000 inhabitants per year is necessary to meet the transfusion needs of a country. In Grenada 8.7 units are donated per 1,000 inhabitants yearly without any blood drive promotion. As part of efforts to increase blood donation, a cohort of 452 St. George's University second year medical school students (> 95% North American) were surveyed regarding their blood donation attitudes and experiences before and after arrival in Grenada. This analysis of the 363 responses, determined if age, gender, knowledge of blood group, time since first arrival in Grenada and donating blood in the year preceding arrival would predict who donated (14%) since arrival. In SPSS, we first used logistic regression to estimate probabilities of donating blood since arrival as a function of each covariate. From these probabilities we generated Receiver Operating Characteristic curves with the area under each curve estimating the covariate's ability to predict blood donation after arrival in Grenada. Sixty-eight percent of the time [95% Confidence Interval (95% CI): 60 to 76%] students who had donated blood the year before arrival were more likely to be donors after arrival than those who had not. This percentage was slightly higher (72%, 95% CI: 63 to 80%) if, compared to the same group, these students were also in Grenada for a longer time and knew their blood group. Neither gender nor age showed any predictive ability. Blood drive promotion should first target students who were not donors the year before arriving in Grenada as they are less likely to donate, without prompting, upon arrival.

821-S

ASSESSMENT OF THE QUALITY AND VARIABILITY OF HEALTH INFORMATION ON CHRONIC PAIN WEBSITES USING THE DISCERN INSTRUMENT. *J Kaicker, V Borg Debono, W Dang, N Buckley, L Thabane (Department of Anesthesia, McMaster University, Hamilton, ON L8N 3Z5, Canada)

The Internet is used increasingly by providers as a tool for disseminating pain-related health information and by patients as a resource about health conditions but remains unregulated, with information varying in quality, accuracy and readability. Five key terms (pain, chronic pain, back pain, arthritis, and fibromyalgia) were entered into the Google, Yahoo and MSN search engines. Websites were assessed using the DISCERN instrument as a quality index and Flesch-Kincaid Readability Algorithm. Univariate (using $\alpha = 0.20$) and multivariate regression (using $\alpha = 0.05$) analyses were used to explain the variability in DISCERN scores and grade level readability using potential for commercial gain, health related seals of approval, language(s) and multimedia features as independent variables. From the 161 unique websites assessed, 6.8% (11/161 websites) offered patients' commercial products for their pain condition, 36.0% (58/161 websites) had a health related seal of approval, 75.8% (122/161 websites) presented information in English only and 40.4% (65/161 websites) offered an interactive multimedia experience. The overall average DISCERN Score was moderate at 55.9 (13.6), with a readability (grade level) score of 10.9 (3.9). The multivariable regressions demonstrated that website seals of approval ($P = 0.015$) and potential for commercial gain ($P = 0.189$) were contributing factors to higher DISCERN scores, while seals of approval ($P = 0.168$) and interactive multimedia ($P = 0.244$) contributed to lower grade level readability, as indicated by estimates of the beta coefficients, using 95% Confidence Intervals (CI)

822-S

VARIATION BETWEEN HOSPITALS IN THE PROPORTION OF COLORECTAL CANCER PATIENTS WHO SEE AN ONCOLOGIST AFTER SURGERY. *E Kreiter, Y Yasui, C de Gara, J White, M Winget (University of Alberta, Edmonton, AB T6G 2T4, Canada)

We recently found that 50% of patients with stage III colon (C3) or stages II or III rectal (R2 and R3) cancer do not receive standard treatment (chemotherapy) after surgery; receipt of chemotherapy requires a consult with an oncologist. To better understand barriers to providing guideline treatment and improve care for cancer patients, we assessed the relationship between the hospital where the surgery was performed and the probability of having an oncologist-consult. All patients diagnosed with C3, R2 or R3 cancer between 2002 and 2005 in Alberta and who had surgery were identified from the Alberta Cancer Registry and included in the study. Demographic, clinical characteristics and treatment data were also obtained from the Alberta Cancer Registry. These data were linked to physician billing data, hospital discharge summaries and electronic cancer medical records. Multivariable logistic modelling with hospitals as random effects was used to estimate cancer-type-specific odds ratios (OR) of not having an oncologist-consult for each hospital, adjusted for age, sex, and co-morbidities, relative to the overall non-consult rate. 21% of C3, 25% of R2 and 13% of R3 patients did not have an oncologist-consult. Consult rates varied across hospitals where the surgeries were performed and between cancer types within hospitals, even after case-mix adjustment (adjusted ORs of non-consult ranged from 0.4-8.1). Hospitals that performed less than 15 surgeries had nearly 0% non-consult rates. The variation in non-consult rates, particularly the low consults of R2 patients with an oncologist, is alarming. Communication of these findings to surgeons and hospitals is needed to address the disparities found.

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PERSONAL HEALTH RECORDS AND HYPERTENSION CONTROL: NOT READY FOR PRIME TIME. *P J Wagner, S Howard, J Dias, P Sodomka (Georgia Health Sciences University and University of South Carolina, Institute for the Advancement of Health Care, Greenville, SC)

Personal health records (PHR) have been proposed as a strategy to increase patient-centered care and patient empowerment. To investigate the impact of a PHR on hypertension control, we conducted a prospective two-group cluster-randomized controlled trial with repeated measures at 4 time points. Physicians were treated as "clusters" with their patients "nested" within their practice. Over the course of one year, 445 patients with hypertension were either provided with an electronic PHR that was tethered to their medical record (intervention group) or participated in a control group receiving care as usual. Half of participants in each condition received an automated blood pressure cuff, which patients in the intervention group could use to download blood pressure information directly to their PHR. Measurements included biological outcomes of blood pressure, BMI, waist circumference, cholesterol levels; patient-centered outcomes of patient activation, patient empowerment, patient assessment of chronic care, and the Consumer Assessment of Provider Health Satisfaction (CAHPS) scores; and medical utilization outcomes. We used analysis-of-covariance methods under the framework of generalized linear mixed models to model these repeated-measures data and test hypotheses. No significant group differences were found. Controlling for initial patient activation levels also showed no impact. Limited uptake and perceived utility of the PHR by the intervention subjects may explain the limited impact of the PHR. Simple provision of PHRs, even with support, is not sufficient to improve hypertension control.

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A PUBLIC HEALTH INTERVENTION PROGRAM TO IMPROVE THE INITIAL MANAGEMENT OF SOFT TISSUE SARCOMAS. *C Bellera, B Bui, C Chevreau, E Bauvin, P Grosclaude, M Saves, E Bompas, S Mathoulin-Pélessier (Institut Bergonié, Regional Comprehensive Cancer Center, Bordeaux, France)

CONTEXT: Soft tissue sarcomas (STS) are rare tumours. STS is estimated to represent 1% of all cancers although the true incidence is unknown. STS management is difficult due to the complex diagnosis. OBJECTIVES: A quasi-experimental before/after study (with control region) was implemented to set up and evaluate a public health intervention aimed at improving the quality of initial management of STS, in collaboration with the French Sarcoma Group, cancer registries and cancer regional networks, involving 5 regions (20% French population) and 3 steps. 2006-7: data collection for cases diagnosed. 2008: program implementation (except for control region) with 2 actions: written information campaign directed towards all relevant practitioners and oral communications in dedicated meetings by opinion leaders. Information on STS cases diagnosed after the action period was collected. We anticipated recruiting 300 cases / year. A preliminary step involved validating quality indicators (QIs) for STS care through a Delphi consensus method. We measured the main impact of the program using a composite criterion for 3 steps of initial management (imaging diagnosis, surgery, multidisciplinary meeting) suspected to be associated with survival. RESULTS: 893 cases included. Data suggest 10% absolute (50% relative) increase in the quality of the initial management of STS and standardized incidence rate of 4.14/100,000. DISCUSSION: Complementary analyses are carried out and will be presented to picture current practices in STS management and assess if simple actions can improve practices. Findings suggest underestimation of STS incidence.

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RISK CALCULATORS FOR FAILURE OF KNEE AND HIP REPLACEMENT IN A LARGE HEALTH MAINTENANCE ORGANIZATION. *C Ake, E Paxton, M Inacio, M Khatod, E Yue, R Namba, T Funahashi (Kaiser Permanente, San Diego, CA 92109)

Using registry data from a large HMO we developed revision total knee (TKA) and hip arthroplasty (THA) risk calculators for clinical decision making at the point of care. Study data included 26834 TKAs and 20897 THAs performed from 2001 thru 2009. Of these 436 TKA (1.6%) and 361 THA (1.7%) primaries were revised, defined as replacement of at least one implanted device. Missing BMI values were imputed, but cases with other missing data were excluded. Risk of THA and TKA revision were modeled separately by logistic regression (LR). Each model used a 100% data sample, with cross-validation for model-checking using 90-95% random sub-samples. Candidate predictors were limited to patient demographics, co-morbidities, and pre-operative diagnoses available at physician consult. Final models were selected via the Hosmer-Lemeshow goodness-of-fit test. To address length of observation, we compared LR models to corresponding Poisson regression models with time offset and Cox regression models with the same covariates. Parameter estimates were highly congruent across such models. Predictors selected for the knee risk calculator were age, gender, BMI, diabetes(Y/N), osteoarthritis, inflammatory arthritis, post-traumatic arthritis, rheumatoid arthritis, and osteonecrosis. Predictors for the hip risk calculator were gender, BMI, diabetes, and inflammatory arthritis. Surgeon feedback for second-generation versions includes suggested additional predictors such as prior knee surgery, steroid use, and Hemoglobin A1c levels. These calculators are the first we know of for TKA and THA revision. Now operational on limited use websites, they exemplify the value of registries in generating clinical decision-making tools.

826-S

PROCESS OF CARE FAILURES IN WOMEN WITH CERVICAL CANCER. *A Spence, P Goggin, P Drouin, A Ferenczy, M Dawes, D Provencher, A Alobaid, L Gilbert, F Da Silva, E Franco (Division of Cancer Epidemiology, Montreal, QC H2W 1S6, Canada)

Cervical cancer is the 3rd most common cancer among Canadian women between ages 20-49 years. There are reliable screening tools, diagnostic tests and effective treatments for pre-invasive lesions. Thus, theoretically, invasive cervical cancer is preventable. The objective was to assess the quality of health care that women with cervical cancer received 5 years before diagnosis. Subjects were Montreal residents diagnosed with invasive cervical cancer between 1998 and 2004. Cervical Papanicolaou (Pap) screening, diagnostic tests, and pre-invasive lesion treatment histories were obtained from hospital medical charts and labs, subject interviews, and physician questionnaires. Processes of care were assessed as per explicit medical review criteria. The respondents of the Canadian Community Health Survey were used as a comparison group. Descriptive statistics, logistic regression and survival analysis were performed. A total of 568 subjects were diagnosed with cervical cancer. The majority (90.4%) of cases were screened at least once during their lifetime. The risk of cervical cancer increased along with the length of time since the last pap. The majority of instances of follow-up processes of care for abnormal Paps (88.5%) and follow-up of pre-invasive lesions (83.8%) were found to be acceptable. Timing of these processes was less likely to be acceptable. In conclusion, women were not being screened on a regular basis. If an abnormal Pap or pre-invasive lesion was found, the processes of care were found to be acceptable in most instances; however, delays in the implementation of these processes were common.

828

ASSESSING DISEASE PREVALENCE THROUGH A COMMUNITY-WIDE ASSESSMENT. *K Lewis (James Madison University, Harrisonburg, Virginia 22807)

The Healthy Community Council (HCC) is a community organization with the mission "to enhance the quality of life for the community through collaborative efforts of individuals, agencies, and institutions." One objective of the HCC has been to conduct a community-wide assessment. Assessments have been conducted every five years since 1996. A cross-sectional study was conducted to assess quality of life (QOL) based on a list of community-specific indicators. One area of emphasis in assessing QOL was overall health and well-being. Of the 830 individuals (response rate = 42% with 3% sampling error) who completed the assessment survey, 12% self-reported that their overall health was fair or poor. Disease prevalence was assessed by asking assessment participants to indicate if they had been told by a health care provider that they had the following health issues. Of the health conditions reported, arthritis (39%), high blood pressure (42%), high cholesterol (41%), and weight problems (26%) were the highest in the community. High blood pressure and high cholesterol are the Healthy People 2010 goals. Based on the recent assessment, there is a clear need to set health goals around cardiovascular health. Initiatives around cardiovascular health may be important in reducing the risk of increased morbidity and mortality due to cardiovascular disease in the community.

827-S

VALIDATION OF CHEMOTHERAPY DRUGS AND COMBINATIONS IN MEDICARE DATA. *J Lund, T Stürmer, R Sandler, L Harlan, J Warren (University of North Carolina, Chapel Hill, NC 27516)

Large healthcare databases are increasingly used for comparative effectiveness research (CER). Yet the ability to correctly identify new cancer treatments using claims data is largely unknown. We assessed the validity of Medicare claims to identify the receipt of any chemotherapy and specific drugs and combinations delivered to patients diagnosed with stage II or III colorectal cancer (CRC) at age ≥ 65 years in 2000 ($n = 187$) and 2005 ($n = 360$). Data on chemotherapy administration and specific drugs were collected by the National Cancer Institute's Patterns of Care studies (POC), which verify treatment through physician contact and inpatient and outpatient medical record abstraction. CRC patients' POC data were linked to their Medicare claims for the year following diagnosis. Chemotherapy reported by Medicare claims was compared with POC data. Kappa, sensitivity (se), specificity (sp), positive predictive value, negative predictive value and 95% confidence intervals were calculated for the receipt of any chemotherapy, specific drugs, and combinations using POC as a gold standard. Kappa, se, and sp for any chemotherapy and all infusion-based drugs and combinations using claims up to 6+ months post-diagnosis were high: $> 73\%$, $> 72\%$, and $> 91\%$, respectively. However, Medicare claims poorly identified capecitabine, an oral equivalent to 5-fluorouracil, ($\text{kappa} < 54\%$, $\text{se} < 47\%$, $\text{sp} < 98\%$). Measures of validity did not vary by age (< 74 vs. ≥ 75 years). Overall, receipt of chemotherapy and specific drugs and combinations administered via infusion can be accurately identified using Medicare claims. These data may be a valuable resource for cancer-related CER; however, their ability to capture oral chemotherapies requires further evaluation.

829-S

ASCERTAINING A RELIABLE THRESHOLD FOR IDENTIFYING LEG LENGTH DISCREPANCIES VIA CHIROPRACTIC EXAM. *R H Olaisen, B B Gerstman, D Johnson, C Woodfield (San Jose State University, San Jose, CA 95192)

Complimentary alternative medical providers, including chiropractors and osteopaths, often rely upon leg length testing as a screening tool to identify vertebral, pelvis and other skeletal joint immobilities. We investigated the inter-examiner reliability of a particular method of leg length examination used by specialty certified chiropractors. Fifty ambulatory volunteers were visually and tactilely examined by two certified examiners to blindly rate: 1) presence of a leg length inequality, 2) side of the shorter leg, and 3) degree of leg length discrepancy. The subjects ambulated and were repositioned between examinations to simulate clinical conditions. Inter-examiner agreement was assessed with a Bland-Altman plot, a quadratic weighted kappa statistic that accounted for seven ordinal ratings, and dichotomous kappa and AC1 statistics at various leg-length inequality thresholds. Overall, the quadratic weighted kappa statistic was 0.44 (95% CI: 0.21 to 0.67), indicating moderate agreement. However, inspection of the Bland-Altman plot suggested that inter-rater agreement varied in relation to the magnitude of the mean leg length discrepancy rating, with poor inter-rater agreement in subjects where the mean difference in ratings was modest, and excellent agreement in subjects where the mean leg length inequality was $\frac{1}{4}$ -inch or more. This finding suggests the possible existence of two populations: one of which has relatively stable leg length asymmetry and at least a $\frac{1}{4}$ -inch discrepancy, and another in which the absence of neuromusculoskeletal fixations result in unstable leg length discrepancy measurements which are generally less than $\frac{1}{4}$ -inch in magnitude.

VALIDITY OF ADMINISTRATIVE DATA FOR IDENTIFYING EPILEPSY – A SYSTEMATIC REVIEW. *C St. Germaine-Smith, A Metcalfe, H Quan, B Hemmelgarn, T Pringsheim, C Beck, N Jette (University of Calgary, Calgary, AB T2N 2T9, Canada)

The quality of administrative data research depends on the validity of case definitions used to identify eligible patients. We conducted a systematic review of published studies that have assessed the validity of epilepsy coding in administrative databases. We searched MEDLINE (1950-Dec 2010) and EMBASE (1980-Dec 2010) databases. Our search strategy consisted of the following terms: administrative data, hospital discharge data, ICD-9, ICD-10, medical record, health information, surveillance, physician claims, claims, hospital discharge, coding, codes, validity, validation, case definition, algorithm, agreement, accuracy, sensitivity, specificity, positive predictive value, negative predictive value combined with the MESH term and keyword for epilepsy. Studies validating epilepsy ICD coding were included. 2 reviewers independently assessed all abstracts for fulfillment of inclusion criteria, and extracted data. 285 abstracts were retrieved from the combined searches for review. 13 abstracts were selected for full text review, with 3 articles meeting all eligibility criteria. The sensitivity (Sn) and specificity (Sp) of an epilepsy case definition was only reported by one study assessing the ICD-10 epilepsy codes G40 and G41 with a Sn of 98.8 (93.3-99.8) and a Sp of 69.6 (55.2-80). For ICD-9 case definitions, positive predictive values (PPV) ranged from 62-98.9 and negative predictive values (NPV) from 97.0-99.1. For ICD-10 case definitions, PPVs ranged from 71.6-100 and NPVs from 89.5-98.5. The validity of administrative data for identifying epilepsy is very good. Appropriate case definitions should be validated in administrative databases prior to their use in health research.

SCREENING COLONOSCOPY ALGORITHMS NOT ACCURATE ENOUGH FOR USE IN RESEARCH. *M J Sewitch, L Joseph, R J Hilsden, A Bitton (McGill University, Montreal, QC H3A 1A1, Canada)

Background: Epidemiologic studies of colonoscopic colorectal cancer (CRC) screening are hampered by difficulties in identifying the colonoscopy indication (screening vs. non-screening). Objectives: To investigate several algorithms that might identify screening colonoscopy using Canadian provincial administrative health data. Methods: An ambidirectional study was conducted of endoscopists and their patients undergoing colonoscopy in two Canadian provinces. Potential predictor variables were patient age and sex, large bowel symptom in the prior year, number of physician visits in the prior year, large bowel procedure in the prior five years, large bowel surgery in the prior five years and CRC risk factor in the prior five years. Predictive accuracy was estimated using logistic regression that presumed a gold standard for the screening outcome (the endoscopist report) and using Bayesian latent class modeling that assumed no gold standard. Results: 1230 endoscopist-patient dyads participated. Patients reported 685 (55.7%) screening and 545 (44.3%) non-screening colonoscopies; endoscopists classified 576 (46.8%) colonoscopies as screening and 654 (53.2%) as non-screening exams. Endoscopist-patient agreement was 74.6% and 88.1% for screening and non-screening exams, respectively. Considering the endoscopist colonoscopy indication as the gold standard, sensitivity for patient screening colonoscopy was 88.7% (95% Confidence Interval (CI) = 85.5%-91.2%) and specificity was 73.4% (69.8%-76.7%). Using latent class modeling that assumes no gold standard, the sensitivities for endoscopist and patient screening colonoscopy ranged from 94.0% (Credible Interval = 80.8%-99.8%) to 89.4% (86.5%-92.2), respectively; specificities were 99.0% (97.0% to 99.9%) and 77.5% (71.4%, 90.0%), respectively. Conclusion: None of the models we investigated was sufficiently accurate in predicting which colonoscopies were for screening to propose using administrative health databases for most research purposes that would require this information.

DEVELOPING AND USING EPISODES OF CARE FOR CHRONIC OBSTRUCTIVE PULMONARY DISEASE TO DESCRIBE HEALTH SERVICES USE ACROSS THE HEALTH CARE CONTINUUM. *J M Quail, L M Lix, G Teare (Saskatchewan Health Quality Council, Saskatoon, SK S7N 3R2, Canada)

Many measures of health care quality are based on discrete events such as hospital re-admissions or number of patients receiving a treatment. However, different health care services are rarely utilized independently of each other. They are typically accessed in a series of separate but related delivery encounters to treat a particular medical condition, termed an 'episode of care'. An episode of care is a clinically homogenous period of health care that provides a meaningful unit of analysis for measuring the cost and quantity of health care associated with a medical condition. Our objectives are to (a) construct an episode-based dataset for chronic obstructive pulmonary disease (COPD) by linking population-based administrative health databases that span acute, primary, emergency, and supportive care services, (b) define episodes of care for COPD, and (c) examine patient-level characteristics associated with variations in episode duration and intensity. We used administrative datasets from Saskatchewan, Canada to identify people with a diagnosis of COPD (ICD-9 codes 490, 491, 492, 496; ICD-10-CA codes J40-J44) in hospital and physician administrative databases from 2001 to 2009 (n = 117,847). We are currently constructing the episode-based dataset. Generalized linear models will be used to examine factors associated with duration and intensity of episodes of care for COPD, including age, sex, income quintile, and geographic residence (urban/rural) in order to identify important differences between groups. Episodes of care can be used to identify factors that influence health outcomes in COPD and have implications for improving the management of this condition.

QUALITATIVE STUDY OF PHYSICIAN PERSPECTIVES ON CLASSIFYING SCREENING AND NON-SCREENING COLONOSCOPY USING ADMINISTRATIVE HEALTH DATA: ADDING PRACTICE DOES NOT MAKE PERFECT. *M J Sewitch, R Hilsden, L Joseph, L Rabeneck, L Paszat, A Bitton, M A Cooper (McGill University, Montreal, QC, Canada)

Background: Previously developed screening colonoscopy algorithms were based on diagnostic and endoscopy variables and were not sufficiently accurate for use in epidemiologic and health services research. Objective: To increase our understanding of the administrative health database variables that could help to discern screening and non-screening colonoscopy. Methods: A qualitative study using physician focus groups was conducted in Montreal, Quebec, Calgary, Alberta and Toronto, Ontario. Specialty-specific focus group sessions were held among family physicians and gastroenterologists, the physicians responsible for referring patients to and performing screening colonoscopy. Interview guides were developed to better understand their clinical and billing practices. Discussions were audio-taped, transcribed verbatim and analyzed using the constant comparative approach. Results: Forty family physicians and 7 gastroenterologists participated in 5 focus group sessions. Patient variables included demographics (age) and medical history (colorectal cancer (CRC) risk factors/symptoms; medication for CRC risk factors/symptoms, gastrointestinal disorders, severe disease). Clinical practice variables included timing of the colonoscopy (evenings, weekends, holidays, during hospitalization; same day endoscopist consultation and colonoscopy), use of services (hospitalization; annual exam; transfer from other facility) and procedure use patterns (large bowel or other medical/surgical procedure prior and subsequent to colonoscopy). Physicians expressed wide variation in clinical and coding practices that will likely preclude the development of a reasonably accurate screening colonoscopy algorithm; they suggested adding a screening colonoscopy code to the administrative health data. Conclusions: Researchers and decision-makers should be aware of the limitations of the provincial administrative health databases to avoid incorrectly interpreting results that influence health policy.

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OPPORTUNITY ANALYSIS: DATA-DRIVEN METHOD TO ESTIMATE SAVINGS ASSOCIATED WITH MEETING TARGETED ACHIEVABLE PERFORMANCE LEVELS. *H Cao, A Harrier, A A Emeott, M Paustian (Blue Cross Blue Shield of Michigan (BCBSM), Department of Clinical Epidemiology and Biostatistics, Southfield, MI 48034)

To support decision-making for physician organizations (PO) participating in BCBSM's pay-for-performance initiatives in the Physician Group Incentive Program (PGIP), we developed a data-driven process of identifying benchmark POs and the estimated PO-specific savings opportunity if non-benchmark POs achieved benchmark performance. We used 2009 BCBSM claims data for 2,868,094 Michigan members, ages 0 to 64 years, assigned a primary care relationship with a provider in one of 37 participating POs. PO-specific risk-adjusted per member per month (PMPM) standard cost measures were calculated for each initiative using direct standardization to the total PGIP primary care attributed population. Parameters of the aggregated benchmark POs were then applied to each population of non-benchmark POs to estimate the PO-specific potential savings opportunity within each initiative. The PMPM savings opportunity in each initiative varied across non-benchmark POs: Radiology (\$0.19 to \$6.02), emergency department (adult \$0.13 to \$5.80, pediatric \$0.07 to \$5.04), generic drug use (adult \$0.11 to \$26.84, pediatric \$0.84 to \$10.32), and inpatient (adult \$0.03 to \$4.36). Estimated savings opportunities were shared with all POs. While initiative participation is voluntary within PGIP, we believe opportunity analysis provides useful information to prioritize areas of utilization with the greatest opportunities for performance improvement. While we limited our analyses to direct standardization, regression-based approaches would be equally viable for estimating savings opportunity associated with performance improvement.

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CANADIAN FORCES CANCER AND MORTALITY STUDY: INITIAL MORTALITY FINDINGS. *M Carew, L Van Til, C Dubiniecki, J Born (Department of National Defence, Ottawa, ON, Canada)

This report describes the rationale, design, methods and initial mortality findings of the Canadian Forces Cancer and Mortality Study which is a collaborative record-linkage project involving the Department of National Defence, Statistics Canada, and Veterans Affairs Canada. The study was undertaken to examine trends and risk factors for cancer and mortality to inform health promotion and force health protection policies and programs for serving personnel and services to care for veterans and their families. Using military administrative records, a cohort of approximately 300,000 persons who enrolled in the CF after 1 January 1972 was linked by Statistics Canada to the national mortality database (up until 31 December 2006). Initial mortality findings, will be presented using standardized mortality ratios for the relevant International Classification of Disease-10 Chapter headings (Infections, Neoplasms, Endocrine and Immune Disorders, Mental, Circulatory, Respiratory, Digestive, Injury and Poisoning - including Suicide). Standardized mortality ratios comparing the study cohort to the general Canadian population, will be calculated using Rothman and Greenland methodology. Age-sex and 5 year era standardized mortality ratios will be completed for chapters of interest. The results will inform the development of effective policies and programs for promoting, protecting, and caring for Canadian military personnel and Veterans.

835-S

HOW EFFECTIVE ARE COLORECTAL CANCER SCREENING PROGRAMS AT INCREASING THE RATE OF SCREENING IN ASYMPTOMATIC AVERAGE-RISK GROUPS IN CANADA? *T Charters, E Strumpf, M Sewitch (McGill University, Montreal, QC H3A 1A2, Canada)

Colorectal cancer has the third highest incidence of cancers in Canada. Although evidence indicates that biannual fecal occult blood tests can reduce colorectal cancer related mortality substantially, screening rates in Canada remain low. In order to increase screening rates, in 2008 the province of Ontario initiated an organized screening program, ColonCancerCheck, to provide screening tests to individuals with and without regular physicians. This project uses data from five cycles of the Canadian Community Health Survey to examine a wide range of demographic predictors of colorectal cancer screening in the average risk population, and uses a difference-in-differences design to evaluate the impact of ColonCancerCheck on screening rates in Ontario. This novel approach from the field of economics takes advantage of screening data before and after implementation of the program and the ability to contrast screening rates in Ontario to other provinces which serve as controls. Baseline results show that factors which influence screening rates, defined as fecal occult blood test within previous 2 years or colonoscopy or sigmoidoscopy within previous 5 years, include education, income, marital status, and healthy lifestyle behaviours. Using a bootstrap repeated replication technique to compute odds ratios (OR) with 95% confidence intervals, the most important univariate predictors of screening include regular access to a physician (OR 3.29 [2.97, 3.64]) and age ≥ 65 (OR 1.30 [1.24, 1.35]). The model indicates that the effect of ColonCancerCheck has been positive for screening with an effect measure of (OR 1.58 [1.40, 1.79]) controlled for all covariates including time trends.

837-S

INDICATOR VALIDITY, THE SUFFICIENT CAUSE MODEL, AND THE PROCESS-OUTCOME RELATIONSHIP FOR THREE TIME-RELATED PERFORMANCE INDICATORS: A SYSTEMATIC REVIEW. *U C Ogbu, O A Arah, G P Westert, K Stronks (Dept. of Public Health, Academic Medical Center, University of Amsterdam, Amsterdam, The Netherlands)

This systematic review was carried out to examine the existing evidence supporting the relationship between three time-dependent process measures, and mortality for myocardial infarction, hip fracture, and pneumonia. A literature search of PubMed, Embase, and the Cochrane review database was carried out. Empirical studies in the English language published since 1995 examining the direct relationship between time-to-reperfusion, time-to-first antibiotics, time-to-surgery, and mortality among myocardial infarction, hip fracture, and pneumonia patients respectively. More than 90% of the 12 studies observed an association between time to reperfusion and mortality among ST-elevated myocardial infarction patients. About half of the 28 studies observed an inverse association between time-to-surgery and mortality among hip fracture patients. One-third of the nine studies observed and association between time-to-first antibiotic dose and mortality among community acquired pneumonia patients. For myocardial infarction, the relationship between time to reperfusion and mortality appears to be well established, but the specific patient population it applies to is unclear. The relationship between time to surgery and mortality is mixed and questions remain as to which populations it applies. The time limits set for time-to-first antibiotic dose among pneumonia patients do not appear to produce a valid quality indicator. In these studies factors were identified that might be considered a component of a sufficient cause. However, the composition of a sufficient cause is not considered when findings are translated performance indicators to quality improvement programs such pay-for-performance. These factors should be considered in the formulation of policy platforms.

PROCESS TO PROCESS CORRELATION: INTERPRETIVE VALIDITY OF INDICATORS. *U C Ogbu, O A Arah, L Van Dijk, D H DeBakker, K Stronks, G P Westert (Dept. of Public Health, Academic Medical Center, University of Amsterdam, Amsterdam, The Netherlands)

Performance on a set of indicators is used to determine a general practitioners prescribing quality. Increasingly such performance information is being publicly reported, or linked to reimbursement. However, the validity of the presumed common link between these indicators has not been empirically demonstrated. Dissemination of invalid information will unfairly punish physicians and mislead the public. The objective of this analysis was to determine the empirical relationship between theoretically related process indicators of antibiotic prescribing guideline adherence among general practices. Data from one hundred and eighteen general practices participating in the Netherlands Information Network of General Practice from 2002 to 2005. In this retrospective study, we used Pearson's correlation coefficient to examine the pairwise practice-level association between guideline adherence rates for episodes of bacterial skin infection (30,757), acute throat pain (28,544), sinusitis (39,648), and urinary tract infections (75,300). We used three-level multivariate multilevel analysis to study the association between practice-level adherence rates of any three adherence indicators, and likelihood to adhere to the fourth guideline. The correlation between performance levels of the prescribing indicators ranged from negative (-0.29) to positive (0.57). The odds ratios and 95% Confidence Interval from the multilevel analyses ranged from a minimum of 0.97 (0.97 – 0.98) to a maximum of 1.02 (1.02 – 1.04) for the various practice-level adherence measures. The relatively weak relationships between the four process indicators indicate that they may not be measuring the same underlying construct. These findings raise questions about the interpretation of performance results based on existing quality indicators.

DETERMINANTS OF PREGNANCY IN A PORTUGUESE SAMPLE OF ADOLESCENTS. *C Pereira, O Amaral, N Veiga, E Coutinho (CI&DETS, Polytechnic Institute of Viseu, Portugal)

Background: The prevention of unintended adolescent pregnancy is an important public health issue. Pregnancy in adolescents is associated with socio-demographic factors. The objective of this study was to identify the socio-demographic determinants of pregnancy in adolescents. Methods: We carried out a cross-sectional study involving 254 pregnant adolescents aged 13–19 years attending obstetric and gynaecologic outpatient appointments in four maternities in the central region of Portugal. We used a self-administered questionnaire answered by the pregnant adolescents in an office, before appointment. The questionnaire comprised questions about the evolution of pregnancy and socio-demographic variables. Results: For eighty six point nine percent (86.9%) of the adolescents this was their first pregnancy. Pregnancy in adolescents differed with age (13 years = 1.8%, 15 years = 15.6%, 16 years = 14.7%, 17 years = 37.6%, 18 years = 21.1%, 19 years = 9.2%), marital status (single 61.5% vs.38.5%), education (≤ 9 years 70.6% vs.29.4%), residence area (urban 66.7% vs. 33.3%), professional situation (unemployed 89.4% vs. 10.6%) and father's education (≤ 9 years 88.3% vs. 11.7%). Fifty point nine percent (50.9%) referred never using any contraceptive method, 33.0% reported seldom using it and 16.0% reported having used always. Eighty nine point nine percent (89.9%) of the adolescents referred that it was an unwanted pregnancy. Conclusions: Pregnancy in adolescents was associated with socio-demographic variables. Successful strategies to prevent pregnancy in adolescence should include community programs to improve social development.

PREVALENCE OF TOOTHBRUSHING IN A PORTUGUESE SAMPLE OF ADOLESCENTS. *C Pereira, O Amaral, N Veiga, J Pereira (CI&DETS, Polytechnic Institute of Viseu, Portugal)

Background: The frequency of toothbrushing, use of dental floss and regular dental appointments are important determinants of oral health. The aim of this study was to assess the oral hygiene behaviours in a Portuguese community sample of adolescents. Methods: A sample of adolescents aged 12–18 years old, attending twenty-six public schools of the district of Viseu, Portugal, were enrolled in this cross-sectional study. A self-administrated questionnaire with questions about oral health behaviour, knowledge and socio-economic status was answered by the adolescents. We sent 8768 questionnaires and received 7644 (87.2%). The global sample included in analysis was composed by 7563 adolescents (4117 female). Results: The prevalence of toothbrushing (twice-a-day or more) is 23.5%. Toothbrushing is associated with parents' level education (< 4 yrs = 18.2%, 4–12 yrs = 23.2% and > 12 yrs = 44.2%, $p < 0.01$) and residence area (urban = 36.9%, and rural = 16.7%, $p < 0.01$). Daily flossing was reported by 4.4% adolescents. Thirty seven point one percent refer never using dental floss. Eighty six point seven percent of adolescents visited a dentist during their life, and 55.0% visited once or more times in the previous twelve months. The more frequent reasons referred for the dental visits in the last twelve months are: 49.8% for dental a check-up, 27.8% when having a toothache and 21.6% for oral treatments. Conclusion: These findings showed that dental health behaviours in adolescents are associated with demographic and socio-economic factors. Community-oriented oral health programmes should be considered in order to increase the level of knowledges and to change attitudes related with oral health among adolescents.

NITROSATABLE DRUGS, DIETARY NITRITES, AND NEURAL TUBE DEFECTS. *J Brender, M Werler, K Kelley, A Vuong, M Shinde, J Huber, Jr., J Sharkey, Q Zheng, L Suarez, P Langlois, M Canfield, P Romitti, S Malik, National Birth Defects Prevention Study (Texas A&M Health Science Center, College Station, TX 77843)

Experimental evidence indicates that nitrosatable drugs, such as secondary or tertiary amines and amides, form N-nitroso compounds in the presence of nitrite in an acidic environment. These compounds have been found to be teratogens in animal models. Using data from the National Birth Defects Prevention Study (NBDPS), we examined nitrosatable drug exposure one month pre- to one month post-conception among 1223 case-mothers of births with neural tube defects (NTDs) and 6807 control mothers who delivered babies without major congenital anomalies during 1997–2005. We also estimated women's dietary intake of nitrites based on responses from a food frequency questionnaire. With adjustment for maternal race/ethnicity, education, and folic acid supplementation, case-mothers were more likely to have taken nitrosatable drugs than control-mothers (odds ratio [OR] 1.4, 95% confidence interval [CI] 1.2, 1.6), especially tertiary amines (OR 1.6, 95% CI 1.4, 2.0). This association was strongest between tertiary amines and anencephalic births (OR 2.0, 95% CI 1.4, 2.8). Odds ratios associated with tertiary amines for lowest to highest tertiles of nitrite intake were respectively 1.0 (95% CI 0.67, 1.5), 2.1 (95% CI 1.5, 2.9), and 1.9 (95% CI 1.3, 2.6). However, ORs for anencephaly with nitrosatable drug exposure were reduced among women who also took daily vitamin supplements with vitamin C, a documented inhibitor of nitrosation. In conclusion, prenatal exposure to nitrosatable drugs may increase NTD risk, especially with higher dietary intake of nitrites. These risks might be reduced by daily supplementation with vitamin C.

842-S

MODIFYING EFFECT OF PRENATAL CARE ON THE ASSOCIATION BETWEEN YOUNG MOTHER'S AGE AND ADVERSE PREGNANCY OUTCOMES. *C Vieira, C Coeli, R Pinheiro, E Brandão, F Aguiar, K Camargo. (UFRJ, Rio de Janeiro, Brazil)

Young mother's age and inadequate prenatal care have been shown to be associated with adverse pregnancy outcomes. The aim of the study was to evaluate the association between mother's age and adverse effects on pregnancy, verifying through additive interaction whether prenatal care may diminish the deleterious effect of young age on these outcomes. The 40,111 records of singleton live-born infants delivered in 2002 whose mothers were under 24 years of age and lived in Rio de Janeiro City were evaluated. We carried out a stratified sectional analysis according to prenatal adequacy in order to evaluate the association between maternal age and adverse pregnancy outcomes. To analyze a possible additive interaction between age and prenatal care on adverse outcomes, we combine age group (adolescent/adult) with adequacy of prenatal care (yes/no). The four-level composite exposure variable created was included in a logistic regression model, adjusting for type of hospital where the delivery took place (private or publicly funded: proxy for mother's income). We calculated the attributable proportion due to interaction (AP). Of the 40,111 singleton live births studied 40.1% were children of adolescent mothers (10 to 14 -1.9%; 15-19 - 38.2%). An association between maternal age and adverse outcomes was observed only among adolescents in the inadequate prenatal stratum. There was an additive interaction between young maternal age and inadequate prenatal care on the occurrence of all analyzed outcomes (AP [95% confidence interval]: low birth weight - 0.28 [0.21;0.35]; premature birth - 0.25 [0.17;0.3]; low Apgar in the fifth minute - 0.33 [0.17;0.38])

844-S

INDEPENDENT EFFECT OF CONTEXTUAL CHARACTERISTICS ON SMALL FOR GESTATIONAL AGE BIRTHS IN QUEBEC, CANADA. *N Savard, P Levallois, L-P Rivest, S Gingras (Université Laval, Québec, QC G1V0A6, Canada)

Our objective was to evaluate if SGA birth is associated with neighbourhood socioeconomic and social environment features over and above individual characteristics of mothers. We benefitted from access to birth registration forms of 667 254 newborns from 143 sectors from Quebec, Canada between 2000 and 2008. We had information on mother's country of birth, birth spacing, parity, language, marital status, age, academic degree, season of birth and past stillbirth. Contextual data was either birth or resident-oriented: birth-oriented data consisted of mothers' individual data aggregated over sectors. Resident-oriented contextual information on physical activity and access to services in the sectors came from the Canadian Community Health Survey, whereas data on material deprivation, social and racial isolation came from the Canadian census. For every contextual variable, crude and adjusted for the presence of individual information odds ratios were calculated using hierarchic logistic models. A multivariate model was also fitted on all contextual variables. Sectors with high proportion of mothers with very short birth spacing had approximately 8% higher adjusted odd of SGA when compared to sectors with low proportion ($p < 0.01$). When adjusting for individual and all contextual characteristics, sectors with high proportion of mothers with very short birth spacing and those with frequent material deprivation of residents had approximately 8% and 11% higher odds of SGA than those with low proportion. We conclude that SGA birth is associated with the socioeconomic feature of material deprivation and with the social feature of very short birth spacing over and above individual characteristics of mothers.

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ACCULTURATION AND RISK OF GESTATIONAL DIABETES MELLITUS IN A COHORT OF HISPANIC WOMEN. *S Blank, P Pekow, G Markenson, L Chasan-Taber (University of Massachusetts, Amherst, MA 01003)

Rates of gestational diabetes mellitus (GDM) are higher among Hispanics as compared to non-Hispanic whites, yet research on the association between acculturation and GDM risk in Hispanics is sparse. We evaluated this association among 897 participants in Proyecto Buena Salud, an ongoing prospective cohort of Hispanic prenatal care patients (predominantly Puerto Rican) in Western Massachusetts. Acculturation was assessed in early pregnancy by bilingual interviewers via the Psychological Acculturation Scale (PAS), birthplace, and language preference. GDM diagnosis was abstracted from medical records and based on American Diabetes Association criteria. A total of 27 (3%) women were diagnosed with GDM. A total of 54% of women were born in the continental US and 79% preferred English. The mean (standard deviation) PAS score was 2.4(0.8) (range 1-6) with 20% of women being highly acculturated (PAS score > 3). Women born in Puerto Rico had an increased GDM risk (Odds Ratio (OR) = 2.7, 95% Confidence Interval (CI) 1.2-6.4) compared to women born in the continental US. After adjusting for age and body mass index (BMI), this association was slightly attenuated (OR = 2.4, 95% CI 0.97-5.3). There was no association between PAS score (OR = 1.0, 95% CI 0.4-2.5 for low vs. high acculturation) nor language preference (OR = 1.5, 95% CI 0.6-3.4 for Spanish vs. English) and GDM risk. Being born in Puerto Rico and preferring Spanish were each associated with increases in screening glucose values of 3.7(1.9) mg/dL and 4.4(2.3) mg/dL respectively, though these did not remain statistically significant in models adjusted for age and BMI. In summary, we found that selected factors indicating low acculturation may be associated with GDM risk.

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USE OF INHALED CORTICOSTEROIDS OR LONG-ACTING β_2 -AGONISTS AND THE RISK OF PRETERM BIRTH AND LOW-BIRTH WEIGHT AMONG WOMEN WITH ASTHMA. *B Cossette, A Forget, MF Beauchesne, C Lemièrre, P Larrivée, L Blais (University of Montreal, Montreal, QC H3C3J7, Canada)

There are limited data on the impact of the use of inhaled corticosteroids (ICS) or long-acting β_2 -agonists (LABA) during pregnancy on the risk of preterm birth (PB) and low-birth weight (LBW). To evaluate these outcomes, we constructed from 2 Quebec (Canada) administrative health databases a cohort of asthmatic women (i.e. with a diagnosis of asthma and at least 1 prescription for an asthma medication during or 1 year before pregnancy) who gave birth between 1998 and 2008. PB was defined as a birth before the 37th week of gestation, while LBW was a weight < 2500 grams. The impact of ICS or LABA on PB and LBW was determined by General Estimating Equation models, adjusted for sociodemographic and pregnancy variables, use of other asthma medications, control of asthma and pre-pregnancy severity of asthma. The cohort was formed of 7456 pregnancies, with use of ICS in 57% and LABA in 9% of them. Overall, the prevalence of PB and LBW was 9.8% and 7.9%, respectively. The use of LABA was not associated with an increased risk of PB [odds ratio (OR) = 0.9 95%CI:0.7-1.3] or LBW [OR = 1.0 95%CI:0.8-1.4]. The use of increasing daily doses of ICS in fluticasone-equivalent was associated with an increasing trend in the risk of LBW: 0-62.5ug [OR = 0.8 95%CI:0.6-1.0]; $> 62.5-125$ ug [OR = 1.1 95%CI:0.8-1.4]; 125-250ug [OR = 1.4 95%CI:1.0-1.9]; > 250 ug [OR = 1.4 95%CI:1.0-2.0] and PB 0-62.5ug [OR = 0.8 95%CI:0.6-1.0]; $> 62.5-125$ ug [OR = 1.0 95%CI:0.8-1.3]; 125-250ug [OR = 1.3 95%CI:1.0-1.8]; > 250 ug [OR = 1.4 95%CI:1.0-2.0], compared to no use. In conclusion, an increasing trend of LBW and PB was associated with the use of higher doses of ICS.

LIFETIME RACIAL DISCRIMINATION ASSOCIATED WITH DEPRESSIVE SYMPTOMS IN PREGNANCY AMONG US BLACK WOMEN WITH LOW, BUT NOT HIGH, SOCIOECONOMIC RESOURCES. *K A Ertel, T James-Todd, K Kleinman, N Krieger, M W Gillman, R Wright, J Rich-Edwards (Harvard University, Boston, MA)

Objectives: To assess the relationship between self-reported lifetime racial discrimination and depressive symptoms during pregnancy among black women. Methods: We evaluated 525 black women from Project ACCESS and 352 from Project Viva, two prospective cohort studies of pregnant women in the Boston area. We used a modified Experiences of Discrimination scale (EOD) to measure self-reported lifetime racial discrimination in 8 domains (0-8 scale). We measured probable depression with the Edinburgh Postnatal Depression Scale. We used multivariable logistic regression analysis. Results: Black women in Project ACCESS were more economically disadvantaged than black women in Project Viva (57% v. 28% with high school education or less and 65% v. 22% with annual household income < \$20,000). 54% and 78% of participants in ACCESS and Viva, respectively, reported racial discrimination; 25% and 13%, respectively, had probable depression. In ACCESS, after adjustment for age, marital status, income, education, and nativity, each 1-unit increment on the EOD was associated with odds ratio of 1.48 (95% Confidence Interval (CI): 1.24, 1.76) for probable depression. We saw no association between racial discrimination and probable depression in Project Viva (OR = 1.12; 95% CI: 0.92, 1.37). Conclusions: Self-reported lifetime experience of racial discrimination was associated with probable depression during pregnancy in a cohort of more disadvantaged black women, but not in a cohort of more advantaged black women. Our study suggests that the impact of racial discrimination on antenatal depression may depend on socioeconomic context.

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PREGNANT WOMEN ADHERING TO FOOD TABOOS IN A RURAL COMMUNITY CAN BE IDENTIFIED EARLY. *O A Oni, T O Lawoyin, E W Harville (College of Medicine, University of Ibadan, Nigeria)

Maternal nutrition affects pregnancy and birth outcomes. In certain communities, pregnant women avoid food items due to taboos, and such women require prompt nutritional counseling. We hypothesized that mothers who adhere to food taboos during pregnancy can be identified early. We followed-up 405 pregnant women attending prenatal care in Saki East Local Government area, Nigeria. First, we obtained qualitative data from a focus group of ten pregnant women selected by simple random sampling from the prenatal clinics. Findings from the discussion were utilized for designing semi-structured questionnaire used for data collection. Questionnaires were administered by trained community health workers at the beginning of prenatal care and updated at delivery. Bivariate analysis was performed using chi-square tests for categorical variables. We performed regression analysis using SAS genmod to determine the adjusted risk for adherence to food taboos during pregnancy. All analyses were done using SAS 9.2. Fifteen percent of the women were teenagers (≤ 19 years), 78.3% had body mass index (BMI) ≥ 23.0 , 13.3% adhered to food taboos, 57.3% lived in low families (< \$54.2 per month), and 1.5% had more than high school education. Twenty-five percent were primiparous, and only 24.4% gained ≥ 0.5 kg per week of pregnancy. Teen age (adjusted relative risk, aRR = 2.39, 95% CI = 1.07-5.37); low BMI < 23.0 (aRR = 2.77, 95% CI = 1.22-6.33), primiparity (aRR = 2.66, 95% CI = 1.18-5.96) and low family income (aRR = 9.72, 95% CI = 4.12-22.69) increased the risk of adherence to food taboos. Our findings will help health workers provide targeted counseling.

DEPRESSION AND PREECLAMPSIA: AN EPIDEMIOLOGIC ANALYSIS OF A STATEWIDE HOSPITAL DATASET. T Arana, D Briones, T Offutt-Powell, B S Nuwayhid, *Z D Mulla (Dept of Medical Education, Texas Tech University Health Sciences Center, El Paso, TX 79905)

There is conflicting evidence regarding a possible association between depression and preeclampsia, a serious hypertensive disorder of pregnancy. The objective of this cross-sectional study was to determine the relationship between depressive disorders and the outcome of preeclampsia after stratification by the season of delivery. The sample included 313,189 women aged 12-50 years who delivered throughout Texas, USA, in 2007 and were found in the Texas hospital discharge dataset. The following depressive disorders were defined using ICD-9-CM codes: major depressive disorder, dysthymic disorder/depression with anxiety, or depressive disorder not elsewhere classified. ICD-9-CM codes were also used to identify women with the outcome of preeclampsia/eclampsia. Prevalence odds ratios (OR) and 95% confidence intervals (CI) were calculated by the season of admission for the delivery: spring (Mar, Apr, May), summer (Jun, Jul, Aug), fall (Sep, Oct, Nov), and winter (Dec, Jan, Feb). ORs were adjusted for several variables including maternal age and obesity. Median age was 26 y. The prevalence of preeclampsia varied minimally by season (3.89% in fall to 4.1% in winter). The overall adjusted OR for preeclampsia (comparing patients who had any of the depressive disorders to those free of these disorders) was 1.66 (95% CI: 1.39-1.98) and this relationship varied by season: spring OR = 1.56 (95% CI: 1.08-2.26), summer OR = 1.25 (95% CI: 0.83-1.87), fall OR = 1.72 (95% CI: 1.18-2.51), and winter OR = 2.06 (95% CI: 1.51-2.81). This population-based analysis found a positive association between maternal depression and preeclampsia in three seasons with the highest OR in women who delivered in winter.

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USE OF FERTILITY THERAPIES IN ASSOCIATION WITH AUTISM SPECTRUM DISORDERS IN CHILDREN OF THE NURSES' HEALTH STUDY II. *K Lyall, SL Santangelo, A Ascherio (Harvard School of Public Health, Boston, MA 02114)

To determine the association between maternal use of fertility therapies and risk of having a child with an autism spectrum disorder (ASD), we conducted a nested case-control study among participants in the Nurses' Health Study II. Participants from this cohort of 116,608 nurses were asked whether they had a child diagnosed with ASD; diagnoses were confirmed through a supplementary questionnaire and the Autism Diagnostic Interview-Revised in a subgroup. Controls were randomly selected by frequency matching to case children years' of birth. Associations were examined by type of therapy and within advanced maternal age and diagnostic subgroups using conditional logistic regression. 9% of the 495 cases and 7% of 2,512 controls indicated use of fertility therapy for the index pregnancy. No significant associations with fertility therapies were seen in the primary analysis. In the subgroup of women with maternal age ≥ 35 years ($n = 1,010$), use of OI was associated with an increased ASD risk, but this association did not reach conventional significance after adjusting for potential confounders (odds ratio 1.81, 95% CI 0.95-3.47). Results were similar by diagnostic subgroup, though within the advanced maternal age group, OI and artificial insemination (AI) were significantly associated with mild ASD but not autism. Thus, in this large cohort of nurses, fertility therapies, including assisted reproductive therapy, do not appear to increase risk of having a child with an autism spectrum disorder. However, the associations observed with ovulation inducing drugs and artificial insemination among older mothers, for whom these exposures are more common, warrant further investigation.

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SOCIOECONOMIC DIFFERENCES IN THE IMPACT OF BEING SMALL FOR GESTATIONAL AGE ON NEURODEVELOPMENT AMONG PRESCHOOL-AGED CHILDREN. *C Drews-Botsch, L Schieve (Department of Epidemiology, Emory University, Atlanta, GA 30322)

Studies of the impact of fetal growth on cognitive outcomes are inconsistent. However, few studies assessed whether effects vary by socioeconomic status (SES). To assess developmental outcomes associated with both fetal growth and SES, we assessed 474 infants who as neonates had participated in a case-control study of small-for-gestational-age (SGA). We created two SGA categories: SGA (< 10th percentile) and Severe SGA (< 5th percentile). Infants were born in 2 settings: a public hospital serving a low-income, African-American population; and a private hospital serving a predominantly White, middle-class population. When they were age 54 months old, a psychologist administered the Differential Abilities Scales (DAS) and Vineland Adaptive Behavior Scales (VABS). Among children with a birth weight that was appropriate-for-gestational-age (AGA, > 10th percentile), DAS scores were lower in children born at the public than at the private hospital (75.2 vs. 95.7 in boys; 76.3 vs. 101.8 in girls). SGA had a weaker effect on DAS scores. Severe SGA was significantly associated with reduced DAS score among children born at the private (-8.0 +2.5 points), but not public hospital (-1.1 + 2.2 points). Severe SGA was associated with VABS score (-9.2 +2.5 points) in children born at the public hospital. We conclude that poor fetal growth influences neurodevelopment, particularly among the smallest infants, but this influence is modified by postnatal SES. Additionally, the strong adverse effects associated with low SES might modify associations between development and other prenatal exposures.

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PAROXETINE AND CARDIAC BIRTH DEFECTS: A CAUSAL ROLE. *D Hinds, A Chang, S Kramer (Epidemiology International, Hunt Valley, MD 21031)

Paroxetine (Paxil) is the most potent antidepressant in the selective-serotonin reuptake inhibitor (SSRI) class of antidepressants. The authors of a recent meta-analysis (Wurst et al, 2010 Birth Defects Research (Part A) 88: 159-170) conducted by the drug manufacturer GlaxoSmithKline concluded that "an increased prevalence of combined cardiac defects [is] associated with paroxetine use during the first trimester." The researchers analyzed 14 individual studies in the literature and found a statistically significant prevalence odds ratio of 1.46 (95% confidence interval 1.17-1.82). Despite the conclusion of this comprehensive meta-analysis by the drug manufacturer and the category D classification of the drug by the Food and Drug Administration (indicating a demonstrated risk to the fetus), the causal role of paroxetine in the formation of cardiac birth defects is still debated in the literature as evidenced by the two commentaries that accompanied the publication of the meta-analysis. A review of the literature, particularly the epidemiologic studies, demonstrates that first trimester paroxetine exposure is temporally, consistently, and strongly associated with cardiac birth defects and sub-groupings of cardiac birth defects. Forest plots of the data illustrate that the vast majority of risk ratios are over 1.0, indicating an elevated risk. Further, paroxetine is a biologically plausible cause of cardiac defects. The consistent associations and biologic plausibility indicate that first trimester exposure to paroxetine is a cause of cardiac birth defects, and evaluation of other SSRIs is warranted based on a common mechanism of action and a potential class effect that has been observed in the literature.

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DISPENSING PATTERNS AND PREGNANCY OUTCOMES IN WOMEN DISPENSED PROTON PUMP INHIBITORS DURING PREGNANCY. *L Colvin, L Slack-Smith, F J Stanley, C Bower (Telethon Institute for Child Health Research, Centre for Child Health Research, The University of Western Australia, Perth, Western Australia)

Background: Proton pump inhibitors (PPIs) are not thought to increase the risk of birth defects when used during pregnancy. However other outcomes for the mother and child are important to investigate. Methods: The cases were all births in Western Australia, 2002-2005 where the mother was dispensed a PPI under the Australian Pharmaceutical Benefits Scheme, the only source of PPIs in Australia during that period. The controls were all other pregnancies during the same period. Maternal socio-demographic characteristics, pregnancy and delivery information were included as well as birth outcomes such as registered birth defects, birth weight and length, and gestational age. Results: 11.1% of the women were dispensed a PPI in each trimester, and 97.7% of the women used the same PPI throughout the first trimester without switching. The women dispensed a PPI (N = 732) were more likely to be aged 35 to 45 years, have smoked during their pregnancy, to have a multiple birth, reside in a lower socio-economic area, and to have essential hypertension or asthma. These women were at a higher risk of a postpartum haemorrhage (PPH), and were more likely to have an elective caesarean delivery. The case children were more likely to weigh < 2500 g, and to be born preterm. With first trimester exposure, there were 18 (5.0%) of the case children and 3,953 (4.0%) of the control children with a registered major birth defect (OR 1.2; 95% CI: 0.8-2.0). There was no significantly increased risk found for any category of defect. Conclusions: This population-based study provides a profile of the outcomes of the pregnancies for the women dispensed a PPI. The case children had a higher risk of preterm birth and lower birth weight. The increased risk of PPH requires further investigation.

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EVALUATION OF ACTIVE SURVEILLANCE OF STILLBIRTH: UTILITY OF AN EXISTING BIRTH DEFECTS SURVEILLANCE PROGRAM - ATLANTA, GEORGIA. *A Azoifeifa, C Duke, S Gilboa, A Correa, L Yeung (National Center on Birth Defects and Developmental Disabilities, Centers for Disease Control and Prevention, Atlanta, GA 30333)

Background: In 2005 the prevalence of stillbirths in the United States was 6.2/1,000 live births and fetal deaths. This probably represented an underestimate because the numerator was based on fetal death certificates (FDCs) data, which are limited by underreporting of cases. We evaluated the utility of using FDCs and an existing active birth defects surveillance program, the Metropolitan Atlanta Congenital Defects Program (MACDP), to improve stillbirth surveillance. Methods: We assessed MACDP's data quality and sensitivity. We conducted stakeholder interviews; reviewed MACDP methods; and used capture-recapture methods to estimate the total number of stillbirth cases (defined as any intrauterine fetal death occurring at ≥ 20 weeks of gestation age or weight ≥ 350 grams if age was unknown), sensitivities, and stillbirth prevalence using FDC data alone and when combined with MACDP data. Results: Compared to FDC data, MACDP's data quality is improved through use of multiple data sources and standard procedures to collect detailed maternal and stillbirth information. Based on 2006 data, sensitivity was 78.5% based on FDC data alone and 95% when combined with MACDP data; the prevalence of stillbirths per 1,000 live births and fetal deaths was 8.2 (95% confidence interval [CI]: 7.5-9.0) based on FDC data alone and 9.9 (95% CI: 9.1-10.8) when combined with MACDP data. Conclusions: Use of MACDP as an additional data source for stillbirth surveillance resulted in higher levels of case ascertainment, and better data quality and estimates of stillbirth prevalence than use of FDC data alone.

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PHYSICAL ACTIVITY AND PREGNANCY OUTCOMES. *L Currie, C Woolcott, D F Fell, B A Armson, L Dodds (Dalhousie University, Halifax, NS B3K 6R8, Canada)

Literature on the role of physical activity in pregnancy outcomes is sparse and inconsistent. This study was conducted to assess the relationship between physical activity levels in early pregnancy and gestational diabetes (GDM), hypertension (HT), and inappropriate gestational weight gain (GWG). Existing data from a prospective pregnancy cohort were used and included women 4-20 weeks gestation presenting for prenatal care in Halifax, Nova Scotia between 2002-2005. At 20 weeks' gestation, women completed a questionnaire to obtain information on numerous life-style and pregnancy factors, including the Kaiser Physical Activity Survey. Pregnancy outcomes were determined by chart review. Inappropriate GWG was defined as being below or above the ranges recommended by the Institute of Medicine (IOM). Logistic regression was used to estimate odds ratios (OR) and 95% confidence intervals (CI). A physical activity score based on active living, household activity, and sports-related activity was not associated with these outcomes among the 1687 women without contraindications to physical activity in pregnancy. ORs and CIs for women in the highest tertile relative to women in the lowest tertile of physical activity, adjusted for prepregnancy body mass index and other confounders, did not demonstrate a significant effect of physical activity on GDM (OR:0.6, 0.2-1.5), HT (OR: 0.7, 0.2-2.3), nor GWG above (OR: 1.1,0.9-1.4) or below (OR:1.1, 0.8-1.4) IOM recommendations. Similar results were observed when the sports-related activity score was independently assessed. Although our analysis was limited by the low number of participants with the specified pregnancy outcomes, physical activity in early pregnancy does not seem to have an effect on inappropriate GWG.

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THE ASSOCIATION OF LOW SOCIOECONOMIC STATUS AND THE RISK OF HAVING CHILDREN WITH DOWN SYNDROME: A REPORT FROM THE NATIONAL DOWN SYNDROME PROJECT. *M Shin, E Graves Allen, S Sherman, L H Bean, A Correa (CDC/NCBDDD, Atlanta, GA)

To examine the association between lower socioeconomic status (SES) and the risk of having a child with Down syndrome (DS), we used data from the National Down Syndrome Project, which is a multisite, population-based, case-control study. Cases were infants born from 2001-2004 with a diagnosis of DS. Controls were live births without major birth defects selected randomly from among all infants born in the same study period and geographic area. Five SES variables were considered: 1) maternal, 2) paternal, 3) grandmother's, 4) grandfather's education, and 5) household income. Additionally we combined these variables to refine the extent of low SES: 1) parental, 2) grandparental education, and 3) an index variable combining both parental and grandparental education and household income. The value of this index variable ranged from 0-3, with the maximum representing a child who had 1) both parents with < 12 years education, 2) both grandparents with < 12 years education, and 3) household income < \$25,000. Odds ratios (OR) and 95% confidence interval (CI) were computed for each individual SES variable and for the combined variables by multiple logistic regressions. Among the combined SES variables, the variable most significantly associated with DS was both grandparents with < 12 years education (OR: 1.7, 95% CI: 1.4-2.1) followed by both parents with < 12 years education (OR: 1.6, 95% CI: 1.2-2.1). After adjusting for maternal race/ethnicity, parity, and maternal age, the adjusted ORs for the SES index values compared with index = 0 increased; however, only the OR for index = 2 compared with index = 0 was statistically significant (OR: 1.8, 95% CI: 1.2-2.5). This study suggests that low SES is associated with an increased likelihood of having an infant with DS. Further studies are warranted to identify the low SES correlates underlying this association.

* = Presenter; S = The work was completed while the presenter was a student

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DOES THE PLACE OF LIVING MATTER FOR ABORIGINAL BIRTH OUTCOMES AND INFANT. *Z C Luo, R Wilkins, M Heaman, J Smylie, P Martens, F Simonet, S Wassimi, W D Fraser (CHU Sainte-Justine, University of Montreal, Montreal, QC, Canada)

Aboriginal birth outcomes are worse than their non-Aboriginal counterparts even in developed countries. Increasingly more Aboriginal people are living off traditional communities. Little is known about whether the place of living or community characteristics may affect Aboriginal perinatal and infant health. In postal code linkage-based birth cohort analyses using the linked birth/infant death data for all births to residents of Quebec and Manitoba, 1991-2000, we assessed how community-level characteristics may affect birth outcomes and infant mortality among First Nations and Inuit in Quebec and among First Nations in Manitoba. Substantial disparities in birth outcomes and infant mortality were observed at the individual- or community-level comparing Aboriginal versus non-Aboriginal populations in Quebec or Manitoba. Birth outcomes were no better or even worse for Aboriginal women living in urban areas or off reserve. Living in the south was not associated with better birth outcomes for First Nations. Living in more remote communities was associated with a substantially higher risk of fetal and infant mortality, especially postneonatal mortality among First Nations. Living in neighborhoods of poor socioeconomic status was associated with an increased risk of infant death, irrespective of whether the mother was First Nations or not, but First Nations were much more likely to live in poor neighborhoods. Our results provide the first comprehensive community-level data indicating a need for improving perinatal and infant care for Aboriginal people migrating out of traditional communities (and into off-reserve, southern and urban areas), and a need for improving socioeconomic conditions and more effective infant health promotion programs for Aboriginal people irrespective of where they live.

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AGE AT DIAGNOSIS OF CHILDREN WITH BIRTH DEFECTS IN THE METROPOLITAN ATLANTA CONGENITAL DEFECTS PROGRAM, 1998-2001. *M Shin, L O'Leary, J Cragan, P Thorpe, A Correa (Centers for Disease Control and Prevention, Atlanta, GA 30333)

Although most birth defects surveillance programs ascertain cases among children under 1 year of age, the proportion of cases that might be missed due to an older age at diagnosis is unclear. The Metropolitan Atlanta Congenital Defects Program (MACDP), a population-based birth defects surveillance system in the 5 central counties of metropolitan Atlanta, ascertains major birth defects among children up to 6 years old. This study aims to describe the distribution of age at diagnosis for cases with birth defects and to identify the types of birth defects that are detected after 1 year of age in MACDP. We included all pregnancy outcomes (live births, fetal deaths, and terminations) with birth defects registered in the MACDP during 1998-2001. Age at diagnosis was calculated by subtracting the date of birth from the date of diagnosis. Defects diagnosed prenatally were assigned an age at diagnosis of less than 0. The cumulative proportion diagnosed by age group was compared among 3 groups of defects: critical cardiac defects (i.e., requiring surgery within the first year of life), non-critical cardiac defects, and non-cardiac defects. Of 7,057 cases of birth defects (6,537 live births, 342 fetal deaths, 178 terminations), 21.9% were diagnosed prenatally. Among live births, 16.6% had defects that were diagnosed prenatally. All (100%) of the critical heart defects, 94.6% of non-critical heart defects, and 94.5% of the non-cardiac defects were diagnosed by 1 year of age. The distribution of most of birth defects diagnosed among children after 1 year of age did not differ from their distribution among children diagnosed less than 1 year of age.

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A LIFE COURSE INVESTIGATION OF THE INFLUENCE OF PRECARIOUS EMPLOYMENT ON OLDER FIRST-TIME MOTHERHOOD. *E J Steele, L C Giles, M J Davies, V M Moore (The University of Adelaide, Adelaide, South Australia 5005, Australia)

Background / Objective: The age at which women have their first child has increased in Western countries over past decades. From a public health perspective, this shift has a raft of health consequences for women and children, and it is imperative to investigate potential barriers to childbearing at 'optimal' ages. Precarious employment conditions may play an important role in older age of first-time motherhood. Extant studies have a range of methodological limitations. Methods: A retrospective birth cohort (n = 974, born 1973-75) was established when women were aged ~ 30 years. In the second wave of follow-up, pregnancy, partnering, education, employment and related data were collected. An 'Event History Calendar' was used to obtain annual (and in some cases monthly) data. Time-varying and time-constant survival analysis techniques were applied within a life course framework to examine the effects of precarious employment on age at first childbirth. Specifically, Cox proportional hazard models, stratified by educational attainment, were fit. Results: The participation rate for the study was 68%. Results of time-constant models showed that every additional year (from age 15) in precarious employment decreased the likelihood of having a first child by age 35 years, by 18% for women who did not finish high school (HR 0.82; 95% CI: 0.69, 0.98), and 9% for women with a Technical and Further Education qualification (HR 0.91; 95% CI: 0.84, 0.97). In the time-varying analyses, the effect of years in precarious employment states did not significantly differ across three year age bands for any educational group. Conclusions: Results support a cumulative influence of precarious employment on delayed motherhood for Australian women. Further, the study provides an example of the collection of fine-grained life course data, operationalisation of a complex exposure construct, and application of existing analysis techniques (survival analyses) within a life course framework.

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ASSOCIATION OF ARSENIC IN DRINKING WATER WITH STILLBIRTH IN UTAH, 1989-2006. *J D Panichello, J A VanDerslice, C A Porucznik, M W Varner, J L Lyon, P F Luedtke (University of Utah, Salt Lake City, UT 84108)

Chronic exposure to high levels of arsenic has been associated with a number of adverse reproductive outcomes, including preterm birth, spontaneous abortion, and stillbirth. Most studies of exposure to arsenic have been in areas such as Bangladesh where arsenic levels in drinking water are extremely elevated. Very few studies have investigated health effects from exposure to levels of arsenic in Community Water Systems (CWSs) in the United States. Maternal addresses at time of delivery were geocoded for over 700,000 births to Utah residents during 1989-2006. Annual average arsenic levels were estimated for each of the 477 Utah CWSs using monitoring data submitted to the Utah Department of Environmental Quality. Arsenic levels were assigned to each birth based on conception year, and linking the geocoded address to a georeferenced service area for each CWS. Multiple births and infants with birth defects were excluded from the study. The level of arsenic was not associated with incidence of stillbirth in a model that adjusted for maternal age, body mass index, diabetes, birth weight, preterm birth, weight gain, and other risk factors. Compared with those with tap water arsenic concentrations less than 2.5 micrograms per liter ($\mu\text{g/l}$), the adjusted odds ratio (OR) for those with 2.5-5 $\mu\text{g/l}$ was 1.15, 95% confidence interval (CI) 1.00, 1.31; for those with 5-10 $\mu\text{g/l}$, OR 0.77 (CI 0.65, 0.91); and for those at or above 10 $\mu\text{g/l}$, OR 0.88 (CI 0.70, 1.10). This study did not include individual-level exposure assessment. Future studies using individual-level exposure assessment are recommended; however, given the lack of effect detected in this large dataset, these studies should not be seen as a high priority.

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ASSOCIATION OF ELEVATION WITH SMALL FOR GESTATIONAL AGE BIRTHS IN UTAH, 1989-2006. *J D Panichello, J A VanDerslice, M W Varner, C A Porucznik, J L Lyon, P F Luedtke (University of Utah, Salt Lake City, UT 84108)

Small for gestational age (SGA) has been consistently associated with high elevation. Most studies to date, however, have compared births at very high elevation with those at sea level. Utah elevations range from 2,500 to over 9,000 feet. Over 700,000 maternal residences (addresses recorded on birth certificates) in Utah from 1989-2006 were geocoded and spatially linked to a digital elevation model (90 meter grid) from the United States Geologic Survey. SGA was defined as the 10th percentile birthweight for births to Utah residents with gestational age between 22 and 44 weeks. The frequency of SGA increased with every 1,000 feet increase in elevation. Compared with births at elevation less than 3,000 feet (ft), the adjusted odds ratio (OR) for births at 3,000-4,000 ft was 1.04, 95% confidence interval (CI) 0.87, 1.23; for births at 4,000-5,000 ft, OR 1.41 (CI 1.24, 1.62); at 5,000- 6,000 ft, OR 1.54 (CI 1.34, 1.77); at 6,000-7,000 ft, OR 1.77 (CI 1.52, 2.06); and at greater than 7,000 ft, OR 2.14 (CI 1.74, 2.63). The ORs were estimated using logistic regression, adjusting for previous SGA births, smoking, elevation, pre-eclampsia, education, low weight gain, age, race, and other risk factors, and excluding multiple births and infants with birth defects. This is the largest study to evaluate the dose-response relationship between elevation of maternal residence at delivery and SGA.

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PUBLIC HOUSING POLICY CHANGE AND RESIDENTIAL MOBILITY PREDICT LOW BIRTHWEIGHT-PRETERM BIRTH. *M R Kramer (Emory University, Atlanta, GA 30322)

Public housing policy in the US fills a critical social welfare role but is also criticized for contributing to the spatial concentration of poverty and residential segregation in American cities. Over the past 15 years the City of Atlanta has systematically dismantled its network of high-density public housing projects in favor of mixed-income developments and rental vouchers for the private housing market. Using geocoded longitudinal maternally-linked birth records we assess the residential trajectories and associated risk for low birthweight-preterm birth (LBW-PTB) in a cohort of women who lived in Atlanta public housing projects at any point from 1994-2007. The cohort consists of 2089 women observed over 4909 singleton births who originated in public housing projects and either remained or moved to new mixed income developments or into the private housing market. Marginal structural models adjusting for time-varying confounding were fit to two kinds of exposure. One contrasted counterfactual housing trajectories (e.g. projects to private; projects to mixed) irrespective of the timing of policy change, and another contrasted women who moved as a result of policy change to those who moved at another time. Women whose previous birth (preconceptional exposure) was in the private housing market had 1.6 times the odds (95% confidence interval [CI] 1.1, 2.1) of LBW-PTB as women with preconceptional birth in public housing projects. Women who moved from public housing to private housing because their project closed had 2.5 times the odds (95% CI 1.4, 4.2) of LBW-PTB as women who moved without regard to date of closure. In this high poverty cohort, women who remain in public housing had lower LBW-PTB risk than women transitioned to the private housing market.

LIFECOURSE CUMULATIVE NEIGHBORHOOD DEPRIVATION MODIFIES ASSOCIATION OF HISTORY OF PRETERM BIRTH WITH SUBSEQUENT RISK FOR PRETERM BIRTH. *M R Kramer (Emory University, Atlanta, GA 30322)

A woman's own history of prior preterm birth is the most robust predictor of subsequent preterm birth, suggesting lifelong susceptibility sometimes attributed to genetic predisposition. An alternative hypothesis is lifecourse persistence of social environmental risk factors including residence in poor or deprived neighborhoods. Longitudinal maternally-linked birth files for all live births to Georgia residents from 1994-2007 including residential geocodes were merged with annually interpolated neighborhood deprivation index (NDI) to measure women's cumulative exposure to high-deprivation neighborhoods across several pregnancies. Low birthweight-preterm birth (LPTB) (< 2500 grams, < 37 weeks) was the outcome. There was substantial variation in longitudinal trajectories (upward and downward mobility) for women of all races. Using binomial regression accounting for repeated measures there was significant interaction between cumulative NDI and history of prior preterm birth in fully adjusted models. The risk difference (RD) for LPTB among women with a history of prior LPTB versus those without who reside in better than average neighborhoods is 6.1% (95% confidence interval [CI] 6.0,6.2). In contrast for women residing in worse than average neighborhoods the RD associated with a history of prior LPTB is 9.4% (95% CI 8.8, 9.9). Recurrence risk for LPTB may be due at least in part to factors associated with living in high-poverty, high-deprivation neighborhoods.

EDUCATIONAL INEQUALITIES IN STILLBIRTH ACROSS GESTATIONAL AGE AND CAUSE OF DEATH. *N Auger, P Deléglise, S Harper, R Platt (Institut national de santé publique du Québec, Montréal, QC H2P1E2, Canada)

Stillbirth-related educational inequalities are poorly understood. We evaluated the relationship between maternal education and stillbirth across gestation and cause of death. Data included 2,143,134 live born and 9,256 stillborn singletons from 1981-2006 in Québec, Canada. Education was expressed as a continuous cumulative rank score. Measures of inequality (Relative Index of Inequality, RII) and 95% confidence intervals (CI) were estimated for the relationship between education and stillbirth, adjusting for maternal age, marital status, language, parity and period. Associations were examined for four gestational intervals (< 28, 28-31, 32-36, ≥ 37 weeks) relative to ongoing pregnancies, and for common causes of death. There were 4.2 stillbirths per 1000 total births. Rates were greater for mothers with fewer years of education in all gestational intervals. Low education was associated with twice greater odds of stillbirth throughout gestation relative to high education, but the magnitude was greater at 28-31 weeks (RII 2.58, 95% CI 2.06-3.22). Low education was associated with 5 times higher odds of diabetic-related stillbirth (RII 5.25, 95% CI 1.79-15.4) and 3 times higher odds of hypertensive-related stillbirth (RII 2.82, 95% CI 1.61-4.95) relative to high education, and associations were greater at ≥ 28 weeks. Education was also associated with other causes of stillbirth, though associations tended to be weaker at < 28 weeks. These findings suggest that low education is associated with stillbirth mortality throughout gestation, and with causes of stillbirth having a behavioural component. Prevention programs for reducing stillbirth may benefit from collaboration with the education sector.

SOCIOECONOMIC INEQUALITIES IN OUTCOME OF PREGNANCY AND NEONATAL MORTALITY ASSOCIATED WITH CONGENITAL ANOMALIES: A POPULATION BASED STUDY 1998-2007. *L K Smith, J L S Budd, D J Field, E S Draper (Department of Health Sciences, University of Leicester, Leicester, UK)

To investigate socioeconomic variation in the risk of congenital anomaly in utero, antenatal detection rates, outcome of pregnancy and neonatal mortality we used data from a population based register covering 581597 births to mothers resident in the East Midlands and South Yorkshire regions of England (~ 10% of England & Wales births) from 1998-2007. Deprivation was measured using a UK area-based measure (Index of Multiple Deprivation 2004) at small area level. We included 1579 fetuses with at least one of 9 anomalies screened for in the antenatal period with poor prognostic outcome. There was no evidence of socioeconomic variation in risk of anomalies (Rate ratio comparing most deprived decile versus least deprived decile: 1.05; 95% Confidence Interval (0.89,1.23)). 86% of anomalies were detected antenatally and there was no evidence that this varied with deprivation (RR: 0.99; 95% CI (0.84,1.17)). However rates of termination of pregnancy due to fetal anomaly were lower in the most deprived areas (54%) compared to the least deprived areas (68%) (RR: 0.79; 95% CI (0.65,0.97)). This led to a wide deprivation gap in the rate of live births with an anomaly and neonatal mortality. The most deprived areas had 61% higher rate of live births associated with a congenital anomaly and 98% higher neonatal mortality rate compared with the least deprived areas. Antenatal screening for congenital anomalies has reduced neonatal mortality through termination of pregnancy. However, socioeconomic variation in termination of pregnancy for fetal anomaly has led to a wide deprivation gap in live born infants with a congenital anomaly and neonatal mortality.

GAMBLING ONSET IN CHILDREN AND YOUTH IS ASSOCIATED WITH BEING YOUNGER THAN ONE'S CLASSMATES. *N Auger, E Lo, M Cantinotti, J O'Loughlin (Institut national de santé publique du Québec, Montréal, QC H2P1E2, Canada)

Determinants of gambling initiation in youth are poorly understood. We sought to determine whether a child's age relative to other classmates was associated with gambling onset (played games for money, bet money, bought lottery tickets). We used a cohort of 647 grade 7 students followed for 8 years (median (interquartile range) age at cohort inception = 12.4 (0.5)). Age of gambling onset was determined retrospectively at age 20.3 years. 'Relative age' was expressed as years above or below the median age. Cox proportional hazards regression was used to estimate hazard ratios (HR) and 95% confidence intervals (CI) for relative age and gambling onset, adjusting for sex, ethnicity, parent education, and impulsivity. A relative age-by-log(time) interaction term was used to account for non-proportionality of hazards. After age 10.5 years, being younger than classmates was associated with progressively greater hazards of gambling onset with time, whereas before age 10.5 years, hazards were progressively lower. At age 17.0 years, for example, the hazard was 1.6 times greater for youth one year younger than their classmates (95% CI 1.4-1.8), but at age 8.0 years, it was lower (HR 0.8, 95% CI 0.7-0.9). Overall, students in the youngest quartile initiated gambling more than the oldest quartile (85.2% vs. 80.7%). In summary, gambling initiation during childhood may be influenced by the age of students relative to others in their grade. Being younger in the class was associated with a greater risk of gambling onset during secondary school, but not during early elementary school. School policies for age at entry may have spin-off effects on addictive behaviours during adolescence.

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NON-ALCOHOLIC FATTY LIVER DISEASE PREVALENCE AMONG SCHOOL AGED CHILDREN IN IRAN AND ITS ASSOCIATION WITH BIOCHEMICAL AND ANTHROPOMETRIC MEASURES. S-M Alavian, A-H Mohammad-Alizadeh, *E-A Farzaneh, A Gelayol, H Behzad (Ministry of Health and Medical Education, Tehran, Iran)

To investigate the prevalence of non-alcoholic fatty liver disease (NAFLD) as well as the determination of associated metabolic abnormalities in Iranian school-aged children and adolescents, we used a cross-sectional survey in 2007 in IRAN. Data were obtained from 966 children aged 7–18 years. These children were subjected to a complete anthropometric and laboratory measurement and abdominal ultrasonography for liver echogenicity and size. Fatty liver was diagnosed by ultrasound in 7.1% of children. The prevalence of elevated alanine aminotransferase (ALT) was 1.8%. NAFLD was significantly more common in the older group (12.5 against 3.5%, $P < 0.0001$). The odds ratios (OR) (95% confidence interval) for NAFLD in children having elevated ALT, high fasting insulin, total cholesterol, low density lipoprotein (LDL) cholesterol, triglyceride and insulin resistance (IR) were 10.9 (3.9–30.4), 2.8 (1.6–4.8), 2.8 (1.5–5.1), 2.8 (1.5–5.3), 2.5 (1.3–4.8) and 4.4 (1.6–12.3) respectively. Therefore, NAFLD was significantly associated with increasing age, ALT, fasting insulin, total cholesterol, LDL cholesterol, triglyceride and IR. In multiple logistic regression analysis, ALT (OR = 1.2; $P < 0.01$), total cholesterol (OR = 1.01; $p < 0.01$) and waist circumference (OR = 1.14; $P < 0.0001$) were independent metabolic factors predictive of NAFLD after adjustment for other variables. It will be very useful if children are assessed for variables such as waist circumference, fasting blood sugar, fasting insulin and serum lipid profile in order to screen those susceptible to NAFLD.

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IMPACT OF IRON FORTIFICATION ON MALARIA INCIDENCE AND SEVERITY IN GHANAIAN INFANTS AND YOUNG CHILDREN. S Zlotkin, S Newton, *A Aimone, S Amenga-Etego, K Tchum, I Azindow, S Owusu-Agyei (The Kintampo Health Research Centre, Kintampo, Ghana)

Background: The primary objective of this research was to determine the impact of providing iron-fortification on the incidence and severity of malaria among anemic and non-anemic children living in a high malaria burden area. **Methods:** A community-based double blinded equivalence trial was conducted in rural Ghana. Infants and young children ($n = 1956$) aged 6–35 months were randomized to Group 'A' or 'B'. All subjects received a micronutrient powder with or without 12.5 mg of iron (ferrous fumarate) added to complementary foods daily in the home for 5 months. Malaria status was assessed at weekly home visits. The number of malaria cases per child over the intervention and follow-up period was recorded. **Preliminary Results:** The groups were similar at baseline in terms of anthropometry, anemia status, demographic characteristics, and dietary intakes. At end-line malaria incidence rates (cases/child/month) did not differ significantly between groups (unadjusted Relative Risk [RR] = 1.05, $P = 0.208$), and the lower bound of the 95% confidence interval of the incidence rate ratio did not exceed the predetermined 10% equivalence margin (0.97, 1.13). The incidence of secondary adverse outcomes, such as cerebral malaria (RR = 1.33) and hospital admissions (RR = 0.82), also did not differ between groups ($P > 0.100$). **Conclusions:** These preliminary results suggest that a powdered form of iron provided with food to young children living in a malaria endemic area does not increase the risk or severity of malaria.

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RISK OF CANCER AND CARDIAC CATHETERIZATION DURING CHILDHOOD: A FEASIBILITY STUDY. *H Baysson, Y Boudjemline, J Petit, J L Réhel, B Aubert, D Laurier, D Bonnet, MO Bernier (Institut de Radioprotection et de Sûreté Nucléaire, Fontenay aux Roses, France)

OBJECTIVE. Children with congenital heart disease frequently undergo cardiac catheterization for diagnosis or intervention purposes. These procedures are known to give higher radiation doses to patients than other procedures in diagnostic radiology. Since children are particularly sensitive to the carcinogenic effects of ionizing radiation, it is important to know whether cancer risk is affected among children who undergo cardiac catheterizations. **METHODS.** The feasibility of a cohort study will be evaluated. The study population will include all children who underwent at least one cardiac catheterization since 2000, who were under 10 years old and were permanent residents in France. Cohort follow up will be done through linkage with the French paediatric cancer registries which record all childhood leukaemia and cancers in France since 1990 and 2000, respectively. The radiation exposure of the children included will be estimated. **RESULTS.** The French National reference Centre for Complex Congenital Cardiac defects, which treated most of the children in France, already agreed to participate and confirmed the possibility to retrieve individual clinical and dosimetric data for the children involved. Considering the period 2000–2013, almost 8,000 children could be included. **DISCUSSION.** The feasibility of a cohort study is being explored in France in order to estimate the cancer risk following radiation exposure during paediatric cardiac catheterization procedures. Our results will give information on paediatric doses in cardiac catheterization and will add to the knowledge of the effects of low-dose radiation, especially in children.

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SURGICAL LIGATION OF PATENT DUCTUS ARTERIOSUS AND MORTALITY/MORBIDITY IN PRETERM INFANTS: REGRESSION AND PROPENSITY SCORE ANALYSES ADJUSTING FOR TREATMENT SELECTION BIAS. *L Mirea, P S Shah, A C Allen, K Sankaran, A Ohlsson, M Seshia, K Aziz, S K Lee, and the Canadian Neonatal Network (Maternal-Infant Care Research Centre, Mount Sinai Hospital, Toronto, ON M5G1X6, Canada)

As the risks and benefits of treatments for patent ductus arteriosus (PDA) in preterm infants remain unclear, we investigated the impact of these treatments on mortality and morbidity with adjustment for treatment selection bias. Eligible infants with gestational age < 33 weeks and diagnosed with PDA from 23 sites of the Canadian Neonatal Network born between 2003 and 2008 were enrolled ($n = 3962$). Of these infants, 633 (16%) were not treated, 2227 (56%) received only indomethacin, 388 (10%) had only surgical ligation, and 714 (18%) received both indomethacin and ligation. Odds ratios (OR) and 95% confidence intervals (CI) for mortality and/or major morbidity among PDA treatment groups were estimated using multivariate logistic regression (MVL) adjusted for possible confounders and other explanatory variables. A propensity score (PS) for ligation was derived that balanced measured covariates between infants with and without ligation within quintiles of the PS. Analyses were performed using PS matching (747 pairs of infants) and PS adjustment. The risk of mortality and/or morbidity was significantly increased for infants with ligation irrespective of indomethacin in MVL [OR = 2.77, 95%CI = (2.16, 3.55)], PS-matched [OR = 2.41, 95%CI = (1.80, 3.22)] and PS-adjusted [OR = 2.83, 95%CI = (2.19, 3.66)] analyses. In these preterm infants < 33 weeks, MVL and PS methods that take into account possible treatment selection bias provide consistent evidence that surgical ligation for PDA is associated with increased risk of mortality and/or major morbidity.

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WITHDRAWN

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THE RELATIONSHIP BETWEEN BIRTH OUTCOMES AND CHILD BEHAVIOR DEVELOPMENT. *M K Kim, H A Lee, E-J Kim, H Lee, Y J Kim, S Cho, E A Park, E H Ha, H Park (Department of Preventive Medicine, School of Medicine, Ewha Women's University, Seoul, Korea)

This study investigated to determine the relationship between child behavior development and birth outcomes including child gestational age, sex, and birth weight. We recruited the 320 children born at Ewha Womans University Mok-dong Hospital in Korea. The subjects were 4- and 5-year-old children. The information of birth outcomes were collected from medical record. And, all of the subjects completely took the enrollment and examined behavior problem by Korean Child Behavior Checklist (K-CBCL) from their parent. We used the analysis to compare the behavior development to birth outcomes with ANOVA and to determine the relationship with simple linear regression. As a result, the analysis was shown that K-CBCL score in girl was higher than in boy (46.80 ± 8.57 in girl vs. 44.83 ± 8.62 in boys) and premature infants was stronger than mature infants (50.14 ± 7.55 in premature group vs. 45.36 ± 8.63 in mature group). The weighted for gestational age had been divided three groups; small for gestational age (SGA), appropriate for gestational age (AGA), large for gestational age (LGA). It was confirmed that it had high risk in LGA group and it was increased 3.023 when it rose up a level than the lower group in total aspect ($p = 0.02$). These results were similar in external aspect ($p = 0.01$). In the conclusion, we found the effect of child behavior problem was associated with the birth outcome, such as LGA and preterm. This tendency was stronger external aspect than total. This work was supported by National Research Foundation of Korea Grant funded by the Korean Government (2009-0071150)

871-S

LARGE ETHNIC VARIATIONS IN MORTALITY IN PRE-SCHOOL CHILDREN IN DENMARK. *G S Pedersen, L H Mortensen, A-M N Andersen (Department of Epidemiology, Institute of Public Health, Odense, Denmark)

The objective of the study was to describe on a national basis ethnic differences in under-five-years mortality in Denmark according to maternal country of origin. We conducted a large registry-linkage study of all singleton live-born children from mothers born in Denmark and from the ten largest migrant groups in the period from 1973-2004 ($n = 1,841,450$). Study outcomes were death before the age of five years from all causes combined and the most frequent death causes. Results showed that children born to mothers of Turkish, Pakistani, Somali and Iraqi origin had an elevated risk of dying before the age of five compared to offspring of mothers born in Denmark, hazards ratios (HR) and 95 % confidence intervals (CI) of 1.48 (1.31-1.67), 1.97 (1.68-2.32), 1.70 (1.29-2.25), and 1.92 (1.41-2.62), respectively. Ethnic differences were also observed in the underlying causes of death. Children of mothers born in Former Yugoslavia, Lebanon, Norway, Sweden, Iran, and Afghanistan did not show statistically significant differences in under-five-years mortality as compared to the ethnic Danish children. Adjustments for household income did not attenuate the results. In conclusion we found excess child mortality in some migrant groups, but not in all. The differences could not be explained by socioeconomic status.

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IMPACT OF SOCIOECONOMIC AND ENVIRONMENTAL FACTORS ON INCREASED HEALTH RISKS OF CHILDREN WITH SINGLE MOTHERS. *M Scharte, G Bolte (Bavarian Health and Food Safety Authority, Munich D-80538, Germany)

Socioeconomic difficulties are discussed as mediating factors for adverse effects of lone parenthood on children's health. As child wellbeing also depends on environmental conditions, we investigated the impact of environmental and socioeconomic factors on differences in health outcomes of children with single mothers versus couple families. Data on 17218 preschool children (47% female) from three cross-sectional surveys conducted during 2004-2007 in Germany were analysed. Health and exposure assessment was based on parental report. Effects of socioeconomic indicators (maternal education, household income) and environmental factors (traffic load, perceived environmental exposures) on associations of 4 health outcomes (parent reported health status, asthma, overweight, psychological problems) with single parenthood were determined by logistic regression analyses. Children with single mothers showed a significantly increased risk regarding parent reported health status (boys: odds ratio (OR) 1.37; 95% confidence interval (CI): 1.07-1.77, girls 1.71 [1.27-2.32]), psychological problems (boys: 1.90 [1.38-2.61], girls: 1.56 [1.02-2.39]), overweight (only boys: OR 1.24 [1.02-1.52], and asthma (only girls: OR 1.92 [1.17-3.18]). Adjusting for socioeconomic factors attenuated differences in parent reported health status, overweight, and psychological problems. Although environmental factors had a significant influence on most health outcomes investigated, they did not alter differences between children with single mothers and couple families. The increased health risks of children with single mothers versus couple families are associated with socioeconomic factors, but not with environmental exposures.

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CHILDREN'S EXPOSURE TO SECOND-HAND SMOKE AT HOME AND IN THE CAR, CANADA, 2009. *S Keller, J Snider, E Rutherford (Office of Research and Surveillance, Controlled Substances and Tobacco Directorate, Health Canada, Ottawa, ON K1A 0K9, Canada)

Background: Second-hand tobacco smoke (SHS) is a known carcinogen to humans, which has prompted some Canadian jurisdictions to ban smoking in motor vehicles when children are present. This study reports on children's exposure to SHS at home and self-reported rates of smoking restrictions when children < 18 years are in family-owned or leased vehicles. Methods: Data were collected by the Canadian Tobacco Use Monitoring Survey 2009, a random-digit dialled computer-assisted telephone interview survey of 20,121 Canadian residents aged 15+ years. A logistic regression model included provinces' ban status, self-reported beliefs, smoking status, sex and age. People who did not have a vehicle or never had youth < 18 in vehicles were excluded. Results: Of Canadian children aged 0-17 years, 6.7% lived in a home where someone smoked inside the home every day or almost every day. Of the 18% of Canadian residents who allowed smoking in their cars, 19% did not restrict smoking in a family motor vehicle when youth < 18 years were present, representing 680,000 or 2.9% of Canadians. Belief that under certain conditions smoking should be allowed was the greatest risk factor for not having restrictions in cars with children < 18 (Odds Ratio 11.8, 95% Confidence Interval 8.1-17.2) followed by being a current smoker (OR 3.5, 95% CI 2.5-4.9), age 15-24 (OR 2.8, 95% CI 2.1-3.8) and absence of provincial law (OR 1.8, 95% CI 1.2-2.7). Conclusion: While the majority of Canadian residents do not allow smoking in the car, children continue to be exposed to SHS. Monitoring exposure to SHS in vehicles will provide an indicator of progress made with the advent of jurisdictional bans on smoking in vehicles.

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AN INTERNATIONAL CONSENSUS-BASED PROCESS TO DEVELOP A RESEARCH AGENDA FOR PEDIATRIC COMPLEMENTARY AND ALTERNATIVE MEDICINE (CAM). D Adams, S Pintov, A Vlieger, K Kemper, *S Vohra (University of Alberta, Edmonton, AB, Canada)

Pediatric complementary and alternative medicine (CAM) is a huge field with many unanswered research questions. Identification of priorities would help researchers, decision-makers, and funders. The objective of this study was to develop and refine a pediatric CAM research agenda. A modified 4-phase Delphi process was used to identify important knowledge gaps in pediatric CAM and to develop consensus around research priorities through an iterative process. In phase I an email survey was circulated to the broad CAM community asking for feedback on important knowledge gaps in pediatric integrative medicine and outcomes to be measured. A total of 143 participants in eleven countries responded to the survey. In phase II, 19/71 pediatric CAM researchers with diverse expertise responded to an invitation to comment on the results of phase I. Phase III consisted of an in-person meeting and yielded a draft research agenda with the following priority areas: i) safety of CAM therapies; ii) conditions for which conventional medicine lacks effective therapies or they are unsafe or costly, and/or when CAM use is highly prevalent among pediatric patients; iii) promising therapies for these conditions; and iv) identification and development of appropriate outcome measures. In phase IV, this draft document was circulated to the broad CAM community for feedback. A total of 197 responses have been received from 16 different countries and the feedback is currently being synthesized. This international consensus-based research agenda will serve as a guide to pediatric CAM researchers, decision-makers, and funders.

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EPIDEMIOLOGY OF PEDIATRIC BURN INJURIES IN HAMADAN-IRAN. *S Torabian, M S Saba (Hamadan University of Medical Sciences, Hamadan, Iran)

Burns are a prevalent problem worldwide especially in developing countries and it is a significant pediatric injury in Iran. This study was performed to analyze the epidemiology and etiological factors of pediatric burn patients in the province of Hamadan in the west of Iran since 20th March 2004 to 19th March 2007. The incidence rate of child burn hospitalization was 33.4 per 100,000 person-years. The median age was three years with 69% of the patients under four years. Male to Female ratio of incidence rate for all age groups was 1.52. Scald was the leading cause in almost all age groups; all four season; both rural and urban area, and It caused totally 266 (71.7%) burns. The correlation analysis showed that younger children are more vulnerable to scald injury. The mean BSA of burning was 16.36 (\pm 11.42) in all cases. Flame was more fatal than other causes of burn. Total fatality rate in this study was 3.5%. Epidemiological findings revealed that scald, age, gender, and rural area are the major issues should be discussed in considering childhood burns. Preventing programs require educating the mothers especially in rural area particularly with a focus on preparing food and controlling hot liquids.

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THE EFFECT OF ZINC SUPPLEMENTATION ON COGNITIVE OUTCOMES OF INFANTS AND TODDLERS AGED 1-24 MONTHS: A META-ANALYSIS. *M Maheu-Giroux, T Baernighausen (Harvard School of Public Health, Dept. of Global Health & Population, Boston, MA 02115)

Background: Zinc deficiency is one of the major contributors to global disease burden and has been linked to growth retardation, impaired immune functions, and increased morbidity due to infectious diseases. Animal studies established a link between zinc deficiency and cognitive dysfunction but the evidence in human, however, is inconsistent. Objectives: To assess the effect of zinc supplementation on selected cognitive outcomes of infants and toddlers aged 1-24 months. Methodology: A systematic review of randomized controlled trials and quasi-experimental studies was performed in order to measure the effect size of zinc supplementation on cognitive outcomes measured using the Bayley Scales of Infant Development (BSID). Studies in English, French, and Spanish were included. The overall mean effect size was estimated for mental and psychomotor development separately using a random-effects model. Heterogeneity was assessed using chi-square test and quantified using Higgins' I². Whenever appropriate, sources of heterogeneity were investigated in stratified analysis. Finally, potential publication bias was investigated. Results: A total of 172 studies were retrieved, from which 8 met the inclusion criteria (with 10 unique comparison groups). Overall mean effect size of zinc supplementation on infant's mental development index was -0.32 (95% confidence interval (CI): -1.80 to 1.17). As for the index of psychomotor development, overall mean effect size was 1.56 (95% CI: -1.90 to 5.03). Conclusion: Zinc supplementation is not associated with improved mental or psychomotor development in infants and toddlers, as measured by the BSID.

878-S

ALLERGEN-SPECIFIC ATOPY BY RACE/ETHNICITY IN CHILDREN. *S Chandwani, G Rhoads, K Demissie (University of Medicine and Dentistry of New Jersey, New Brunswick, New Jersey 08901)

Variations in exposure to different allergens and susceptibility to them may differ by race. The purpose of this study was to determine racial differences in the prevalence of allergen-specific atopy using the 2005-2006 National Health and Nutrition Examination Survey data. Allergen-specific atopy was defined as IgE level ≥ 0.35 kU/L. Subjects who identified themselves as non-Hispanic white (NHW) or non-Hispanic black (NHB) were included. In this nationally representative sample, among children 1-5 years of age, NHB were more likely than NHW to report physician diagnosed asthma (17.4% vs. 9.4%), wheeze (20.2% vs. 16.2%), and eczema (22.6% vs. 20.5%). In children 6-19 years, eczema was higher among NHB, but no difference by race was seen in rates of physician diagnosed asthma and wheeze. Among 1-5 yrs, NHB were more likely than NHW to exhibit atopy to eggs [odds ratio (OR) = 2.16; 95% confidence interval (CI): 1.35-3.47] and milk (OR = 2.39; 95% CI: 1.52-3.77). Among 6-19 yrs, NHB were more likely than NHW to exhibit atopy to the following indoor allergens: D.Farinae (OR = 2.06, 95% CI: 1.39-3.08), D. Pteronyssinus (OR = 2.01, 95% CI: 1.40-2.88), cockroach (OR = 4.00, 95% CI: 2.89-5.52), mouse (OR = 8.06, 95% CI: 2.47-26.34) and rat (OR = 4.78, 95% CI: 1.80-12.71). Similarly, NHB showed a higher likelihood of atopy to outdoor allergens, including ragweed (OR = 1.93; 95% CI: 1.20-3.09) and Alternaria (OR = 2.42; 95% CI: 1.58-3.71). No significant differences by race were noted for atopy to cat and dog allergens. Findings from this study suggest that exposure or sensitization to different allergens vary by race and underscore the need for adoption of race-specific measures to reduce atopic diseases among African-American children.

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SOCIOECONOMIC STATUS (SES) RELATED TO BONE PROPERTIES IN CANADIAN ADOLESCENT FEMALES. *S Imam, M Tammemagi, P Klentrou, K Gammage (Brock University, St. Catharines, ON L2S 3A1, Canada)

Osteoporosis is a bone condition characterized by low bone mass and increased susceptibility to fractures in older adults, particularly females. Peak bone mass (PBM) is accrued by age thirty in females. It is imperative adequate PBM be acquired in adolescent females to minimize future risk for osteoporosis. There is limited literature on the relationship between SES as a risk factor and bone properties in adolescent females. In a cross-sectional study of Canadian adolescent females (n = 430) from six randomly selected schools in Southern Ontario, multivariable regression analyses were used to assess the association between parental SES indices and bone speed of sound (SOS) in a multilevel model with participants nested in schools. Bone SOS was measured by transaxial quantitative ultrasound at the distal radius and mid-tibia. SES was determined by matching residential address for each participant with Statistics Canada 2006 Census data for their census area. Mean age was 15.7 ± 1.1 years. Multilevel analysis found a significant difference in SOS among schools at both radial and tibial sites ($p < .001$). Multivariable regression analysis indicated significant positive relationships for both median family income ($p = .003$) and median household income ($p = .003$) with tibial SOS adjusted for grade, weight, body mass index, smoking and alcohol use. Further analysis of average family income ($p = .006$) and average household income ($p = .003$) also indicated significant positive relationships with tibial SOS. These data suggest that school and SES at the census aggregate variable level are important predictors for bone SOS in female adolescents when analyzed separately. School appears to dominate over SES census variables when analyzed together.

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PRENATAL PET EXPOSURE AND THE TRAJECTORY OF TOTAL IGE DURING INFANCY. *C C Johnson, S Havstad, G Wegienka, K Woodcroft, K Bobbitt, C Nicholas, E Peterson, S Lynch, H Boushey, C Joseph, E Zoratti, D Ownby (Henry Ford Health System, Detroit, MI 48202)

Allergies and asthma have been increasing in prevalence over the last half century among children residing in Westernized countries. Pets in a home during the prenatal period and during early infancy have been associated with a lower prevalence of allergic sensitization and total IgE in middle childhood. No studies have examined the effect of pet exposure in a general risk population using multiple early life measures of serum total IgE. Our objective was to examine within-individual longitudinal trends in total IgE during early childhood and assess the effect of indoor prenatal pet exposure on those trends. Using the population-based Wayne County Health, Environment, Allergy and Asthma Longitudinal Study (WHEALS) birth cohort, we analyzed 1187 infants with one to four measurements of total IgE collected from birth to 2 years of age. Effects of pet exposure on the shape and trajectory of IgE were assessed using a multilevel model. The best fit shape to the trajectory of IgE was non-linear. Total IgE was lower, across the entire early life period, when there was prenatal pet exposure ($p < 0.001$). This effect was stronger in both children born from caesarian-section births and non-African American mothers. Total IgE increased, but not necessarily in a linear fashion, over the early life period of children. Children from households where prenatal indoor pet exposure was reported had a consistently lower IgE over this time period. This effect may be stronger in children of caesarian-section births and with non-African American maternal race.

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INCOME DISPARITIES IN PREVENTIVE DENTAL CARE AMONG CHILDREN WITH SPECIAL HEALTH CARE NEEDS. *M Gage, J Wilder, K Rankin (University of Illinois, Chicago, IL 60612)

Unmet dental care is a challenge among children with special health care needs (CSHCN). This challenge may be more exaggerated in CSHCN at or below 200% of the federal poverty level (FPL). We conducted a cross-sectional study to explore income disparities in preventive dental care among CSHCN. The 2007 National Survey of Children's Health was analyzed and restricted to CSHCN aged 1-17 (N = 18,025 nationally weighted N = 13,831,698). Complex sampling procedures were used to generate population level estimates. We created a propensity score to capture household and parental characteristics to adjust for confounders. Among CSHCN at or below 200% FPL, 22% did not receive preventive dental care in the previous 12 months compared to 11% of CSHCN above 200% FPL. After adjustment, factors associated with CSHCN receiving preventive dental care were oral health status (excellent/very good) odds ratio (OR) = 2.38, 95% confidence interval (CI) 1.55-3.66; good OR = 1.73, 95% CI 1.12-2.67), oral health problems (1 OR = 1.82, 95% CI 1.34-2.46; ≥ 2 OR = 2.76, 95% CI 1.73-4.42), and insurance type (private OR = 2.55, 95% CI 1.50-4.30; public OR = 3.03, 95% CI 1.79-5.10). CSHCN at or below 200% FPL who were US-born (OR = 2.62, 95% CI 1.52-3.71) or school-aged (OR = 3.36, 95% CI 2.79-3.99) were more likely to receive preventive dental care. The proportion of CSHCN at or below 200% FPL not receiving preventive dental care is 2 times greater than those above 200% FPL. School-age and US nativity are protective factors for receiving preventive dental care among CSHCN at or below 200% FPL. While income disparity may be a major determinant to receiving preventive dental care in CSHCN, other social attributes play important roles in their access to dental care.

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CORRELATION OF INFANT MORTALITY AND MULTIPLE CAUSES OF DEATH. *R Levine, B Kilbourne (Meharry Medical College, Nashville, TN 37208)

Using the CDC Wonder Internet web site's presentation of the compressed mortality file, we identified 114 US counties with reliable infant mortality rates as well as age-adjusted mortality for non-Hispanic whites ages 1 to 85 years for malignant neoplasms, ischemic heart disease, other heart disease, diabetes mellitus, cerebrovascular disease, transport accidents, other accidents, assault, and diseases of the liver. Among men, significant correlations were found for malignant neoplasms, diabetes mellitus, ischemic heart disease, cerebrovascular disease, assault, and diseases of the liver. Among women, significant correlations were found for ischemic heart disease, malignant neoplasms, and cerebrovascular disease. The findings are consistent with the hypothesis that infant mortality is an important indicator of general community health.

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POSTNATAL EXPOSURE TO METHYL MERCURY AND COGNITIVE DEVELOPMENT IN 7-YEAR-OLD CHILDREN. *Y Wang, A Chen, K Dietrich, W Rogan (NIEHS, Research Triangle Park, NC 27709)

High prenatal exposure to methyl mercury (MeHg) causes mental retardation, and moderate exposure, as in the Seychelles and Faroes, may affect cognition in children. There are few studies of background postnatal exposure and cognition. We measured MeHg in blood samples from the Treatment of Lead-exposed Children trial, in which 780 children, 12-33 months old, were given succimer or placebo and followed with IQ and other neurodevelopmental tests through age 7 years. We have reported that MeHg at age 2 years was unrelated to IQ at age 2, 5 and 7; here we examine MeHg and IQ both measured at age 7 years. A maximum likelihood method was used to estimate geometric mean MeHg concentration and Generalized Linear Models were used to analyze log (MeHg) and IQ scores. Geometric mean MeHg in 618 specimens at age 7 was 0.57 [95% Confidence Interval (CI): 0.55, 0.60] µg/L. MeHg and IQ were the same in the succimer and placebo groups. A 10-fold increase in MeHg was associated with a 1.6 (0.2, 2.9) point increase in IQ, adjusted for MeHg at age 2, caregiver's IQ, clinical center, race, 7 year blood lead concentration, and language spoken at home. MeHg comes mostly from fish consumption, and fish are rich in fatty acids that are important for brain development. MeHg blood concentration may be a measure of a diet that is net favorable for cognitive development in children. Longitudinal studies that measure IQ, MeHg, and micronutrients from fish are needed to refine the recommendations for fish consumption in children. Key words: Mercury; IQ; behavior; diet

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LONGITUDINAL PATTERNS OF PERCEIVED EXPOSURE TO SMOKING IN MOVIES IN ADOLESCENCE AND SUBSEQUENT CIGARETTE SMOKING STATUS. *K Choi, D Erickson, J Forster (University of Minnesota, Division of Epidemiology and Community Health, Minneapolis, MN 55454)

Although previous studies have found an overall decline in recent years in the perceived exposure to smoking in movies among teenagers, the potential heterogeneity of this perception has not been examined. Using data from the Minnesota Adolescent Community Cohort, we explored the trajectories of perceived exposure to smoking in movies from age 12.5 to 15.9, and their effects on smoking status at ages 16 and 18. Participants (n = 2243), ages 12-13 at baseline and surveyed every six months through age 18, reported how often they saw actors and actresses smoking in movies (responses collapsed into high [all the time] versus low [some of time, hardly ever, never]). We assessed participants' smoking status with six smoking stages (from non-smoker to established smoker), constructed from five survey items. Using latent class growth analysis, we found different patterns of perceived exposure to smoking in movies over time from age 12.5 to age 15.9: Class 1 (consistently high exposure, 14%), Class 2 (declined from high to low exposure, 13%), Class 3 (consistently moderate exposure, 18%), and Class 4 (consistently low exposure, 55%). In a regression analysis, membership in Classes 1 and 2 (compared to Class 4) predicted a higher smoking status at age 16 (p < .01), and membership in Class 1 (compared to Class 4) also predicted a higher smoking status at age 18 (p = .02), after controlling for demographic predictors and previous smoking status. In conclusion, consistently high perceived exposure to smoking in movies during adolescence not only predicts greater risk of smoking during adolescence but also in young adulthood.

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EXPANDING DIMENSIONS OF EPIDEMIOLOGY: POPULOMICS? *D Labarthe (Division for Heart Disease and Stroke Prevention, CDC, Atlanta, GA)

Research in epidemiology and prevention of cardiovascular diseases continues to grow in scope and complexity, as it does for noncommunicable diseases generally and other conditions of global dimension [1]. Time, Place, and Person come to be viewed as extending, respectively, from pre-history to future generations, from small areas to the world, and from communities to regional and global populations. While the population is the ultimate level of concern, the scope of relevant research extends across the full spectrum of biomedical and community health research, from molecules to populations. Notions of 'black box' epidemiology may have given way to 'Chinese box' epidemiology, but a further evolutionary stage is apparent. Needs of global CVD and other chronic disease prevention require reconsideration of the classic epidemiologic dimensions of time, place, and person on a larger than usual scale as, for example, with the theory of epidemiologic transition. A larger view also recognized regarding collaboration across scientific disciplines, communication between science and other societal interests, and partnerships extending beyond health to reach other sectors. Calls for such forms of "connectivity" are expressions of need to broaden engagement in health as a societal interest. A concept may be useful that embraces the full breadth of population health along these several dimensions and can have growing impact on population health. In the current "-omics era", this territory and enterprise might be designated "populomics" – a broadly conceived integrative human ecology, with improving population health as its goal and epidemiology at its core. [1] Labarthe DR. (2010) *Epidemiology and Prevention of Cardiovascular Diseases: A Global Challenge*. Jones and Bartlett Publishers, Sudbury MA

A COMPARISON ON THE PREVALENCE OF BEING OVERWEIGHT, OBESE AND UNDERWEIGHT AMONG CHILDREN AGED 4-6 YEARS BETWEEN 1997 AND 2008. *N Sakamoto, U Yamborisut, L Yang (National Research Institute for Child Health and Development, Tokyo, Japan)

To examine the prevalence, trends and urban/rural distribution of under- and over-nutrition in children aged 4 to 6 years in 2008 compared to 1997, in Saraburi province, Thailand, we conducted two cross-sectional surveys in 1997 and 2008. The number of children included in the analysis was 1157 and 1561 in 1997 and 2008, respectively. The WHO Child Growth Standards and WHO reference 2007 were used to assess the children as stunted, underweight, wasting, overweight and obese. The overall prevalence of stunted growth decreased in both urban and rural areas. Overweight and obesity remained at high levels, and was stable among urban children. The significant increase in overweight and obesity occurred in rural areas. The prevalence of overweight (including obesity) increased from 11.6% to 17.8% among rural children, and prevalence of obesity increase from 4.0% to 9.4% between 1997 and 2008. Logistic regression analysis showed a significant increase in being obese in the 2008 survey compared with 1997 survey in rural areas, after adjusting for age and gender. This study demonstrated a high prevalence of children being overweight and obese among urban preschool children and an increasing trend among their rural counterparts. These findings emphasize the need for the establishment of new public health strategies to tackle the threat of being overweight and obese among children, while focusing on both urban and rural areas.

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CHRONIC MALNUTRITION AND ACADEMIC PERFORMANCE, THE ROLE OF SCHOOL LUNCH PROGRAMS IN RURAL NICARAGUA. *J K Edwards, M L Zelek (University of North Carolina, Chapel Hill, NC 27516)

Chronic malnutrition contributes to the cycle of poverty in the developing world. We examined the impact of such malnutrition on academic performance in communities with and without school lunch programs. The Fabretto Health and Nutrition Study, conducted in Cusmapa and Las Sabanas, Nicaragua in 2009, included 535 primary school students. Cusmapa had a school lunch program, while Las Sabanas did not. Chronic malnutrition was defined as stunting, or measuring more than two standard deviations below the mean height for the WHO reference population. Math, Spanish, and conduct grades in 2009 were compared between stunted and non-stunted children using hierarchical linear models to account for clustering at the community and household level. After controlling for confounding by age, mother's education level, and distance from the child's home to the school, stunted children in Las Sabanas performed 1.47 (95% confidence interval: -1.30, 4.24), 1.09 (-1.59, 3.78), and 1.90 (-0.19, 3.80) points worse than nonstunted children in Math, Spanish, and conduct, respectively. However, in Cusmapa, stunted children performed 1.14 (-3.44, 5.72) and 0.52 (-3.95, 4.99) points better than nonstunted children in Math and Spanish, and 3.07 (-1.64, 7.79) points worse in conduct. School attendance, a strong predictor of Math and Spanish grades, was higher among stunted children than non-stunted children in Cusmapa (difference in percent attendance = 2.31 [-0.58, 5.20]), but lower in Las Sabanas (difference = -2.68 [-5.17, -0.18]). These findings suggest that school lunch programs may reduce the disparity in academic performance between malnourished children and non-malnourished children by providing an incentive for malnourished children to attend school.

PRACTICAL TOOLS FOR MANAGING THE QUALITY OF BIOLOGICAL AND ENVIRONMENTAL SPECIMENS COLLECTED FROM A DISTANCE. *S V Baker, M Watson, N B Ragan, P J Schwingl (Social & Scientific Systems, Inc, Durham, NC)

Assuring quality in the collection, handling, storage, and transport of specimens for epidemiologic studies can be challenging in the most straightforward of circumstances. These operations performed remotely - in sophisticated medical centers across the U.S., Europe, or Asia, or in small villages in Africa - require acknowledgment of the pragmatic and logistical challenges early in the design phase and throughout the life course of the project. The paper lays out an "informed logistical approach" to mitigate unknown threats to specimen quality and integrity. Recognition of the cultural context of the study and a mantra of "No assumptions" is essential. Early and frequent communication with local collaborators, input from potential participants, site institutions, local communities and regional and country-level stakeholders is essential to ensure smooth operations. The opinions of village elders or large institutional bureaucracies may appear to constrain the project, but are necessary to understand early on to overcome logistical barriers. Adapting and scaling the management system and technologies for the setting is critical. Early clarification of roles, responsibilities and job descriptions can identify unwarranted assumptions and potential gaps. Issues regarding the management of results from specimen analysis in the field, monitoring and trouble shooting from afar, and avoidance of ubiquitous environmental contaminants are addressed. Modeling and evaluating specimen integrity and quality using a "dry-run," a run-in phase, and intensive review during the ramp-up phase, creates opportunities to make corrections and adaptations before the full study.

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VALIDITY OF SURVEY ITEMS AND PICTOGRAMS OF TOBACCO USE IN HOUSEHOLD SURVEYS OF RUSSIA, UKRAINE, AND KAZAKHSTAN. *P N Singh, L Drach, N Gavrikova, Y Ibrayev, V Nesterova, V Shalakhov, A Shumkov, A Zamudriakova, M Zhalovaga, E Zaitsev, A Sokolov, A Bokhari, S Knutsen (Loma Linda University, Loma Linda, CA 92350)

There is currently a paucity of national prevalence data on all forms of tobacco use in nations of the former Soviet Union. Since the tobacco market opened to multinational brands during the 1990's, these nations have experienced a vast proliferation of the commercial brands of cigarette, cigarillos, cigars, and pipe tobacco sold and manufactured. Such brands include tobacco-laced filters, products that target young women, and products that use locally grown tobacco leaves with higher levels of nicotine. The expansion of commercial cigarette brands is occurring in addition to the established regional forms of tobacco that include the papirosi and in some nations the water-pipe. We sought to design a survey that could comprehensively monitor the wide range of tobacco products in nations of the former Soviet Union. Our 20-item survey combined questionnaire items with pictograms of brand, type, and amount of tobacco. The instrument was designed as part of an epidemiology training program to build the research capacity of local health professionals. Survey design was accomplished by conducting key informant interviews and focus groups of tobacco users, review of previous surveys of tobacco use in Russia and parts of Asia, and through pre-testing. Quantitative validation was accomplished by a systematic sampling of 167 adults who were administered the questionnaire and a test of salivary cotinine. The tobacco survey items and pictograms administered to this sample had a sensitivity of 94.7% [95% CI 89.0%-97.7%], specificity of 94.3% [95% CI 79.5%-99.0%], and positive predictive value of 98.4% [95% CI 93.9%-99.7%] in the detection of tobacco use by salivary cotinine. The number of cigarettes estimated was positively correlated (spearman's $r = 0.59$, $p < 0.0001$) with salivary cotinine. A 20-item tobacco survey that uses pictograms to identify brand, type, and amount of tobacco was a valid estimator of tobacco use in Russia, Ukraine, and Kazakhstan.

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ADVERSE EVENTS AND OUTCOMES DURING MULTIDRUG RESISTANT TUBERCULOSIS (MDR-TB) TREATMENT IN PATIENTS WITH AND WITHOUT ALCOHOL USE, TOMSK, RUSSIA. *A Miller, I Gelmanova, S Keshavjee, S Atwood, S Mishustin, J Furin, S Shin (Harvard Medical School, DGHSM, Boston, MA 02115)

Alcohol use poses substantial challenges to successful MDR-TB treatment. We report on adverse events and treatment success in a cohort in Russia with high rates of use. 418 non-incarcerated patients were consecutively enrolled to start MDR-TB treatment between 10 Sept.2000-1 Nov. 2004 in Tomsk Oblast, Russia. All data were collected via standardized chart abstractions. Adverse events (AE) included hepatitis, nephrotoxicity, hypokalemia, depression, psychosis, seizure, hypothyroidism or ototoxicity. Of 418 study participants, 268(61.7%) used alcohol during treatment. 284 participants had an AE of whom 173(60.9%) were alcohol users. Alcohol users were more likely to have depression(9.3% vs. 3.8% $p = 0.03$), and less likely to have nephrotoxicity (7% vs. 13%, $p = 0.04$) than non-users. No other statistically significant differences in adverse events were noted, including hepatotoxicity, seizure, or neurotoxicity. Non-users had higher mean treatment adherence proportions than users (92% vs. 83%, $p < 0.00$). 58.4% of alcohol users vs 78.4% of non-users had good treatment outcomes ($p < 0.00$). This association remained true whether or not adverse events had occurred. Conversely, having an AE was associated with an increase in good treatment outcomes among alcohol users (58.4 had AE vs. 31.8% no AE, $p < 0.01$), but not among non-users(78.3% had AE vs 78.4% no AE, $p = 0.3$). Better adherence to MDR TB treatment may result in both increased likelihood of toxicity and better outcomes. Alcohol use is associated with worse outcomes, but medication side effects did not appear to be the reason for the difference in outcomes. 58% of users still had good outcomes.

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GLOBAL INCIDENCE AND PREVALENCE OF SYSTEMIC LUPUS ERYTHEMATOSUS BETWEEN 1990 AND 2010: A SYSTEMATIC REVIEW. *M Senga, M A Ganser, E C Somers (University of Michigan, Ann Arbor, MI)

Systemic lupus erythematosus (SLE) is a serious autoimmune disease with significant impact on morbidity, mortality, and quality of life. However, it has received little public health attention. We conducted a systematic literature review to investigate the global pattern of incidence and prevalence of SLE. Four electronic databases were searched to identify cohort and cross-sectional studies, published from 1990-2010, describing incidence and/or prevalence of SLE. Crude incidence and prevalence rates and corresponding 95% confidence intervals were computed based on the number of cases and population at risk. Results were stratified by continent, and by physician-confirmed diagnosis versus self-report. Heterogeneity was assessed by exact likelihood ratio tests. Pooled estimates were calculated when heterogeneity was not detected, weighted by denominator. Of 11,870 screened articles, 65 (49 prevalence & 32 incidence) from 5 continents met eligibility criteria and were included in the analysis. Studies from all regions yielded annual incidence rates between 0.3 and 8.7 per 100,000 and prevalence between 1.1 and 534.9 per 100,000. High incidence was observed in the United States, Caribbean, Brazil, and Sweden. Prevalence was much higher in the United States than in Europe and Asia. Prevalence was also higher among studies with self-reported physician-diagnosed SLE cases compared to physician confirmed cases. We conclude that there was considerable variability in both incidence and prevalence across different regions. Multiple sources of discrepancy must be considered in international research: study design, case ascertainment method, type of surveillance, race, gender, and method of case classification.

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HIV PREVENTION SUPPORT TIES DETERMINE ACCESS TO HIV TESTING AMONG MIGRANT FEMALE SEX WORKERS IN BEIJING, CHINA. *M Park, H Yi (Columbia University, New York, NY 10032)

Scaling up access to public health resources is critical to control the HIV epidemic among most-at-risk populations. In China, despite the government's continuous efforts, the actual coverage of HIV testing among female sex workers (FSWs) is still limited due to structural (e.g., criminalization and frequent relocation) and socio-cultural barriers. This study explored the role of HIV prevention support ties (HPST) in access to HIV testing among migrant FSWs in a low-income neighborhood of Beijing. We constructed HPST as social capital for prevention, including mass media, clinics, ties with non-governmental organizations (NGOs), FSWs' managers, coworkers, and non-sex work related social ties. Using an intervention mapping method, we conducted a survey with 348 migrant FSWs from 8 different types of venues for 3 months in the winter time in 2009 to include the seasonal "floating" rural-to-urban migrant women. Of the participants, only 22% had been tested for HIV in the past year. HIV testing was associated with education, origin of migration, income, sex work venues, HIV knowledge, regular STI check-up, and two indicators of HPST – receiving condoms and HIV knowledge from (1) co-workers and (2) NGOs. In multivariate models, only HIV knowledge (Adjusted Odds Ratio; AOR = 1.75, 95% Confidence Interval; CI: 1.41-2.90) and HPST (coworkers: AOR = 1.61, 95% CI: 1.35-3.21; NGO: AOR = 2.04, 95% CI: 1.80-3.21) were found to be independent predictors for testing. The findings suggest that structural foundation of prevention capacity in the FSWs community should emphasize relational protective networks with coworkers and NGOs to facilitate collective infrastructure building of health promotion.

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KNOWLEDGE AND ATTITUDES AMONG WOMEN AND HEALTHCARE PROVIDERS ABOUT HIV TRANSMISSION AND BREASTFEEDING. *R Rasal, N T Nguyen, S L Welles, G Alleyne, L Coleman, E Aaron, M Follen, S Urdaneta Hartmann (Drexel University College of Medicine, Center for Women's Health Research, Philadelphia, PA 19102)

Basic knowledge of HIV-transmission may help improve understanding and acceptability of biomedical interventions to prevent it. We are currently developing a nipple shield device that will deliver anti-HIV compounds (e.g., nevirapine, edible microbicides) to prevent HIV-transmission through breast milk. To access acceptability and feasibility of the use of this device we are evaluating the baseline knowledge and attitudes among women and healthcare providers about HIV transmission and breastfeeding. Data will be collected in the U.S. from women (HIV-infected and non-infected) and healthcare providers that advise women on infant feeding. We will implement a cross-sectional self-administered anonymous survey. Data will be analyzed using descriptive statistics to compare demographic characters and univariate and multivariate analysis to identify relationships and interaction between factors associated with HIV knowledge and acceptability of safe breastfeeding method. We hypothesize that HIV-infected mothers are more knowledgeable regarding vertical transmission of infection through breastfeeding than non-infected mothers, and that they favor development of interventions that would allow them to safely breastfeed their babies. We also hypothesize that healthcare providers would recommend an intervention only if it were 100% effective in preventing vertical transmission of HIV through breastfeeding. Understanding baseline knowledge and perception among potential end users of the intervention and those who would recommend it will help in planning strategic implementation and design of this biomedical device. In future this survey will be replicated in Nigeria.

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PREVALENCE AND FACTORS ASSOCIATED WITH IRRITABLE BOWEL SYNDROME AMONG MEDICAL STUDENTS OF KARACHI: A CROSS-SECTIONAL STUDY. *S S Naeem, E U Siddiqui (Dow University of Health Sciences, Karachi, Pakistan)

Irritable bowel syndrome (IBS) is commonly reported among university students; however few analytical based studies are available on IBS from Pakistan. We investigate the prevalence and pattern of symptoms of IBS along with anxiety among medical students of Karachi. A cross-sectional study was conducted among 360 students attending three large medical colleges of Karachi recruited in equal proportion. Data was collected using validated tool "Rome III Criteria" and Generalized Anxiety Disorder Questionnaire. Diagnosis were made on the criteria that students experiencing abdominal discomfort at least 2-3 days/month, also had high level of Anxiety. Convenient sampling was done to recruit the participants aged 18 years and above, after getting written informed consent. The apparent prevalence of IBS was found to be 102 (28.3%) with a predominance of 87(85.29%) in female than male students 15 (14.71%). The psychological symptoms of anxiety were encountered in 57 (55.8%) participants with IBS, among which, male were 15.7% and female 84.2% respectively. Stress during examinations, university assignments, clinical rotations, interpersonal relationships, emotional disorders and living environment are few of the major independent factors found to be associated with IBS. The medical students of Karachi who suffered more mental stress and anxiety resulted in a high level IBS as compared with previous study reports. There were significantly more women with IBS than men. As a consequence, key health messages and interventions to reduce stress and anxiety among students may help in curtailing the burden of this disease.

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EXPLORING DETERMINANTS OF HOOKWORM INFECTION IN PERUVIAN SCHOOLCHILDREN USING A GENDER ANALYSIS. T W Gyorkos, M Maheu-Giroux, *B Blouin, M Casapia (Division of Clinical Epidemiology, McGill University Health Centre, Montreal, QC, Canada)

Gender has recently become recognized as a fundamental determinant of health; however, epidemiological studies on parasitic diseases have failed to appropriately consider it in study methodologies and analyses. The present survey aims to investigate how determinants for hookworm infection may be gender-based. All Grade 5 children, who provided parental consent and child assent, from eligible primary schools in Belen, Peru were interviewed with a 30-item questionnaire and asked to provide a stool specimen. Hookworm prevalence and intensity were determined using the Kato-Katz technique. Preliminary data were obtained for 927 children: 50.7% boys; mean age 10.4 yrs; hookworm prevalence in boys: 17.0%, and in girls: 9.0%. In univariate analyses, being a boy, having dirty fingernails, lacking potable water in the home, drinking water directly (not boiled or treated), and walking barefoot in the home were found to be determinants of hookworm infection. To examine whether determinants were gender-based, multivariate analyses were stratified. In boys, dirty fingernails (OR = 2.20; 95% CI: 1.33, 3.64), presence of potable water in the home (OR = 0.55; 95% CI: 0.32, 0.94) and wearing shoes or sandals in the home (OR = 0.20; 95% CI: 0.06, 0.61) remained significant determinants for hookworm infection. In girls, however, no variables were found to be significant determinants for hookworm infection. Further multivariate analyses exploring the gender basis for these differential results will inform the development of an epidemiological framework for gender analysis in parasitic diseases and, ultimately, appropriate and responsive targeted interventions.

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ASSOCIATIONS OF CANDIDATE GENES WITH OVERWEIGHT RISK AND BMI IN CHINESE ADOLESCENTS. *B Xie, D Li, P H Palmer, C Anderson Johnson, David Conti (School of Community and Global Health, Claremont Graduate University, San Dimas, CA 91773)

A few candidate genes regulating dopamine and serotonin synthesis, release, uptake and transportation have been identified to be associated with overweight risk and body mass index (BMI) with mixed findings in a limited but growing body of literature. Replication studies with population-based samples are clearly necessary to quantify population effects of the relevance of genetic variants on risks of overweight and BMI. We attempted a systematic investigation of associations between 57 candidate genes with over 3,432 SNPs and BMI and overweight status in 1,282 Chinese adolescents of 11-15 years old living in Wuhan, China. A pathway-based approach was adopted to provide more complete coverage of the underlying genetic variation within a suspected etiologic system. Both gene-based (significance of most significant SNP within a gene after correction for other tested SNPs within the gene) and experiment-wide (significance level after Bonferroni correction across 57 genes and defined as $p < 0.0009$) significance were applied. Although none of SNPs achieved experimental-wide significance levels, an SNP (rs4870266) on the mu1 opioid receptor gene (OPRM1) emerged as a plausible candidate that was consistently associated with both overweight risk and BMI at gene-based significance level. Other five genes probed with multiple SNPs (HCRTR2, PICK1, POMC and CRH1) were associated only with BMI at gene-based significance level. Our findings convey the potential to derive new insights about gene effects on overweight risk and BMI in Chinese adolescent population.

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INCIDENCE AND AWARENESS OF CIGUATERA FISH POISONING IN ST. THOMAS, U.S. VIRGIN ISLANDS. *E Radke, L Grattan, S Roberts, M Abbott, J G Morris (University of Florida, Gainesville, FL 32610)

Introduction: Ciguatera fish poisoning (CFP) is a public health concern for persons in tropical and sub-tropical areas. We performed a telephone survey to estimate the incidence of CFP in St. Thomas, describe those affected, and gauge public awareness. Methods: Home and cellular numbers were randomly selected from a database of residential telephone exchanges. Incidence was estimated with emergency department (ED) data from the local hospital and survey data on the proportion of people who visited an ED during their most recent CFP episode. Chi-square tests were used to compare participants with history of CFP to those without. Results: 407 households were contacted and willing to participate. 87 participants (21%) recalled ever having fish poisoning. Of these, 36% reported visiting the ED. Based on a four year average, the incidence was estimated at 3.6 per 1000 (95% confidence interval = 2.8-5.2). Factors associated with CFP were education, fish consumption, and being born in the Caribbean. A majority of participants believed that certain types of fish are poisonous, but no species was mentioned by more than 20%. A large proportion (41%) incorrectly believed they could tell if a fish is poisonous. Conclusion: The incidence estimate is lower than older estimates in St. Thomas. Future surveys will use a more comparable measure to examine the trend over time. Despite 25% of households having someone affected by CFP, there were large gaps of knowledge that indicate a need for further public education. This survey provides information about the status of CFP in the U.S. Virgin Islands and provides a base for planned future surveys in the region.

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DETERMINANTS OF ANTIBIOTICS PRESCRIPTION FOR SCHOOLCHILDREN AT ALLADA, SOUTH BENIN. *G K Koura, A Garcia, T Beheton, P Deloron, M Cot, J-F Faucher (Institut de Recherche pour le Développement, UMR 216, Mère et enfant face aux infections tropicales, Paris, France)

To study the determinants of antibiotics prescriptions for schoolchildren by nurses. Data were collected during a prospective study on treatment of parasitologically-confirmed cases of malaria in four schools (Allomé, Centre, Dankoli, Dogoudo) of the district of Allada in the Republic of Benin. One thousand six hundred thirty children were included from February till June 2008. Fever was the first reason for consultation (57%), followed by digestive (27%) and respiratory (24%) symptoms and skin lesions (17%). A malaria diagnosis was confirmed in 61% of the children attending for fever. Antibiotic was prescribed for 40% of children (21% with confirmed malaria diagnosis and 57% with a non-malarial-fever). We found a significant association between an antibiotic prescription and a respiratory infection diagnosis (OR [IC 95%]: 41.09 [24.34-69.33]), and to a lesser extent between an antibiotic prescription and a cutaneous infection diagnosis (OR [IC 95%]: 5.78 [4.20-7.97]). The rational use of the antibiotics is a major challenge in poor resource countries. A better knowledge of the determinants of antibiotics prescription is critical in order to establish rules of this rational use of antibiotics. We found that, by far, the diagnosis of respiratory infection is the main factor associated with an antibiotic prescription. Was this finding firmly established, further clinical research studies would be needed in order to find the most appropriate ways of restricting antibiotics prescriptions for children who complain with respiratory symptoms.

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AN INNOVATIVE APPROACH TO COGNITIVE INTERVIEWING FOR CULTURALLY ADAPTING AUTISM SCREENING INSTRUMENTS. *F Yucel, M Kudumu, C Barker-Cummings, A Wetherby (Social & Scientific Systems, Inc., Durham, NC 27703)

We culturally adapted four autism screening and diagnostic instruments in preparation for a study of cultural differences in early signs of autism spectrum disorder (ASD). The study will compare early signs of ASD in children from the KwaZulu-Natal province of South Africa with children from Leon County, Florida, and children of Latino immigrants in Immokalee, Florida. To ensure an accurate translation into isiZulu, we had to assess the questions for comprehensibility and relevance to the Zulu culture. To do this we adapted cognitive interviewing techniques. In cognitive interviewing, a process that typically involves audio recording and transcription, a trained interviewer asks each question, and then debriefs subjects on how they answered to assess their understanding of the question. We replaced this with a pen-and-paper method of recording subjects' feedback, allowing us to employ interviewers with no prior cognitive interviewing experience, and to bypass transcription. Two English-and-isiZulu speakers were trained as interviewers. Bilingual Zulu parents were recruited as the subjects to evaluate 193 statements and questions. Approximately 36% of the 193 questions and statements were revised as a result of this process. 45% of the revisions involved simplifying the English wording for greater clarity; 28% of the changes involved replacing English idiomatic expressions; 15% of the changes involved replacing ambiguous English words with more specific ones; 12% of the changes involved eliminating or replacing content that was not culturally relevant. Overall, this technique proved to be an effective tool for assessing the clarity and cultural relevance of instruments prior to translation.

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PREVALENCE AND RISK FACTORS FOR SOIL-TRANSMITTED HELMINTH INFECTION IN BENINESE WOMEN DURING PREGNANCY. *G K Koura, V Briand, A Massougbdji, M Cot, A Garcia (Institut de Recherche pour le Développement, Paris, France)

The three major soil-transmitted helminths [roundworms (*Ascaris lumbricoides*), whipworms (*Trichuris trichiura*), and hookworms (*Ancylostoma duodenale* and *Necator americanus*)], considered as Neglected Tropical Diseases, represent a major public health problem in poor and developing countries because of their prevalence and their adverse effects. To estimate the prevalence and identify epidemiologic risk factors relating to these soil-transmitted helminths during pregnancy, a cross sectional study was carried out among 300 pregnant women at two maternity hospitals in a district in Benin. Out of the 300 pregnant women, 23 (7.67%) were positive for soil-transmitted helminths with any helminth species, according to Kato-Katz method examined under a microscope. From the 23 soil-transmitted helminths infected patients, single infections were found in 21 (91.30%) pregnant women. The other two pregnant women had respectively a double (4.35%) and a triple infection (4.35%). Among the 21 single soil-transmitted helminths infected, hookworm species was the most prevalent helminth identified, 90.48% (19/21), followed by *T. trichiura* 9.52% (2/21). Interestingly, not a single case of *Ascaris* infection was detected. Rural place of residence (OR = 5.18 [1.63-16.48], $p = 0.005$) and wearing shoes outside the house (OR = 0.22 [0.08-0.60], $p = 0.003$) were independently associated with risk of soil-transmitted helminths.

901-S

ADJUSTING BIRTH-WEIGHT DATA FROM DEVELOPING COUNTRIES TO ACCOUNT FOR HEAPING: A NOVEL METHOD. *R M Whelan, D Feiner, R Rapaka, C H Bunker, R Stone (University of Pittsburgh School of Public Health, Pittsburgh, PA)

Background: Birth-weight (BW) is an important indicator of a baby's chances for survival, growth, and development. Few data sets capture BWs that have been reliably measured and recorded from the developing world. Biases in these data include measurement error, operator error, recall bias and heaping. No adequate method exists to correct these data and estimate accurate rates of low BW (LBW). Our goal was to develop such a method. Methodology: From October 2009 to May 2010, we weighed every baby born at MedCiti Hospital, Andhra Pradesh, India ($n = 1211$). Each baby was weighed by the usual method (analog scale, labor and delivery nurse), and then weighed by the gold standard (10-gram sensitive digital scale, trained research nurse). Head circumference (HC) and baby length (BL) were recorded. We developed a method to correct the analog BW data using a modified statistical calibration and multiple imputation. Calibration is based on analog values from the calibration data set. Multiple imputed data sets were combined using Rubin's Rules. Data were analyzed using Microsoft Excel, SAS 9.2 and MATLAB 7.11 R2010B. Results: Rates of low birth-weight (LBW), defined as less than 2500 g, for the original and calibrated/imputed data were analog (22%), digital (28%), and imputed (30%, with a range of 28% - 33%). Using logistic regression, we calculated the associations between BW and BL, BW and HC. The association between the analog BW data and these variables is different than the association with the digital BW data. The results from the calibrated/imputed data most closely matched the digital BW data (gold standard). Conclusions: Regression calibration plus imputation produces adjusted analog weight data that accurately reflect the gold standard. This approach could be applied to other data sets in India or other parts of the developing world, to more accurately estimate rates of LBW ascertained from analog weights.

902

GLOBAL IMPACT OF DIFFERENT HEALTH STATES ON SELF-ASSESSED GENERAL HEALTH AMONG INDIVIDUALS IN 68 COUNTRIES. *O A Arah, C A Thompson (Department of Epidemiology, University of California, Los Angeles, CA)

Self-assessed general health remains one of the most commonly used health outcomes in both the health and social sciences although its meaning, validity and predictors are frequently debated. Furthermore, little is known about which common health states such as mobility, vision, and other impairment influence self-assessed general health. If there are any associations, even less is known about whether similar health states are associated with general health across different world regions and countries. Using data on a quarter of a million individuals in 68 countries, we quantified the associations between eight health states (namely, mobility, self-care, pain and discomfort, cognition, interpersonal activities, vision, sleep and energy, and affect) and self-assessed general health collectively, and by world region, national income group, country mortality stratum, and country. Collectively, pain and discomfort, mobility, affect and self-care showed the largest associations with general health. This pattern was also seen in Europe, the Americas and the Middle East but not in Sub-Saharan Africa, South Asia and East Asia and Pacific Islands. Moreover, a different pattern was observed in low-income countries. Overall, self-assessed general health might reflect both similar and different health states weighted dissimilarly across world regions and countries.

904

WITHDRAWN

903

WITHDRAWN

905-S

THE CEDAR PROJECT: GENDER DIFFERENCES IN HOMELESSNESS AMONG ABORIGINAL YOUNG PEOPLE WHO USE STREET DRUGS IN TWO CANADIAN CITIES.

*B L Bingham, S H Patel, A Moniruzzaman, P M Spittal, for the Cedar Project Partnership (Simon Fraser University, Vancouver, BC, Canada)

Objective: Aboriginal scholars suggest the legacy of colonialism is a key contributing factor to rising rates of homelessness among Aboriginal young people. This analysis examined factors related to sleeping on the streets for 3 nights or more (ie. homelessness) and HIV vulnerability among Aboriginal young people who use drugs. Methods: The Cedar Project is an ongoing prospective study of Aboriginal young people who use drugs in Vancouver and Prince George. This analysis is based on baseline data collected by Aboriginal interviewers between 2003-2005. Multivariable logistic regression identified factors significantly associated with homelessness. Results: Of the 602 participants included in this analysis, 405 (67%) reported homelessness. Of this, 55% were males and 45% were female. A stratified logistic regression analysis by gender demonstrated that homelessness among men was significantly associated with: living in Vancouver (Adjusted Odds Ratio [AOR]: 2.5, 95% confidence interval [CI]:1.4,4.5); being denied shelter because of drug use [AOR: 2.3, 95% [CI]:1.1,4.8]; and reporting 20+ sexual partners [AOR: 1.9,95%[CI]:1.0,3.5]. Among females, ever been incarcerated [AOR:2.8,95%[CI]:1.5,5.2]; residing in Vancouver [AOR: 2.6, 95% [CI]:1.4,4.8]; been denied shelter because of drug use [AOR: 2.5,95%[CI]:1.1,5.6]; and ever sexually abused [AOR:2.1,95%[CI]: 1.1,4.1]. Conclusions: Aboriginal young people face complex issues related to trauma. Having a stable place to sleep is critically important to enhancing harm reduction efforts and resiliency for Aboriginal young people who use drugs. Safe housing strategies based on Indigenous teachings and values are urgently required.

906

TUBERCULOSIS AMONG MEXICAN MIGRANTS INDIGENES IN SONORA, MEXICO. G Álvarez, M del Carmen Candia, M E Reguera, M B Rivera, T Weaver, J Greenberg (Department of Medicine and Health Sciences, Universidad de Sonora, Mexico)

Introduction. Tuberculosis (TB) is a challenge for the Mexican Health System. Its burden is particularly high among migrants indigenes. Cultural barriers aggravate vulnerability of these groups that travel along the "Mexican Pacific Corridor" to get jobs in Sonora, and eventually will migrate to the United States. Little is known about how perceptions of disease, barriers to care, marginalization, and migration history, relate to the TB burden of these communities. **Methods.** We conducted a cross-sectional study to examine the TB incidence in Mexican migrant indigenes assented in agricultural fields of Sonora, Mexico. The epidemiological profile of TB was characterized, and a qualitative approach was used to examine perceptions of health personnel, and TB patients. **Results.** A four-fold excess of TB incidence rate (121.2/100,000) was found in these groups when compared with national and state average. Very low rates of cure (25%) were found in indigenes, and a high proportion (54%) of patients was detected belatedly. A mixture of indigenes patients was observed, most of them coming from the south of Mexico. TB burden may be underestimated in these groups because ethnicity is not routinely investigated by health personnel. **Conclusions.** The TB burden among Mexican migrant indigenes arriving to Sonora is well above of the national average. The Mexican Health System does not systematically identify ethnicity in TB patients, which may exacerbate difficulties for the TB control, and eventually to favor its dissemination along the US-Mexico Border.

908

TOTAL-POPULATION INVESTIGATION OF DENTAL HOSPITALIZATIONS IN INDIGENOUS CHILDREN UNDER FIVE YEARS: PATTERNS BY ICD CODES. *L Slack-Smith, A Read, L Colvin, N Kilpatrick, D McAullay, L Messer (University of Western Australia, Crawley 6009, Australia)

Objectives: There is limited literature describing dental hospitalizations (DH) in Indigenous children. The aim of this study was to describe DH in Indigenous children under five years of age using total-population data. **Methods:** The data used for this study were extracted from population databases which linked midwives data collected on all births (1980-1995) in Western Australia with data regarding deaths, hospitalizations, birth defects and intellectual disability. Odds ratios and 95% confidence intervals presented and ICD9 code were used. **Results:** There were 738 dental admissions for 665 of the children of Indigenous mothers until five years of age. Overall 3.2% of all Indigenous children had a dental admission compared to 2.7% of non-Indigenous children (1.18, 1.09-1.28). Indigenous children were more likely to be admitted under two years (32% cf 10%). We determined 8.7% of Indigenous children with a dental admission had a birth defect while 5.5% had an identified intellectual disability (cf 8.9% and 3.2% for non-Indigenous). Indigenous children were more likely to be admitted for ICD9 528 Disease of soft tissues of the mouth (12.35, 10.50-14.52) and 523 Gingival and periodontal disease (9.15, 6.21-13.49) and less likely to be admitted for 521 Diseases of the hard tissues of the teeth (0.55, 0.49-0.63). Indigenous children were more likely to have a longer dental admission, more likely to be admitted under two years of age and for soft tissue categories. **Conclusion:** Indigenous children have different patterns of dental admission to non-Indigenous children. Total population data can be used to monitor and interpret these patterns and any interventions.

907

RECORD LINKAGE TO ENHANCE STD/HIV SURVEILLANCE DATA FOR OREGON'S AMERICAN INDIAN/ALASKA NATIVE POPULATION. *M Hoopes, S Schafer (NW Tribal EpiCenter, Portland, OR 97201)

Background: American Indians/Alaska Natives (AI/ANs) are frequently undercounted in disease surveillance systems such as cancer registries, injury, and death records. To the extent that this population is racially misclassified in STD/HIV surveillance data, public health disease control efforts may be hampered. **Methods:** We evaluated race coding in Oregon's STD/HIV registry, years 2000-2009, using probabilistic record linkage to a file derived from Indian Health Service patient enrollment records. Using linkage-corrected race data, we examined STD and HIV incidence and prevalence rates for AI/ANs compared to all other races combined. **Results:** Record linkage increased AI/AN-identified non-HIV STDs by 48%, from 2007 to 2966. Of 959 cases newly identified as AI/AN, 70% were previously coded as White and another 20.5% as unknown or missing race. HIV cases identified as AI/AN increased by over 70%, from 72 to 123 cases. The correction of AI/AN race resulted in significantly higher average annual incidence rate estimates for chlamydia (from 263.8 to 386.6 per 100,000) and gonorrhea (from 25.3 to 39.2). HIV prevalence increased from 11.4 to 19.6 per 100,000. Rates of chlamydia and gonorrhea for AI/AN females were approximately 50% higher than corresponding disease-specific rates for females of all other races; rates among AI/AN males were similar to other races. **Conclusions:** The correct classification of race is an important factor in disease surveillance. The methods used here can be expanded to increase the accessibility and quality of health data for AI/AN, informing prevention and intervention efforts and funding.

909

ARECA NUT USE IS ASSOCIATED WITH OBESITY AND ARTHRITIS IN GUAM: RESULTS FROM THE 2007 BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM (BRFSS). *Y Paulino, E Hurwitz, A Katz, R Novotny, L Wilkens (University of Hawaii, Honolulu, HI 96822)

Areca nut is chewed by about 10% of the world population, and has been shown to be associated with an array of chronic diseases. The habit is common on Guam, a United States territory in the Western Pacific with some of the highest rates of chronic diseases. To investigate the association of areca nut and chronic disease, we used self-reported cross-sectional data from the 2007 Guam BRFSS. A questionnaire on areca nut was added to the 2007 BRFSS to capture prevalence of areca nut use. Of the 362 adults (≥ 18 years old) who completed the areca nut questionnaire, 37.3% were ever chewers and 12.4% were current chewers. We performed multivariate logistic regression to compute the odds of chronic disease adjusted for age, education, ethnicity, sex, alcohol and smoking. Of the five chronic diseases investigated, areca nut was significantly associated with obesity and arthritis. When comparing current chewers to never chewers, areca nut was positively associated with obesity (Odds Ratio = 6.16, 95% Confidence Interval: 2.17, 17.5). When comparing former chewers to never chewers, areca nut was positively associated with obesity (OR = 4.15, 95% CI: 1.73, 9.97) and arthritis (OR = 2.54, 95% CI: 1.13, 5.72). The positive associations of areca nut with obesity are consistent with previous studies. The positive association of areca nut and arthritis is among the first to be reported. The associations are inconsistent with cultural belief that areca nut suppresses appetite and treats arthritis, and may be expected if arthritics and obese people in Guam use areca nut for therapeutic purposes. A further investigation that accounts for temporal ambiguity is needed to clarify the association.

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WITHDRAWN

912-S

PREDICTORS OF SEVERE H. PYLORI-ASSOCIATED GASTRITIS IN ARCTIC CANADA. *M Lefebvre, J Geary, S Girgis, K J Goodman, CANHelp Working Group (University of Alberta, Edmonton, AB, Canada)

H.pylori infection induces gastritis, a spectrum of inflammation involved in gastric carcinogenesis. Little is known about determinants of gastritis severity. We aimed to identify risk factors for severe gastritis among H.pylori-positive participants in a community-based project inspired by local concerns about risks from H.pylori infection, highly prevalent in Arctic Aboriginal communities. In Feb 2008 residents of Aklavik, Northwest Territories were offered gastroscopy with biopsies taken for pathological assessment; gastritis was graded as mild, moderate or severe. We collected risk factor data by interviewer-administered questionnaire. In logistic regression models, we estimated relative prevalence odds ratio (OR) of severe gastritis (v mild/moderate) with 95% confidence intervals (CI) for: sex; age; education; prior care for stomach complaints; medications; symptoms; food frequencies (fruit, vegetables, meat, fish, coffee, tea, pop, alcohol). Of 129 participants aged 11-80 years with H.pylori-positive histology, gastritis was mild in 11 (8.5%), moderate in 62 (48%), severe in 56 (43%). In multivariable models, 5 factors had p-values < 0.25; in 101 participants with complete data, mutually adjusted ORs (CI) were: 1.7(0.72, 4.2) for male sex; 0.67(0.38, 1.2) for > 12 years of school; 0.51(0.20, 1.3) for prior care; 2.2(0.93, 5.3) for ≥ 1 serving/day of pop; 0.50(0.21, 1.17) for ≥ 5 servings/week of tea. We present initial research on severe H.pylori-associated gastritis in Arctic Aboriginal communities. For more accurate results we need more data to address key limitations (small sample, temporal ambiguity, endoscopy-associated selection factors and few cases of mild inflammation for a sharper contrast in gastritis severity)

911-S

DETERMINANTS OF BREASTFEEDING INITIATION AMONG CANADIAN INUIT: RESULTS FROM THE INUIT HEALTH SURVEY FOR CHILDREN. *K E McIsaac, D Sellen, W Lou, T K Young, G M Egeland (University of Toronto, ON M5T3M7, Canada)

Inuit Canadians initiate breastfeeding less frequently than other Canadians, yet there is a paucity of breastfeeding research in an Inuit-specific context. Using the Inuit Health Survey for Children, a cross-sectional, population based survey of pre-school aged children, we examined the determinants of breastfeeding initiation among Inuit Canadians. The survey was administered in 16 out of a possible 25 communities in the territory of Nunavut in 2007 and 2008. Caregivers of Inuit children ages 3 to 5 who lived in a participating community were randomly selected to complete the interviewer-administered questionnaire. Of the 537 caregivers successfully contacted, 388 participated and 345 were included in our analyses. Preliminary findings suggest the weighted prevalence of breastfeeding initiation among Inuit in Nunavut is 67.1%. Using a forwards, stepwise, weighted logistic regression model, we calculated odds ratios (OR) and 95% confidence intervals (95% CI) for breastfeeding initiation. Adopted children (OR = 0.19, 95% CI: 0.10, 0.36) and children whose mothers smoked during pregnancy (OR = 0.43, 95% CI: 0.20, 0.98) were not as likely to be breastfed while children of high birth weight (> 4100 grams) (OR = 5.37, 95% CI: 1.67, 17.25) and children living in communities with a hospital or birthing centre (OR = 1.91, 95% CI: 1.02, 3.62) were more likely to be breastfed in multivariable models. These findings suggest that adoption, maternal smoking during pregnancy, birth weight and place of residence affect the likelihood of breastfeeding initiation among Inuit Canadians. Moreover, some determinants appear to be more population specific (e.g. adoption) and are deserving of further investigation.

913

WITHDRAWN

914-S

COMMUNITY KNOWLEDGE OF HELICOBACTER PYLORI INFECTION IN NORTHERN CANADA. *A Wynne, J Geary, K J Goodman, CANHelp Working Group (University of Alberta, Edmonton, AB, Canada)

H. pylori infection and related diseases occur with increased frequency in Arctic Aboriginal populations. Public awareness has created concerns in some northern Canadian communities about stomach cancer risks from this infection. The Aklavik H. pylori Project links community leaders, health authorities and scientists in an effort to address these concerns. This report describes participants' knowledge of and concerns about H. pylori. From 2007-10, 344 residents of Aklavik, Northwest Territories (population = 590, ~90% Aboriginal) responded to a survey asking if they had heard of H. pylori infection, and if so, if they knew what problems it caused or how people got it. Respondents were asked if they thought H. pylori was a community concern, and if so, why. Response frequencies (95% confidence interval) are presented for 299 respondents aged ≥ 12 years. 56% (50-62) indicated they had heard of H. pylori; however, the related illnesses of cancer, stomach problems, and ulcers were each mentioned by $< 20\%$. 77% (71-81) agreed that H. pylori was a community concern. Reasons for concern were cancer (15% (11-19)), many people having it (14% (11-19)), and that it causes illness (10% (7-14)). Reported modes of transmission were water-related (17% (13-22)), personal contact/hygiene (7% (5-11)) and germs/infectious agent (4% (2-6)). Of those who reported a family history of H. pylori infection or stomach cancer, more had heard of H. pylori (72% (63-79) vs 45% (37-52)), believed it is transmitted via water (25% (18-34) vs 11% (7-17)), or believed it is a community concern (85% (77-90) vs 71% (64-78)). Although general awareness and concern about H. pylori infection were common, few respondents articulated specific knowledge or reasons for concern.

916-S

THE CEDAR PROJECT: PREDICTING SAFE INJECTION SITE USE AMONG YOUNG ABORIGINAL PEOPLE WHO USE INJECTION DRUGS IN VANCOUVER. *K Jongbloed, W Christian, M Schechter, P Spittal (University of British Columbia, Vancouver, BC, Canada)

This study examines predictors of safe injection site (SIS) use among participants of the Cedar Project, a prospective study of young Aboriginal people in Vancouver and Prince George who use illicit drugs. Use of Vancouver's SIS was defined as using the site at least once a month in the past 6 months. Venous blood samples were tested for HIV and HCV antibodies. With data collected between 2004-09, generalized estimating equation (GEE) models for participants who lived in Vancouver and reported injection drug use identified factors associated with SIS use. Participants using the SIS were more likely to: have difficulty finding new rigs (Unadjusted Odds Ratio (UOR):2.00; 95% confidence interval (CI):1.24, 3.27); need help injecting (UOR:1.70; 95% CI:1.10, 2.62); and test positive for HCV antibodies (UOR:2.25; 95% CI:1.38, 3.66). They were more likely to report frequent heroin injection (daily: UOR:7.53; 95% CI:4.65, 12.31; less than daily: UOR:3.07; 95% CI:1.75, 5.39), cocaine injection (daily: UOR:4.11; 95% CI:2.38, 7.11; less than daily: UOR:2.32; 95% CI:1.46, 3.69), and speedball injection (daily:UOR:5.54; 95% CI:2.89, 10.63; less than daily: UOR:3.48; 95% CI:2.00, 6.07). In a multivariate model, predictors of SIS use were: daily heroin injection (Adjusted Odds Ratio (AOR):5.65; 95% CI: 3.30, 9.69), less than daily heroin injection (AOR:2.26; 95% CI: 1.22, 4.19), and less than daily cocaine injection (AOR:2.00; 95% CI:1.11, 2.60). Participants using the SIS demonstrate high intensity drug use and are highly vulnerable. Expanding access to similar harm reduction strategies that are culturally safe should be considered elsewhere in British Columbia.

915-S

CHRONIC DISEASE IN CANADA'S NORTH: ETHNIC COMPARISONS. L M Lix, *O Fadahuni, S Bruce, A Leamon, M Tribes, T Kue Young (University of Saskatchewan, Saskatoon, SK S7N5E5, Canada)

Background: Circumpolar regions are experiencing rapid changes in their social, cultural, and physical environments. These changes are having a negative impact on the health of the Aboriginal population. However, there is limited research about differences within this population, which includes First Nation (FN), Inuit, and Métis groups, and variations across regions. Objectives: To compare the prevalence of diabetes, hypertension, and asthma in: (1) FN populations from Canada's Yukon and Northwest Territories (NWT), and (2) the FN, Inuit, and Métis groups from NWT. Methods: Population-based administrative data from 2000 to 2008, including hospital separations, physician billing claims, and community health centre records, were used to identify diagnosed disease cases using previously-validated case definitions. Hypotheses about relative rates (RRs) of chronic disease were tested using generalized linear models; covariates were age and sex. Results: There were no differences ($p > .05$) between the FN populations of Yukon and NWT for diabetes and hypertension, although asthma was significantly higher ($p < .0001$) for Yukon in both youth (0-18 years RR = 1.6) and adults (19-49 years RR = 1.4). In the NWT, compared to Métis there were lower rates ($p < .05$) of diabetes and hypertension in Inuit and FN (diabetes: RRs ≤ 0.6 ; hypertension: RRs $\leq .0.9$), and lower rates of asthma in FN than in Métis and Inuit (RR < 0.7). Conclusion: Major chronic diseases are not uniformly distributed across Aboriginal groups in Canada's circumpolar populations. The results underscore the need and importance of targeted community-based primary prevention interventions in northern communities.

917-S

THE CEDAR PROJECT: UNSTABLE HOUSING AND HIV VULNERABILITY AMONG YOUNG ABORIGINAL MEN AND WOMEN WHO USE DRUGS IN VANCOUVER AND PRINCE GEORGE. *K Jongbloed, B Bingham, M Schechter, P Spittal (University of British Columbia, Vancouver, BC, Canada)

This study examined gender differences in HIV vulnerability associated with unstable housing among participants of the Cedar Project, a prospective study of young Aboriginal people in Vancouver and Prince George who use illicit drugs. Venous blood samples were tested for HIV and HCV antibodies. Unstable housing was defined as sleeping on the streets, living in hotels, shelters or couchsurfing. Using data collected between 2003-09, generalized estimating equation (GEE) models identified factors associated with unstable housing over the study period. Separate models were carried out for men and women. Adjusted odds ratios (AOR) and 95% percent confidence intervals (CI) were calculated. At follow up 8, 46.7% of participants reported unstable housing (baseline: 45.7%). In multivariable analysis, factors associated with unstable housing for young women included living in Vancouver (AOR:2.12; 95% CI:1.63, 3.01), having been in foster care (AOR:1.62; 95% CI:1.16, 2.28), injecting drugs (AOR:1.47; 95% CI:1.09, 1.97), and daily crack smoking (AOR:1.66; 95% CI:1.17, 2.34). For young men, factors included living in Vancouver (AOR:3.70; 95% CI:2.63, 5.21), gay/bisexual sexual identity (AOR:1.68; 95% CI:1.04, 2.72), injecting drugs (AOR:2.30; 95% CI:1.66, 3.18), and daily crystal meth smoking (AOR:1.85; 95% CI:1.20, 2.85). Young Aboriginal men and women experience the parallel epidemics of HIV and unstable housing in different ways, and these experiences must be understood and responded to within the context of historical and lifetime trauma. They must be involved in developing housing responses that meet their unique needs.

918-S

HOUSEHOLD FACTORS ASSOCIATED WITH H PYLORI INFECTION IN AKLAVIK, NORTHWEST TERRITORIES. *L Aplin, K Fagan-Garcia, J Geary, K J Goodman, CANHelp Working Group (University of Alberta, Edmonton, AB, CANADA)

Concerns raised by residents of Aklavik, Northwest Territories (population = 590, ~90% Aboriginal) about health risks from H pylori (Hp) infection resulted in the formation of the community-driven Aklavik Hp Project, aimed at identifying public health strategies for Hp infection in Arctic Canada. This analysis describes associations of household characteristics with Hp infection among project participants. From 2008 to 2010, participants were tested for Hp by urea breath test or endoscopy; 62% (221/355) were positive. Data on household characteristics were collected from representatives of 145 participating household using a survey; 296 individuals were included in this analysis. Logistic regression was used to estimate odds ratios (OR) and 95% confidence intervals (CI) for associations of household characteristics with Hp infection in individuals adjusting for age, sex and ethnicity. We observed various strong household effects, notably for income, education and density indicators. Adjusted ORs (CIs) were: 1.0, 0.62 (0.25-1.53), 0.42 (0.17-1.03), and 0.28 (0.13-0.61), respectively, for annual household income of < \$25,000, \$25,000-\$49,999, \$50,000-\$74,999, and \geq \$75,000; 1.0, 0.77 (0.42-1.42) and 0.56 (0.28-1.12), respectively, for highest educational attainment by a household member of grade 12; 1.0, 0.84 (0.42-1.66), 1.08 (0.45-2.58) and 7.02 (1.94-25.40), respectively, for 0, 1, 2, 3-6 children in the house; 1.0, 1.40 (0.78-2.51) and 2.71 (0.77-9.56), respectively, for \leq 1, 1.01-2 and 2.01-3 people/bedroom. We present initial research on household-level risk factors for Hp infection, many of which appear to be strongly associated with individual Hp status among residents of the Arctic hamlet.

920-S

DO RISK FACTORS FOR HEAD AND NECK CANCER DIFFER BY ANATOMICAL SUB-SITE? *N Farsi, B Nicolau, P Allison, E Franco, N Schlecht, F Coutlee, M-C Rousseau, (McGill University, Montreal, QC, Canada)

Squamous cell carcinomas arising from various anatomical sub-sites within the head and neck (H&NSCC), while histologically identical, have different clinical, molecular, and genetic characteristics. Anatomical differences may result in different levels of exposure or susceptibility to a given risk factor. We used data from an ongoing international hospital-based case-control study (HeNCe life study-Canadian site) to evaluate H&NSCC risk factors and whether they vary by anatomical sub-site. Cases (n = 150) were newly diagnosed H&NSCC patients recruited from four main Montreal area hospitals, while controls (n = 161) were randomly sampled from various outpatient clinics in the same hospitals. Logistic regression allowed to identify smoking, lower education levels, HPV-infection and number of missing teeth as the main H&NSCC risk factors. Stratified analysis by anatomical sub-site showed that smoking was most strongly associated with laryngeal cancer [(Odds ratio (OR) = 1.02, 95%CI:1.01-1.04)per pack-year] while alcohol drinking [(OR = 2.91, 95%CI: 1.15-7.38) > 6 vs. 0-1 drinks/week], HPV-infection [(OR = 12.20, 95%CI:5.46-27.27) positive vs. negative] and number of missing teeth [(OR = 4.13, 95%CI:1.72-9.92) > 9 vs. 0-9 missing teeth] were most strongly associated with pharyngeal cancer. Lower education levels [(OR = 4.81, 95%CI: 1.21-19.10) high school or less vs. university] had the strongest relationship with oral cancer. Different risk factors seem to play various roles at the different H&NSCC sub-sites. Further research is needed to better understand the stronger associations of some risk factors with specific H&NSCC sub-sites.

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ABORIGINAL HEALTH RESEARCH PARTNERSHIPS: WHAT RESEARCHERS AND ABORIGINAL COMMUNITIES NEED TO KNOW. *N Lightfoot, G Daybutch, P Toulouse, M Maar, H Cheu, R Schinke, R Strasser (Rural and Northern Health, Laurentian University, Sudbury, ON P3E2C6, Canada)

Many Aboriginal health leaders recognize the need for health research in their communities, but examples exist of external health researchers utilizing non-participatory methods resulting in community-based research fatigue and negative feelings about investigator-driven research. We conducted a qualitative study that employed focus groups in four North Shore Tribal Council Aboriginal communities across northeastern Ontario to examine research readiness. Based on these culturally informed insights, we produced a booklet and video describing how external researchers and Aboriginal communities can best work together. The participants outlined criteria for communities to consider when evaluating a health research proposal and study results. They considered various types of health research study designs and what communities and external researchers should consider before, during, and after undertaking a health research study. They also identified how external researchers can assess their own knowledge gaps about Aboriginal people and approaches for project success. Highlights from the booklet and video will be presented. Some suggestions for external researchers included: the need to determine the study context and approval process; the benefits of honoraria, qualitative information, and involving community co-researchers and study personnel; and the importance of partnership, listening, respect, casual dress, being non-judgmental, non-technical in wording, data confidentiality, and discussion of results and data ownership. External researchers and communities should follow the seven living teachings and work in a true long-term partnership.

921-S

ESTROGEN RECEPTORS IN CONTRALATERAL BREAST CANCER –EFFECT ON RISK, CORRELATION AND PROGNOSIS. *M E C Sandberg, M Hartman, S Eloranta, A Ploner, P Hall, K Czene (Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden)

Background: We conducted a large, population based, comprehensive study of the effect of estrogen receptor (ER)-status on the risk of contralateral breast cancer (CBC), the correlation between the ER-status of the two tumors and the effect of ER-status on the prognosis after CBC. Methods: The cohort used consists of all women with breast cancer in the Stockholm region 1976-2005; 25551 cases, of which 1294 suffered CBC. The risk was analyzed by standardized incidence rate ratios (SIR), the correlation by logistic regression and the prognosis with Poisson regression. Results: Overall, the risk of CBC compared to unilateral breast cancer is distinctively increased and was statistically significantly more increased among patients with ER-negative first cancer, for the risk of ER-negative CBC. The risk of distant metastasis after CBC, compared to the risk after unilateral breast cancer, was significantly worse among the ER-positive cancers, but not among the ER-negative cancers. We also found it 4.6 times more likely that the two tumors had the same ER-status, compared to having different, this association was affected by latency time between the two cancers and hormonal therapy for the first cancer. Conclusion: This is one of the largest studies of CBC to date. We show that the risk of CBC is not affected by ER-status of the first cancer, the ER-status of the two tumors are strongly correlated and ER-status of both cancers has an important impact on prognosis.

922-S

A CASE-CASE APPROACH TO THE STUDY OF CUTANEOUS MELANOMA. *M Kvskoff, N Pandeya, D C Whiteman (Queensland Institute of Medical Research, Herston, QLD 4006, Australia)

Recent research suggests a causal heterogeneity for several cancers, such as melanoma and breast and colon cancers. Melanoma has been hypothesized to arise through 2 different pathways according to phenotype, body site, and sun exposure. To test this hypothesis, we explored etiologic differences by anatomic site of melanoma using a case-case comparative approach. This design maximises response rates and minimises differential recall bias. 808 melanoma patients aged 18-79 years and diagnosed in 2007-2011 were sampled from pathology laboratories in Queensland, Australia. A research nurse counted melanocytic nevi and solar keratoses (SKs) and recorded phenotypic factors in all participants. We compared counts for nevi and SKs between melanomas arising on the head and neck (MHN, n = 130) and those arising on the trunk (MT, n = 572, the reference group). Odds-ratios (ORs) and 95% confidence intervals were computed using logistic regression models. MHN patients were significantly less likely to have high nevi counts compared with MT patients (OR = 0.19 for ≥ 130 nevi compared with < 30 , p-trend < 0.0001). The strongest associations were observed for counts for nevi on the trunk, where melanocytic proliferation is the largest. MHN patients were also more likely than MT patients to have high numbers of SKs (OR = 2.79 for ≥ 8 SKs compared with 0, p-trend = 0.002). In summary, compared with MT, MHN is inversely associated with number of nevi at all body sites (especially the trunk), but positively associated with number of SKs, a marker of chronic sun exposure. Our findings accord with the hypothesis of causal heterogeneity for melanoma, with one pathway associated with nevus propensity, and one pathway associated with cumulated sun exposure.

924-S

AN ASSESSMENT OF NECESSARY CONDITIONS FOR THE HEALTHY WORKER SURVIVOR EFFECT. *A I Naimi, S R Cole, D B Richardson (University of North Carolina, Chapel Hill, NC 27599)

The healthy worker survivor effect (HWSE) is recognized as a potential source of bias in occupational exposure-disease associations. The necessary conditions for bias are associations between: (1) work status and subsequent outcome; (2) exposure and subsequent work status; and (3) work status and subsequent exposure. Here, we present an analysis of the component associations of the HWSE in a study of the association of asbestos exposure and lung cancer mortality. Data were obtained on 3,072 workers in an asbestos textile plant between 1 Jan 1940 and 31 Dec 1965, followed through 31 Dec 2001 for vital status and cause of death. Annual asbestos exposure levels were estimated using job-specific ambient asbestos concentration measurements and job history information. During 118,519 person-years of follow up, 198 lung cancer deaths occurred. Cox proportional hazards models, adjusted for gender, age, birth year, and race, were used to estimate the magnitude of the association between (1) work status and lung cancer mortality, and (2) asbestos exposure and subsequent work status. By design association (3) is infinite: people who leave work have no chance of incurring subsequent work-based exposure. The covariate-adjusted hazard for lung cancer mortality was 3.2 times larger after leaving the workplace (95% confidence limits [CL]: 1.0, 10.2). The covariate-adjusted hazard for leaving the workplace was 0.01 times smaller for every 100 fiber-years/mL of cumulative asbestos exposure (95% CL: 0.01, 0.02). Based on prior simulation work, these associations imply that HWSE is an important source of bias in these data, and that standard adjustment for work status may induce appreciable bias.

923

DIFFERENCES IN RISK FACTORS FOR SERRATED COLORECTAL POLYPS ACCORDING TO CPG ISLAND METHYLATOR PHENOTYPE (CIMP) STATUS. *A N Burnett-Hartman, P N Newcomb, M T Mandelson, M A Wurscher, K W Makar (Fred Hutchinson Cancer Research Center, Seattle, WA 98109)

Colorectal cancers (CRC) with a CpG Island Methylator Phenotype (CIMP) are hypothesized to have serrated polyp precursors; serrated polyps include hyperplastic polyps (HP), traditional serrated adenomas (TSA), and sessile serrated polyps (SSP). We conducted a case-control study of CIMP-positive and negative serrated polyps among participants, aged 24-79, evaluated via colonoscopy. Cases had HPs, SSPs, or TSAs (n = 261); controls had no colorectal pathologies (n = 1037). Methylation of polyp tissue DNA was quantified by MethyLight PCR using a validated CIMP panel (*CACNA1G*, *IGF2*, *NEUROG1*, *RUNX3*, and *SOCS1*). Polytomous regression was used to estimate adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for the associations between sex, race, age, smoking history, body mass index (BMI), alcohol consumption, physical activity, family history of CRC, non-steroidal anti-inflammatory drug (NSAID) use, and hormone therapy and CIMP-positive and CIMP-negative serrated polyps, separately. Of 261 cases, 76 were CIMP-positive (3 or more markers positive). For CIMP-negative serrated polyps, there was an inverse association with age (OR = 0.97; 95% CI: 0.95-0.99), and there were positive associations with smoking (0 pack-years vs. > 22) (OR = 4.25; 95% CI: 2.73-6.62) and BMI (18.5-25 kg/m² vs. ≥ 30) (OR = 1.65; 95% CI: 1.05-2.56). For CIMP-positive serrated polyps, only Caucasian race (OR = 2.58; 95% CI: 1.01-6.58) was significant. Our study suggests CIMP-positive and CIMP-negative serrated polyps have different risk-factors; the association between CIMP-positive polyps and Caucasian race may be a clue for the role of genetics in the initiation of CIMP-positive CRC.

925

COMPARISON OF STANDARD METHODS WITH G-ESTIMATION OF ACCELERATED FAILURE-TIME MODELS TO ADDRESS THE HEALTHY WORKER SURVIVOR EFFECT. *J Chevrier, S Picciotto, E A Eisen (University of California, Berkeley, CA 94720)

Background: Studies of autoworkers report associations between exposure to straight metalworking fluids (MWF) and cancer mortality. Previous studies, however, have not addressed the healthy worker survivor effect (HWSE). Several methods have been proposed but none consider that this bias may be caused by time-varying confounders affected by prior exposure. G-estimation of accelerated failure-time models was developed to address this issue but was never applied to account for the HWSE. Methods: We apply g-estimation of accelerated failure time models to estimate hazard ratios for chronic obstructive pulmonary disease (COPD), heart disease, and selected cancers in relation to straight MWF exposure in 38,747 autoworkers. We compare results with those from standard Cox-based methods previously proposed to address the HWSE. We expand our analysis by using a series of binary variables to capture the change in effect with increasing exposure concentration. Results: Standard methods suggest that exposure to straight MWF has a null or protective effect for mortality from all causes combined, all cancers combined, COPD, and heart disease. In contrast, results using g-estimation suggest that exposure may be causally related to these outcomes. Analysis of specific cancer sites by g-estimation also suggested increased mortality risk for lung cancer. Conclusion: Bias may arise because health status is associated with mortality, determines future exposure and is predicted by past exposure. G-estimation accounts for health status being both a confounder and possibly an intermediate variable between exposure and disease. This method may thus provide a better control for the HWSE than standard methods.

926

G-ESTIMATION OF ADDITIVE VS. MULTIPLICATIVE STRUCTURAL NESTED ACCELERATED FAILURE TIME MODELS: PREVENTING BIAS DUE TO THE HEALTHY WORKER SURVIVOR EFFECT. *S Picciotto, J Chevrier, E A Eisen (University of California, Berkeley CA 94720)

The healthy worker survivor effect arises when workers with poor health decrease their exposure. Healthier workers do not decrease their exposure, thus giving rise to weak, null, or protective effect estimates even when exposure causes disease. Robins developed g-estimation to correct for this type of bias, but until recently it had not been applied to occupational exposures. Published applications of g-estimation of structural nested accelerated failure time models (SNAFTMs) consider a time-varying binary exposure and assume an additive structural model. Removing the effect of one year of exposure increases (or decreases) the counterfactual survival time by a fixed amount. We present a multiplicative SNAFTM appropriate for harmful exposures. Under this alternative model, removing the effect of one year of exposure increases the counterfactual survival time by a fixed factor rather than a fixed amount. The log of the ratio of the counterfactual survival time under no exposure to the observed survival time is modeled as the product of the parameter to be estimated and the total duration of exposure. We illustrate g-estimation of both models using data from an occupational cohort study of ischemic heart disease in autoworkers exposed to metalworking fluids. We compare the two models and their interpretations. Cumulative exposure is a more biologically relevant measure than duration of exposure for chronic disease; we therefore consider extensions of SNAFTMs to continuous measures of exposure.

928

SHORT- AND LONG-TERM LOST WORK TIME AND HOUSEHOLD INCOME CHANGES ASSOCIATED WITH WORK-RELATED INJURIES AMONG CHILDREN ON AGRICULTURAL OPERATIONS: REGIONAL RURAL INJURY STUDY III. S G Gerberich, *B H Alexander, A D Ryan, C M Renier, T R Church, A Masten, P M McGovern, S J Mongin (University of Minnesota, Minneapolis, MN 55455)

This study was conducted among agricultural operation households to identify the short- and long-term physical, psychosocial, and economic consequences of injuries among children/youths living in the households and the burden on the overall operations. Baseline data, collected in Minnesota, Wisconsin, North Dakota, South Dakota, and Nebraska for 1,474 eligible agricultural households, used computer assisted telephone interview instruments; two six-month injury data collection periods followed baseline collection. Respective child/youth case and control households, for these two six-month periods were: 1) 100 cases (122 Injuries), 366 controls; and 2) 115 cases (138 injuries), 414 controls. Short-term consequences within the 6-month injury reporting periods were: 35% of children and 7% of other household members lost agricultural work time, while 5% and 7%, respectively, lost non-agricultural work time. Evaluation data were collected annually for the subsequent two years. Comparing case and control households, analyses focused on changes in lost work time among household members caring for an injured or ill child, between baseline and follow-up interviews. Confounders were selected for multiple logistic regression analyses using directed acyclic graphs; reweighting adjusted for response and eligibility biases. At one-year post-injury, case households were twice as likely as control households to have increased lost time from operation-related work due to a child's health issues (O.R. 2.1, 95% C.I. 1.1-4.1). There was no effect on household income during the same time period.

* = Presenter; S = The work was completed while the presenter was a student

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EMERGENCY DEPARTMENT VISITS FOR TRAUMATIC BRAIN INJURY IN A BIRTH COHORT OF PUBLICLY INSURED CHILDREN. *C DiMaggio (Columbia University, New York, NY)

We examined New York City Medicaid records for emergency department services for children born between 1999 and 2005. We used the Barell Matrix to identify traumatic brain injury (TBI). We calculated age-specific incidence rates and mapped Bayesian-smoothed gender-adjusted standardized morbidity ratios at the ZIP Code Tabulation Area looking for hot spots based on probability exceeding greater than twice the city-wide risk. Of 29,593 injured children, 871 (2.9%) had diagnostic codes consistent with TBI. Three hundred twenty seven of the TBI patients (37.5%) were admitted for inpatient care and accounted for 6.3% of all injury admission among the cohort. Three of six recorded deaths occurred in children with head injury. Between 1999 and 2005, the overall TBI injury rate for cohort males was 5.0 per 10,000 population. The rate for females was 3.8 per 10,000 population. While overall the incidence declined as children aged, the 1999 cohort had the highest incidence at each year of life. Some ZIP code tabulation areas in New York City were at greater than 10 times the expected number of TBI. The probability of TBI risk exceeding twice the underlying city-wide risk in a particular ZIP Code tabulation area varied by age group, although some areas had persistently elevated risk for all age groups. In the United States the leading cause of TBI is motor vehicle crashes, particularly pedestrian injuries in urban areas. In 2005, New York City implemented a large-scale Safe Routes to School initiative of improvements to the built environment surrounding public schools at high risk for pediatric crash injuries. This study helps inform these efforts by establishing a baseline and identifying areas of high risk.

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SURVEILLANCE FOR ACQUIRED BRAIN INJURY IN CANADA: AN ONTARIO EXAMPLE. *A Colantonio, A Chen, D Parsons, B Zagorksi, R VanderLaan (University of Toronto and the Toronto Rehabilitation Institute, Toronto, ON M5G1V7, Canada)

Acquired Brain Injury is a leading cause of death and disability in North America. The aim of this presentation is to provide an overview of the first comprehensive surveillance system that combines brain injury from both traumatic (TBI) and non-traumatic causes (NTBI) utilizing administrative data from publicly funded health care system in Canada. Cases were selected from both emergency room data from the National Ambulatory Care Reporting System and inpatient data from the Discharge Abstract Data and National Rehabilitation Reporting System for the fiscal years 2002-2006. For these years, 17,482 TBI and 19,311 cases were identified. Rates per thousand were 1.3 and 1.2 respectively which were as high as 2.3 in northern geographical areas. The rationale for the inclusion of specified ICD-10 codes of TBI and NTBI cases (consisting of injury due to brain tumours, infections and anoxia for instance) are discussed. The presentation provides a discussion of the methodological issues related to combining surveillance systems that can guide planning and evaluation of services dedicated to injury prevention and post acute care.

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LONG-TERM AND RECENT RECREATIONAL ACTIVITY AND RISK OF ENDOMETRIAL CANCER: THE CALIFORNIA TEACHERS STUDY. *C M Dieli-Conwright, J V Lacey, J Sullivan-Halley, E Chang, F Schumacher, S Neuhausen, H Ma, D Deapen, K D Henderson, L Bernstein (City of Hope, Duarte, CA 91010)

We investigated the association between long-term and recent recreational physical activity with endometrial cancer risk in the California Teachers Study. Between 1995 and 2007, 995 patients were newly diagnosed with incident invasive endometrial cancer among 93,888 eligible participants. The relative risks (RR) associated with long-term (high school through age 54 years or current age) and recent (past 3 years) strenuous and moderate physical activity were estimated using Cox proportional hazards regression models. Combined long-term strenuous and moderate physical activity was inversely associated with endometrial cancer risk among women who exercised at least 3 hr/wk/yr versus < 0.5 hr/wk/yr (RR = 0.86; 95% CI: 0.71-1.04; P_{trend} = 0.07) as was recent strenuous activity (RR = 0.77; 95% CI: 0.64-0.93; P_{trend} = 0.008). Among overweight/obese women (> 25 kg/m²), endometrial cancer was inversely associated with long-term strenuous (RR = 0.81; CI: 0.62-1.05 for 3 hr/wk/yr vs. ≤ 0.5 hr/wk/yr; P_{trend} = 0.04), and moderate (RR = 0.77; 95% CI: 0.60-1.00 for 3 hr/wk/yr vs. ≤ 0.5 hr/wk/yr; P_{trend} = 0.04) physical activity; the association was not observed for women with body mass index < 25 kg/m². Similar results were found for recent physical activity where the risk of endometrial cancer decreased with increasing recent strenuous (RR = 0.53; 95% CI: 0.39-1.74 for 3 hr/wk/yr vs. ≤ 0.5 hr/wk/yr; P_{trend} = 0.0002) and moderate (RR = 0.72; 95% CI: 0.57-0.91 for 3 hr/wk/yr vs. ≤ 0.5 hr/wk/yr; P_{trend} = 0.004) activity in overweight/obese women. Long-term and recent strenuous or moderate recreational physical activity may protect against endometrial cancer especially among overweight/ obese women.

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PERINEAL TALC USE AND RISK OF ENDOMETRIAL CANCER IN POSTMENOPAUSAL WOMEN. *L Crawford, S Sturgeon, N Luisi, R Balasubramanian, K Reeves (University of Massachusetts, Amherst, MA 01003)

Endometrial cancer is the most common female reproductive cancer in the United States. Most known risk factors for endometrial cancer are either genetic or related to exposure to unopposed estrogens; less is known about risk due to environmental exposures. While a number of studies have found a positive association between perineal talc use and ovarian cancer risk, only one study has addressed the relationship of talc use with endometrial cancer, finding a small increase in risk among postmenopausal women. The Women's Health Initiative Observational Study, a prospective cohort study of United States postmenopausal women from 1993-2005, measured perineal talc use at baseline via self-report. Cases of endometrial cancer were self-reported and confirmed by both local and central physician adjudicators. Cox proportional hazards regression was used to model the association between ever perineal talc use and endometrial cancer, adjusting for body mass index and age. Of the 48,132 women in our analysis, 18,831 (39%) reported ever use of perineal powders. There were 449 incident cases of endometrial cancer during 360,602 person-years of follow-up. Overall, ever perineal talc use did not show an association with increased risk of endometrial cancer (hazard ratio 0.92, 95% confidence interval 0.76-1.12). Further analysis will model the association with adjustments for other known risk factors and stratification by duration of perineal talc use. Findings will add to the literature on environmental risk factors for this common reproductive cancer.

931-S

COFFEE, TEA CONSUMPTION AND ENDOMETRIAL CANCER RISK: A PROSPECTIVE COHORT STUDY. *A Giri, K Reeves, N Luisi, R Balasubramanian, S Sturgeon (University of Massachusetts, Amherst, MA 01003)

As the 4th leading incident cancer among women in the US, approximately 40,000 women are diagnosed with endometrial cancer annually. Biological data suggest coffee or tea consumption may lower endometrial cancer risk through estrogenic and insulin-mediated pathways. Two of three prospective cohort studies have shown an inverse association between coffee and endometrial cancer risk. While, both prospective cohort studies examining tea and endometrial cancer risk showed null associations. We used data from the Women's Health Initiative (WHI) Observational Study, a prospective cohort study of a multi-ethnic population, to evaluate the association between coffee, tea and endometrial cancer risk. We identified 48,912 eligible post-menopausal women with a mean follow-up time of 7.5 years. During this period there were 452 pathologically confirmed incident endometrial cancer cases. We used Cox-proportional hazard models to evaluate the effects of coffee and tea consumption measured at baseline, on endometrial cancer risk among non- vs. daily- drinkers. Compared to non-drinkers, the age- and body mass index (BMI)-adjusted hazard ratio (HR) was 0.97 [95% confidence interval (CI), 0.79-1.20] for coffee drinkers and 0.95 (95% CI, 0.77-1.18) for tea drinkers. When we stratified coffee and endometrial cancer risk by BMI category our results did not differ; HR 1.06 (95% CI, 0.77-1.47) for normal weight, HR 1.01 (95% CI, 0.65-1.57) for overweight, and HR 0.86 (95% CI, 0.61-1.21) for obese women. Further analyses are underway to consider number of cups/day, coffee preparation method, and adjustment for other confounders. Our results do not show a protective effect of coffee or tea consumption on endometrial cancer risk.

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SLEEP DURATION AND ENDOMETRIAL CANCER RISK: A PROSPECTIVE STUDY OF POSTMENOPAUSAL WOMEN. *S R Sturgeon, N Luisi, R Balasubramanian, K W Reeves (University of Massachusetts, Amherst, MA 01003)

Disruption in circadian rhythm is classified a "probable" carcinogen by the International Agency for Research on Cancer (IARC) based on strong animal evidence and limited human evidence. In the only study to examine the association between shift work and risk of endometrial cancer, a small increase in risk was observed among women who were long-term night shift workers, plausibly due to increased exposure to light at night, suppressed night-time melatonin production and its effects on reproductive hormones. As shorter sleep duration also may be a surrogate for light exposure at night, we examined for the first time the association between sleep habits and endometrial cancer risk in the Women's Health Initiative Observational Study cohort of 43,872 eligible postmenopausal women. Self-reported information on sleep duration on a typical night over the past month was obtained at baseline. There were 419 incident endometrial cancer cases diagnosed over the 335,063 person-years of observation. Compared to women with sleep durations of 8 hours, the age- and body mass index-adjusted hazard ratios and 95% confidence intervals were 1.22 (0.83-1.80), 1.16 (0.88-1.54), 1.13 (0.87-1.45) and 1.36 (0.88-2.10) for sleep durations of < 5, 6, 7 and > 9 hours, respectively. Our preliminary findings do not show the hypothesized trend of increasing risk with decreasing sleep duration; however, there was a tendency for women with 8 hours of sleep duration to have a lower risk than women with shorter sleep durations. Additional analyses will consider adjustment for other potential confounders, a reassessment of sleep duration during follow-up, and possible effect modification by body mass index.

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ALL-CAUSE, LIVER-, AND NON-LIVER, RELATED MORTALITY AMONG HEPATITIS C INFECTED INDIVIDUALS IN THE GENERAL US POPULATION. *S S El-Kamary, R Jhaveri, M D Shardell (University of Maryland School of Medicine, Baltimore, MD 21201)

To determine the association between hepatitis C virus (HCV) infection and all-cause, liver- and non-liver related mortality among US adults, HCV status was assessed from 1988 to 1994, with mortality follow-up through 2006 in the Third National Health and Nutrition Examination Survey (NHANES III) Linked Mortality File. A total of 9,378 nationally representative adults aged 17 to 59 years were followed prospectively over a median follow-up of 14.8 years during which a total of 614 deaths occurred. After adjusting for all covariate risk factors (including measures of liver function), being chronically infected with HCV was associated with a 2.37 times higher all-cause mortality rate ratio [MRR](95% Confidence Interval [CI]: 1.28 to 4.38; $P = 0.008$), a 26.46 times higher liver-related MRR (95% CI: 8.00 to 87.48; $P < 0.001$), and 1.79 times higher non-liver related MRR (95% CI: 0.77 to 4.19; $P = 0.18$), compared to being HCV-negative. The data represented an estimated 2.46 million US adults aged 17-59 years with chronic HCV infection who had an estimated 31,163 deaths from all causes per year, of which 57.8% (95% CI: 21.9% to 77.2%) were attributable to HCV. Among those, there was an estimated 9,569 liver-related deaths per year, of which 96.2% (95% CI: 87.5 to 98.9%) were attributable to HCV. Non-liver related deaths were not significantly associated with HCV status. In conclusion, all-cause mortality among HCV chronically infected individuals was more than twice that in HCV negative individuals. These data suggest that those with chronic HCV infection are at a higher risk of death even after accounting for liver-related morbidity, and should be closely monitored.

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SYNERGY AND ANERGY IN THE CONTEXT OF INFECTIOUS DISEASE EPIDEMIOLOGY: THE ROLE OF CO-INFECTIOIN. E Flannery, M Rosenthal, E R Roberts, J J Henderson, B M Davis, *B Foxman (University of Michigan, Ann Arbor, MI 48109)

In epidemiology, infectious diseases have been reduced to a single cause: the infecting agent. Although valuable, this has led us to overlook the effects of interaction among 2 or more infectious agents on transmission and pathogenesis of disease. The AIDS epidemic brought co-infection to the forefront for epidemiology, as HIV infection enhances transmission and pathogenesis of several infectious agents, most notably tuberculosis. However, co-infection is not limited to HIV/AIDS, for example, there is a synergy between influenza and community-acquired pneumonia at the population level and mechanistically. We conducted a systematic review of the literature using the keywords co-infection, dual infection, polymicrobial infection and related terms, to characterize the extent that co-infection was reported to result from independent processes, synergy or anergy between infectious agents. We found the effects of co-infection were manifest in pathogenesis, disease presentation, and transmission systems. However, there was no consistency in definitions of co-infections across fields, no clear framework for understanding the causal processes, and discussions were usually limited to either the molecular, clinical or population level. This is a major limitation because molecular interactions may modify disease pathogenesis and transmission probabilities observable only at a population level. Epidemiologic studies of co-infection can provide insight into disease pathogenesis and clues for treatment and prevention. We present a summary of our systematic review and specific examples to support our conclusions.

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META-ANALYSES OF HEPATITIS C SEROCONVERSION IN RELATION TO SHARED SYRINGES AND DRUG PREPARATION EQUIPMENT. *E R Pouget, H Hagan, D C Des Jarlais (NDRI, New York, NY 10010)

Hepatitis C infection (HCV) is endemic among injection drug users (IDUs). HCV is transmitted through shared syringes, but it is unclear to what extent transmission can be attributed to shared drug preparation equipment. To assess and compare the risks of HCV seroconversion associated with shared syringes and drug preparation equipment we conducted a systematic review of cohort or case-control studies reporting seroconversion in relation to risk behaviors, and meta-analyzed results from 22 published and unpublished studies using random effects models. Most risk effects compared IDUs who shared to IDUs who did not, during 1-24 months of susceptibility. Syringe sharing was significantly associated with HCV seroconversion (Rate Ratio (RR) = 1.97, 95% confidence interval (95% CI) = 1.57, 2.49). We also found significant associations for sharing drug preparation containers (RR = 2.42, 95% CI = 1.89, 3.10), filters (RR = 2.61, 95% CI = 1.91, 3.56), rinse water (RR = 1.98, 95% CI = 1.54, 2.56), combinations of this equipment (RR = 2.24, 95% CI = 1.28, 3.93), and "backloading," a syringe-mediated form of sharing prepared drugs (RR = 1.86, 95% CI = 1.41, 2.44). Syringe sharing and combined equipment sharing models showed substantial heterogeneity. Effects calculated using survival models were generally smaller than those calculated using other means. Differences in effect sizes by equipment category were small. Disseminating broad principles of infection control may be more effective in reducing exposure to HCV than using information regarding the relative risks of sharing each piece of equipment used during injection. Considerable reductions in exposure to sources of contaminated blood while injecting appear necessary to reduce HCV infection rates.

937-S

INSULATION: A NOVEL INFECTION-SPECIFIC NETWORK CENTRALITY MEASURE. *E Lofgren, J Kim, N Fefferman (University of North Carolina, Chapel Hill, NC)

The study of contact networks, sexual or social, has yielded considerable insight into the spread and control of infectious diseases. Recent research has gone beyond collecting information about research subject's social mixing patterns, and into the nature of the contact networks themselves, requiring mathematical measurements of the shape of a contact network, and the positioning of individuals within it. The public health utility of many of the metrics used to characterize a network, and an individual's position in it, is however limited, as they were not originally created with epidemiologic studies in mind. The wide-scale structure of a network is only of tangential interest to most epidemiologists—the more relevant question is the positioning of infected individuals within that network, and how close as-yet unexposed individuals are to possibly infective contacts, and the routes with which infection can spread from one individual to the next. We present a novel alternative network measurement, "Insulation", which characterizes an individual's risk of disease from other infected members of their social contact network. It measures the possible routes of infection across a network to each individual member of that network, adjusting the value of each route by the likelihood of transmission. Simulations contrast insulation with other commonly used network centrality measures, such as closeness and betweenness in disease spread models. The potential use of insulation in observational studies as an exposure measurement is explored for both cross-sectional and cohort study designs.

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SEX-SPECIFIC ASSOCIATIONS BETWEEN OBESITY, ABDOMINAL CIRCUMFERENCE AND THE BARRETT'S ESOPHAGUS: A POOLED ANALYSIS FROM THE INTERNATIONAL BEACON CONSORTIUM. *A Kubo, N Shaheen, M Cook, L Murray, T Vaughan, D Whiteman, D Corley (Kaiser Permanente Division of Research, Oakland, CA 94612)

Barrett's esophagus is a precursor lesion of esophageal adenocarcinoma, a cancer that has increased over 500% during the last 40 years. It is approximately twice as common in men as in women, thus previous studies have lacked a large number of women for sex-specific analyses. We leveraged the power of the international BEACON consortium to assess the relationships between body mass index (BMI), abdominal circumference and Barrett's esophagus stratified by sex. Four case-control studies provided 1,130 cases (327 females, 803 males) and 1,434 population controls (450 females, 984 males) for analysis. Study-specific estimates, generated using individual participant data, were combined using random effects meta-analytic method. Abdominal circumference was more strongly associated with the risk of Barrett's esophagus than BMI for both males and females. Among males, there was a clear dose-effect relationship between abdominal circumference and the risk of Barrett's esophagus [per each cm increment: odds ratio (OR) = 1.03; 95% confidence interval (CI) 1.01-1.07, test for trend $p < 0.05$], while there was no association for BMI. Women in the highest quartile of abdominal circumference had over 3.5 times higher risk of Barrett's esophagus [OR = 3.62 95%CI:1.02-6.74, vs. first quartile]. In addition, the highest BMI (35+) was associated with increased risk [OR = 3.95 95%CI 1.43-10.9] in females only. The strengths of the associations were similar when adjusted for symptoms of gastroesophageal reflux disease. We conclude that strong associations exist between abdominal circumferences and the risk of Barrett's esophagus adjusting for BMI, while no association was observed for BMI with or without adjusting for abdominal circumference. The patterns of associations were similar among males and females.

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OVERWEIGHT BREAST CANCER SURVIVORS ARE AT INCREASED RISK OF CONTRALATERAL BREAST CANCERS AT THE LONG TERM FOLLOW-UP. *B Majed, L Ribassin-Majed, B Asselain (Arras General Hospital, Arras, France)

Background: Breast cancer survivors are at increased risk of second primary cancers. Obesity represents a reliable risk factor for breast cancer in postmenopausal period and a prognosis factor in breast cancer regardless menopausal status. Current epidemiological data indicate improved survival of breast cancer patients and increase of overweight prevalence in western countries. Our aim was to study whether overweight breast cancer survivors were at increased risk of contralateral breast cancers (CBC), especially at the long term follow-up. Methods: We used a large cohort of women followed since a first BC without distant spread and/or synchronous CBC. Stoutness was assessed at diagnosis time using binary codings of Body Mass Index (BMI). Thus, overweight and obese patients were opposed to the others. Survival models assuming proportional hazards (Cox models) were used. Proportional hazards assumption was explored using graphical methods, Schoenfeld residuals and time-dependent covariates. In case of non-proportional hazards when considering the total period of follow-up, survival models were computed over time intervals in which hazards were proportional. Results: Over 15,000 patients were included in our survey. Median of follow-up was 10 years. Incidence of CBC was 8.8 [8.3-9.3]/1000 person-years and increased during follow-up. A significant time-dependent association between overweight and CBC events was observed. After the tenth year of follow-up, almost all followed women were postmenopausal. Interestingly, we found an increased hazard of CBC among patients having a BMI ≥ 25 kg/m²: the adjusted hazard ratio was of up 1.50 [1.21-1.86], $p = 0.001$. Conclusions: After ten years of follow-up, our study found a poorer prognosis among overweight breast cancer survivors regarding CBC events. Benefits from diet habits and weight control may improve breast cancer prognosis at the long term follow-up.

939-S

OBESITY, INCIDENT DISEASE, AND MORTALITY – THE OBESITY PARADOX REVISITED. *S Walter, J Mackenbach, R Newson, A Hofman, H Tiemeier (Department of Public Health, Erasmus Medical Center, Rotterdam, The Netherlands)

Obesity is a risk factor for several diseases which in turn are associated with mortality; yet in the elderly, obesity has not been consistently associated with higher mortality. To investigate the obesity paradox, the effects of obesity on disease and mortality in the elderly were studied in a cohort study of 4,611 persons with a mean age 67 years and free from disease at baseline. Participants in the Rotterdam Study underwent clinical examination and were continuously followed for major diseases and death for a median of 14 years. Survival analysis was used to relate baseline BMI and incident diseases (diabetes, hip fracture, dementia, cancer and cardiovascular disease) to all-cause mortality. Overweight and obesity were related to a higher likelihood of incident disease (overweight: HR 1.14, 95%-CI 1.03-1.26, obesity: HR 1.39, 95%-CI 1.21-1.59) and associated with a reduction in mortality risk (overweight: hazard ratio (HR) 0.89, 95%-CI 0.80-0.99, obesity: HR, 0.80, 95%-CI 0.69-0.94). However, mortality risk among those with incident disease was more than 3-fold higher in normal weight and overweight participants whereas in the obese mortality risk was doubled as compared to participants without disease (p-value of effect difference: 0.048). Although associated with incident disease, overweight and obesity were related to longer survival in the non-diseased older population. This can be explained partly by longer survival of obese persons with disease.

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CANCER INCIDENCE IN A COHORT OF TYPE 2 DIABETICS. *H W Hense, H Kajuter, J Wellmann, U Batzer, O Heideringer (Cancer Registry NRW and University Muenster, Muenster, Germany)

Meta-analyses have shown an association between type 2 diabetes (T2D) and neoplasms. Recently, anti-diabetic therapy was suspected as having potentially protective (metformin) or adverse (insulin, glargin) effects. We investigated in a cohort of 26,472 T2D patients, aged 40 to 79 years at enrolment in a diabetes management program, the risk of incident malignancies by linkage with records from a population-based cancer registry. The crude incidence of any cancer (ICD C00-C96) was 759 per 41,170 person-years in men and 605 per 47,603 py in women with T2D. The standardized incidence ratio compared with the general population from the same county was raised in T2D patients (SIR = 1.14 (99% confidence interval [1.04-1.21])). Specifically, the incidence of liver cancer (SIR = 1.94 [1.18-2.99]) and pancreas cancer (SIR = 1.45 [0.97 - 2.06]) was raised while prostate cancers were less common (SIR = 0.65 [0.52-0.82]). SIRs for colon, lung, breast and endometrium cancer were all close to 1.0. Cox proportional hazard models revealed that within the cohort, apart from gender (female vs male HR = 0.63 95% CI [0.6 -0.71]), diabetes duration had a marked impact on the occurrence of any cancer (per year, HR = 0.95 [0.93 - 0.96]). Moreover, insulin therapy showed a substantial effect on cancer incidence (HR = 1.69 [1.43 - 1.99]) even after adjustment for gender, body mass index and diabetes duration. Insulin analogues were related to a moderate increase in men only (HR = 1.49 [1.01 - 2.18]). Metformin appeared unrelated to cancer incidence. We confirm previous reports on a raised risk of cancer among T2D patients, in particular shortly after diagnosis, and a potential relation with insulin therapy. Analogues raised the cancer risk only in men.

IMPACT OF BODY MASS INDEX AT DIAGNOSIS ON PROSTATE CANCER MORTALITY. *R Haque, S K Van Den Eeden, K Richert-Boe, N Ghai, G Inzhakova, B Khallakury, S Weinmann (Research and Evaluation, Pasadena, CA 91101)

Purpose: Some studies suggest that obesity is associated with increased risk of prostate cancer death, while other studies have not found such an association. Therefore, we evaluated the association between body mass index (BMI) at diagnosis and prostate cancer mortality in a large population based case-control study using data from three large health plans in the western U.S. Methods: This study included 651 men with prostate cancer who underwent prostatectomy. Cases (N = 300) died from prostate cancer, while matched controls (N = 351) were alive at the time of the case's death. Adjusted odds ratios (AOR) were calculated using multivariable logistic regression models including the matching factors (health plan site, race, age at diagnosis, year of diagnosis, stage at diagnosis, duration of health plan membership). Results: Three BMI (kg/m²) categories were created: healthy (18.5-24.9), overweight (25-29.9) and obese (> 30). Over 40% of the study population was overweight or obese at diagnosis. Cases were more likely to be obese than controls (29% vs. 23%). Overall, obese men were twice as likely to die from prostate cancer compared to men with healthy BMI (AOR = 2.30, 95% Confidence Interval (CI), 1.42-3.73). After stratifying by Gleason score, the odds of mortality generally rose with increasing BMI. The strongest effect measure was observed in the Gleason Score 8+ category (AOR = 2.97, 95% CI: 1.04-8.46). These effect estimates remained the same after adjusting for PSA at diagnosis. Conclusions: These compelling results suggest that BMI at diagnosis is strongly correlated with prostate cancer mortality, and that men with aggressive disease have a markedly greater odds of death if they are overweight or obese.

944-S

INFERTILITY RESOLVED WITH OR WITHOUT FERTILITY TREATMENT IN AUSTRALIAN WOMEN AGED 31-36 YEARS: A PROSPECTIVE, POPULATION-BASED STUDY. *D L Herbert, J C Lucke, A J Dobson (University of Queensland, Brisbane, Australia)

Birth outcomes during a three year period were compared for women with a history of infertility who did or did not use fertility treatment with hormones and/or in vitro fertilisation. Participants in the Australian Longitudinal Study on Women's Health born in 1973-78 were randomly selected from the universal public health insurance database and completed up to five mailed surveys (1996-2009). Participants reported on their infertility and use of treatment at age 28-33 years (survey 4 (S4) in 2006) and 31-36 years (survey 5 (S5) in 2009). The odds of resolved infertility at S5 were estimated using logistic regression with adjustment for age, area of residence, private health insurance and male infertility. Among 7280 women who responded to both S4 and S5, 18.6% (n = 1378) reported infertility. More than half (n = 804, 56.8%) of these women did not use treatment and 43.9% (n = 347) gave birth between S4 and S5. Compared to infertile women who did not use treatment, women who used treatment were more likely at S5 to have recently given birth (odds ratio (OR) = 1.59, 95% CI 1.26-2.00) or be pregnant (OR = 1.77, 1.27-2.46). Further, women who used treatment were more likely to have twins (3.37, 1.18-9.62), premature births (1.52, 0.95-2.43), or low birthweight babies (1.83, 0.70-2.53) compared to women who gave birth without using treatment. Many women aged up to 36 years with a history of infertility can conceive naturally over a three year period without the use of treatment. Women who have never had a prior birth may need to use treatment to resolve their infertility but they are at higher risk of poorer perinatal outcomes, such as premature or low birthweight babies.

EFFECT OF CALCIUM ON BONE RESORPTION AND BONE MINERAL DENSITY IN PREGNANCY: A RANDOMIZED CONTROL TRIAL. *A S Ettinger, H Lamadrid, A Mercado, K Kordas, K Peterson, H Hu, M Hernández-Avila, M M Téllez-Rojo (Harvard University, Boston, MA)

Calcium requirements are increased during pregnancy to meet the needs of the developing fetus; however, the role of dietary supplementation in preventing maternal bone loss is unclear. In a double-blind, randomized control trial conducted from 2001-2003 in Mexico City, we randomly assigned 670 women in their first trimester of pregnancy to calcium (two-600 mg calcium carbonate; N = 334) or placebo (N = 336) taken at bedtime. Subjects were followed through 1-month postpartum and the supplement effect on urinary cross-linked N-telopeptides (NTx) was evaluated using an "intent-to treat" analysis among 563 subjects (84%) who completed follow-up. Analyses were then conducted stratifying subjects by treatment compliance ("as treated") defined from pill counts at each visit. In a subset of subjects (N = 290), the supplement effect on radial bone mineral density (BMD) was also estimated. Adjusting for baseline NTx, dietary energy and calcium intake, age, primigravidity, and time, supplement was associated with an overall reduction of 15.8% in NTx relative to placebo (p < 0.001). Among those who consumed > 50%, > 67%, and > 75% of pills, respectively, the effect of calcium was associated with 16.5%, 20.4%, and 20.7% reductions in NTx compared to placebo (all p < 0.001). By 1-month postpartum, among highest compliers, calcium was associated with a 59.0 m/sec higher radial BMD relative to placebo (p = 0.009). Calcium was associated with reductions in bone resorption and attenuated losses to BMD when administered during pregnancy and, thus, may constitute an important intervention to prevent skeletal loss associated with childbearing.

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INFERTILITY DRUGS AND YOUNG-ONSET BREAST CANCER: RESULTS FROM THE TWO SISTER STUDY. *C Fei, L A DeRoo, D P Sandler, C R Weinberg (National Institute of Environmental Health Sciences, Research Triangle Park, NC 27709)

Infertility drugs have been associated with breast cancer risk, but reported associations vary and data on young-onset disease are limited. We examined the association between young-onset breast cancer and two ovulation-inducing drugs, Clomiphene (Clomid) and follicle-stimulating hormone (FSH), in the Two Sister Study, a sister-matched case-control study of women living in United States and Puerto Rico. Women with breast cancer whose cancer-free sisters were already enrolled in the prospective Sister Study were eligible if they were under age 50 at diagnosis and were still within 5 years of diagnosis. This analysis includes 1107 affected sisters enrolled 2008-2010 and 1314 of their cancer-free sisters. Odds ratios (ORs) were calculated using conditional logistic regression adjusting for age at first birth and relative birth order among the sisters. Compared with non-users, Clomid users (n = 209) were less likely to be diagnosed with young-onset breast cancer [OR = 0.72, 95% confidence interval (CI): 0.51, 0.96]. The odds ratio was lower among women who had used Clomid before age 30 (OR = 0.64, 95% CI: 0.42, 1.00) and lower among those who had not conceived in any Clomid cycle (OR = 0.56, 95% CI: 0.37, 0.84). History of FSH treatment (n = 76) was also inversely associated with breast cancer risk (OR = 0.79, 95% CI: 0.49, 1.29). Infertility per se appeared unrelated to risk. Infertility drug use (particularly Clomid) may have direct effects or may be serving as a marker for lower average endogenous estrogen levels in women with ovulatory infertility.

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ANTIDEPRESSANT USE DURING PREGNANCY AND THE RISK OF GESTATIONAL HYPERTENSION. *M A De Vera, G Hanley, T Oberlander, T Koren, E Rey, M St-Andre, A Bérard (University of Montreal/CHU, Montreal, QC, Canada)

Despite growing knowledge on the impact of antidepressant use during pregnancy on fetal and neonatal outcomes, there is paucity of data on maternal outcomes. Our objective was to evaluate the impact of antidepressant use during pregnancy on the risk of gestational hypertension. Using a nested case-control study design, we obtained population-based data from the Quebec Pregnancy Registry for 1,254 women with a diagnosis of gestational hypertension with or without pre-eclampsia, with no history of hypertension before pregnancy. We randomly selected 10 controls for each case, matched on the case's index date (date of diagnosis) and gestational age at time of diagnosis. Use of antidepressants was defined dichotomously. Crude and adjusted odds ratios (OR) with 95% confidence intervals (CI) using conditional logistic regression models were calculated, adjusting for potential confounders such as diagnosis of depression or anxiety before pregnancy, maternal sociodemographic characteristics, maternal chronic conditions, and antidepressant use and use of health care services in the year before pregnancy. A total of 46 (3.7 %) women with gestational hypertension had at least 1 prescription filled for an antidepressant during pregnancy compared with 304 (2.4%) in the matched control group (OR 1.53; 95% CI 1.12-2.10). After adjusting for potential confounders, use of antidepressants during pregnancy was associated with a 58% increased risk of gestational hypertension with or without pre-eclampsia (OR 1.58; 95% CI 1.04-2.41). Overall, these data indicate that women who use antidepressants during pregnancy have an increased risk of gestational hypertension with or without pre-eclampsia above and beyond the risk that could be attributed to their depression or anxiety disorders.

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MEASURING HEALTHCARE DISPARITIES. *J P Scanlan (James P Scanlan, Attorney at Law, Washington, DC 20007)

Healthcare disparities are studied through a variety of measures: relative differences in rates of receiving appropriate care (including recommended procedures); relative differences in non-receipt of appropriate care; absolute differences between rates; and odds ratios. But each of these measures tends to be systematically affected by the overall prevalence of the outcome. As levels of appropriate care increase generally, relative differences in receipt of such care tend to decrease while relative differences in non-receipt of such care tend to increase. Absolute differences and odds ratios tend also to change systematically as general levels of appropriate care increase or decrease. As relatively uncommon outcomes increase in overall prevalence, absolute differences tend to increase; as relatively common outcomes increase in overall prevalence, absolute difference tend to decrease. Differences measured by odds ratios tend to change in the opposite direction of absolute differences. This presentation will illustrate these patterns with real and hypothetical data and present examples of studies where different measures would yield opposite conclusions about directions of changes in disparities over time. It will be argued that researchers maintaining that different measures reveal different aspects of an issue or that value judgments justify choosing one measure over another are mistaken. Rather, there can be only one answer to whether a disparity has changed in a meaningful sense, although the answer may sometimes be difficult to discern. The most effective approach to identifying a meaningful change over time is a probit analysis, which derives from each pair of rates the difference between the means of underlying normal distributions.

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ADOLESCENT PHYSICAL ACTIVITY AND THE BUILT ENVIRONMENT: A LATENT CLASS ANALYSIS APPROACH. *K McDonald, M Hearst, K Farbaksh, C Patnode, A Forsyth, J Sirard, L Lytle (University of Minnesota, Minneapolis, MN 55454)

This study used a novel approach (latent class analysis [LCA]) to classify neighborhoods proximal to adolescents' homes according to built environment characteristics, and examined if adolescent physical activity (PA), inactivity (IA), and screen time (ST) varied across neighborhood classes. The adolescent cohort ($n = 344$, mean age = 15.4 years [SD 1.7]) was from the Minneapolis-St. Paul area. The LCA included built environment characteristics hypothesized to be associated with adolescent PA: distance to nearest trail, recreation center, school, park and gym; density of transit stops, retail food outlets and busy streets within 1600-meter buffers; median block size; and a walkability index (WI) (from residential population density, intersection density, and retail employment density). Based on the model fit indices (likelihood ratio value [G^2] and associated degrees of freedom, AIC and BIC), an LCA model with four distinct neighborhood classes was identified: 1) low density retail/transit, low WI; 2) high density retail/transit, high WI; 3) moderate-high density retail/transit, moderate WI; and 4) moderate-low density retail/transit, low WI. Adolescents were assigned to the class in which they had the highest probability of membership; mean class probability was > 0.89 . Multivariate linear regression models estimated if adolescent PA, IA and ST differed by neighborhood built environment class. We failed to find evidence of an effect of neighborhood class on objective PA or IA, or self-reported ST after adjusting for potential confounders. These results highlight the difficulty of disentangling the potential effects of the built environment on PA.

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THE EFFECTS OF INTERPERSONAL AND INSTITUTIONAL HOUSING DISCRIMINATION ON PSYCHOLOGICAL DISTRESS: LEVERAGING A HOUSING VOUCHER EXPERIMENT AND INSTRUMENTAL VARIABLE ANALYSIS TO ESTIMATE CAUSAL EFFECTS. *T L Osypuk, E Tchetgen Tchetgen, M M Glymour (Northeastern University, Boston, MA)

Both interpersonal and institutional discrimination are associated with worse mental health. However most studies are observational (thus potentially biased by unmeasured confounding), and few studies model multiple forms of discrimination simultaneously. Our study capitalizes on an experimental design of a housing voucher program (the Moving to Opportunity study which randomized families to receive Section 8 vouchers to move to lower-poverty neighborhoods, compared to public housing controls). We apply instrumental variable (IV) methods to estimate the causal effect of both institutional (neighborhood % poverty) and interpersonal discrimination (subjective report of discrimination when renting an apartment) on psychological distress (Kessler K6) among adults, compared to OLS models. Results: OLS models of interpersonal discrimination on distress generated positive associations, consistent with this body of literature; yet these estimates may be biased since IV methods find no significant positive effects. Indeed, adults moving to better neighborhoods reported more interpersonal discrimination ($p < .01$), yet better mental health, vs. controls. Institutional discrimination was positively associated with distress, and it significantly mediated the treatment effect (using IV mediation methods) of moving to a low-poverty neighborhood with distress ($B = 0.007$ [95% CI:0.001,0.013]) while interpersonal discrimination did not ($B = 0.55$ [95%CI:-0.36,1.45]). Different forms of discrimination likely influence mental health, but attention to institutional discrimination may be important for understanding housing and neighborhood health patterns.

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EXPLAINING SOCIOECONOMIC INEQUALITIES IN TOBACCO USE IN LOW AND MIDDLE INCOME COUNTRIES. *S Harper, B McKinnon (McGill University, Montréal, QC, Canada)

Given the historical social patterning of tobacco use in richer countries, there is a pressing need to understand the social dimensions of smoking in poorer countries as tobacco extends its global reach. We used cross-population comparable data from the World Health Survey to investigate the contribution of demographic, behavioral, health, and other socioeconomic factors to income-related inequalities in current smoking for 264,947 men and women in 53 low and middle income countries. We measured socioeconomic inequalities using the absolute and relative concentration index (expressed as a % of maximum inequality), and decomposed inequalities using a probit regression technique. Both overall prevalence and absolute socioeconomic inequalities in smoking were larger for men than women, with the largest inequalities (% of index maximum) observed in Southeast Asia (median = 20.7%, interquartile range[IQR] = 6.1) and smallest in Africa (median = 8.5%, IQR = 13.1). Education was generally the largest contributor to income-related smoking inequalities, but we found considerable variation in the determinants of inequalities both within and across regions. On average education explained 44% of income-related smoking inequality among Western Pacific men (ranging from 29% in China to 75% in Vietnam), but only 18% in African countries. Other health behaviors explained little socioeconomic inequality in smoking in most regions except the Americas (29%) and Southeast Asia (11%). The contribution of potential determinants of socioeconomic inequalities in tobacco smoking vary widely across poorer countries. This suggests that intervention efforts to reduce inequalities in tobacco use in resource-poor environments may be different than those in richer countries.

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FUTURE CASES AS PRESENT CONTROLS TO ADJUST FOR EXPOSURE-TIME TRENDS. *S Wang, C Linkletter, M Maclure, D Dore, V Mor, S Buka, G Wellenius (Brown University, Providence, RI 02912)

Self-matched case-only studies, such as the case-crossover (CC) or self-controlled case series method (SCCS), control for time-invariant confounders (measured or unmeasured) by design but not for confounders that vary with time. A bidirectional CC design can adjust for exposure-time trends, however, in pharmacoepidemiology, illness often influences future use of medications, making a bidirectional design problematic. Suissa's case-time-control design combines the CC and case-control designs and adjusts for exposure-trend bias in the cases' self-controlled odds ratio by dividing that ratio by the corresponding self-controlled odds ratio in a concurrent matched control group. However, if not well matched, the control group may re-introduce selection bias. We propose two study designs which improve matching by restricting controls to future-cases. We evaluated these designs through simulation and analysis of a theoretically null relationship using Veterans Administration (VA) data. The 'case-case time control' (CCTC) design involves crossover analyses in cases and future-case controls, while the 'case-case as control' (CCC) design involves a case-control analysis (without crossover) where controls are sampled from future-cases. Simulation studies show that the CCTC can adjust for exposure trends while controlling for time-invariant confounders. The CCC can account for exposure trends but may remain biased by time-invariant confounders if not explicitly adjusted for. When analyzing the relationship between vitamin exposure and strokes using data on 3192 patients in the VA, the CC odds ratio of 1.5 [1.3-1.7] was reduced to 1.1 [0.9-1.3] when divided by the concurrent exposure trend odds ratio (1.4) in matched future-cases, suggesting that the CCTC approach reduces bias from exposure-time trends.

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THE IMPACT OF POVERTY REDUCTION POLICY ON CHILD AND ADOLESCENT OVERWEIGHT: A QUASI-EXPERIMENTAL ANALYSIS OF THE EARNED INCOME TAX CREDIT. *D Rehkopf, K Strully, W Dow (Stanford University, Stanford, CA 94305)

The burden of child obesity is disproportionately borne by low-income families and disadvantaged communities. However, moving beyond evidence of correlation to estimates of the impact of anti-poverty policy has been difficult because there are many potential confounding factors that may jointly determine poverty and child overweight. Our approach to identifying the impact of the largest U.S. anti-poverty program amounts to a quasi-experimental research design to decrease these concerns about confounding bias. We therefore have examined how increases in family income generated by changes in earned income tax credit (EITC) policy impact variation in child overweight. We have used 11 waves of data from 1986-2006 from the nationally representative Children and Young Adults of the National Longitudinal Survey of Youth 1979 including 60,422 observations. We used individual fixed effect regression models that controlled for basic demographic time-varying characteristics. The level of qualification for EITC benefits was based on household earnings, state of residence, year and number of dependents. We found that there is a meaningful effect of poverty reduction policy on decreasing odds of overweight. There were decreased odds ratios (OR) (0.88, 95% Confidence Interval (CI) 0.77-0.99) of overweight with \$1000 in EITC credits. This association, however, was found only among boys (OR = 0.80, CI 0.67-0.95) and not girls (OR = 0.97, CI 0.81-1.16). We perform post hoc subgroup analyses based on head of household gender and the gender of siblings to determine if gender differences in our findings are consistent with different allocation of tax credit benefits to boys and girls.

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COMPARATIVE EFFECTIVENESS RESEARCH IN 2011. *K Dickersin (Center for Clinical Trials Johns Hopkins Bloomberg School of Public Health, Baltimore, MD)

The Patient Protection and Affordable Care Act, signed into US law in 2010, authorizes a new, non-profit corporation, the Patient-Centered Outcomes Research Institute (PCORI), and funding for "comparative clinical effectiveness research," (CER). CER identifies what works best for which patients under what circumstances. CER encompasses clinical trials, systematic reviews, prospective cohort studies, and analysis of data from large datasets and patient registries. PCORI will choose a path for prioritizing CER and will contract with government funding bodies, including the National Institutes of Health (NIH), the Agency for Health Care research and Quality (AHRQ), who will in turn fund research projects. This session will provide background material on the CER and the new institute, update the epidemiology community on the plans for funding CER research, and discuss how clinical trials, systematic reviews, and observational studies fit into CER, the inclusion of patients and consumers, and the focus on "real world" studies with real world participants. Speakers: Carolyn Clancy (Agency for Healthcare Research and Policy) Michael Lauer (National Heart Lung and Blood Institute) Jonathan Samet (Institute for Global Health, University of Southern California) Presented by: Society for Clinical Trials.

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CONCEPTUALIZING AND MEASURING RACISM IN SOCIAL EPIDEMIOLOGIC RESEARCH. *C L Ford (Society for the Analysis of African American Public Health Issues)

The purpose of this symposium is to explore new directions and emerging issues in studying racism-related factors as social determinants of health. Sponsored by the Society for the Analysis of African American Public Health Issues (SAAPHI), the symposium will foreground the innovative work of SAAPHI members and of the U.S. Centers for Disease Control and Prevention's Racism and Health Workgroup (RAHW), which develops and validates measures of racism for surveillance purposes and for health disparities research. The panelists will discuss important considerations for conceptualizing and measuring racism, review the RAHW's progress toward expanding the numbers of organizations and states that use the validated measures of racism for routine surveillance, and highlight emerging issues in this field of research. The symposium also will introduce attendees to the Public Health Critical Race praxis. This praxis was recently developed to aid public health researchers in applying Critical Race Theory, which originated in the field of legal studies, to health equity research. Panelists will explore both the potential contributions and the potential challenges of using critical race approaches to conduct epidemiologic research. The symposium will include a 30-minute question and answer session to encourage discussion between attendees and panelists regarding the issues raised in the presentations. Speakers: *Welcome and Introduction to the Society for the Analysis of African American Public Health Issues and the CDC Racism and Health Workgroup* - Rebecca Hasson (SAAPHI President) *Measuring Racism: Cutting Edge Work of the CDC Racism and Health Working Group* - Camara P Jones *The Public Health Critical Race Praxis: Useful or Not for Health Equity Research?* - Chandra L Ford *How the History of Socioeconomic Status Influences Impoverished Race and Ethnicity Variables* - Jay Pearson.

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EXPLORING THE HUMAN MICROBIOME WITH NEXT GENERATION SEQUENCING: MAKING SENSE OF OUR COMPLEX ECOSYSTEM. *G Weinstock (The Genome Institute, Washington University at St. Louis, MO)

The Human Microbiome is all the microbes that live on and in the human body. Humans are actually complex ecosystems of human and microbial cells, with the latter outnumbering the former by an order of magnitude. Because these ecosystems are communities of thousands of organisms, it required next generation DNA sequencing methods to produce data on a scale to be able to adequately describe the communities. In addition, computational improvements were needed to manage and analyze the data avalanche. In the NIH Human Microbiome Project, 300 subjects have been sampled at 15/18 body sites (male/female), on 2-3 sampling visits. The > 11,000 specimens obtained, each a microbial community, have been sequenced to determine the 16S genes (taxa) present and their abundance and over 700 specimens have been shotgun sequenced. Analysis of this publicly available data set is being performed and results will be presented.

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EPIDEMIOLOGICS-THE IMPACT OF THE HUMAN MICROBIOME PROJECT ON EPIDEMIOLOGY. *B Foxman (University of Michigan, Ann Arbor, MI)

The Human Microbiome Project (HMP) is characterizing the microbes that live on and in the human body. There are 10 times as many bacterial cells than human cells; fungi and virus are also present in astonishing numbers. Preliminary results from the HMP suggest that there is tremendous variation in microbial community structure found at a specific body site within an individual over time, and an even greater variation in microbial community structure among individuals. Additional studies underscore that microbial communities found on and in the human body are essential to human health. These findings create a number of opportunities and challenges for epidemiologic studies, most critically, that studies of infectious diseases might greatly benefit from measuring the role of microbiota in preventing or assisting colonization and infection by pathogens. Speakers: *Exploring the Human Microbiome with Next Generation Sequencing: Making Sense of our Complex Ecosystem* - George Weinstock (Washington University in St. Louis) *Microbiome wide association studies: lessons from a mouse model of ulcerative colitis* - Wendy S. Garrett (Harvard Medical School, Dana Farber Cancer Institute) *Implications of the Human Microbiome Project of Epidemiology* - Betsy Foxman (Center for Molecular and Clinical Epidemiology of Infectious Diseases (MAC-EPID)).

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MICROBIOME WIDE ASSOCIATION STUDIES: LESSONS FROM A MOUSE MODEL OF ULCERATIVE COLITIS. *W S Garrett (Harvard School of Public Health, Harvard Medical School, Dana Farber Cancer Institute, Boston, MA)

Numerous, large scale studies of the microbial communities that are found throughout the human body are underway with the goal of unraveling the role of microbes in both human health and disease. Inflammatory bowel disease (IBD) is in many ways an ideal setting for such studies as disruption of homeostasis between the host immune system and the intestinal microbiota is now a well-accepted contributor to its pathogenesis. Whether IBD is instigated by individual species or disruptions of entire microbial communities remains controversial. We have characterized the fecal microbial communities in the T-bet^{-/-} x Rag2^{-/-} ulcerative colitis (TRUC) mouse model driven by T-bet deficiency in the innate immune system. 16S rRNA-based surveys of TRUC and Rag2^{-/-} mice revealed distinctive communities that correlate with host genotype. Using this model, we have identified features of these microbial communities that may instigate colitis. Enterobacteriaceae appear to function as key inflammatory allies as we have shown that the presence of *Proteus mirabilis* and *Klebsiella pneumoniae* correlates with colitis in TRUC mice and that TRUC-derived strains, in conjunction with an endogenous microbial community, incite colitis in WT mice. We have also identified a reduction in the community presence of putative beneficial microbes, such as, *Bifidobacterium* spp. Consumption of a fermented milk containing *Bifidobacterium animalis* subsp. *lactis* reduced intestinal inflammation by altering a niche for colitogenic microbes. These studies revealed the utility of using both culture-independent and -dependent approaches to interrogate the contribution of community members to disease pathogenesis. This model also provides a foundation for defining how gut microbial communities work in concert with specific culturable colitogenic agents to cause IBD and creates an opportunity to evaluate preventative or therapeutic measures directed at components of the gut microbiota and/or host.

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IMPLICATIONS OF THE HUMAN MICROBIOME PROJECT FOR EPIDEMIOLOGY. *B Foxman (University of Michigan School of Public Health, Ann Arbor, MI)

The human microbiome project is characterizing microbes that normally inhabit the human body, known as commensals. There are 10 times as many commensal microbes than human cells, with a combined genome consisting of 100 times the number of human genes. I discuss the implications of this new perception of the human host as a 'super organism' for determining disease etiology, and the potential for identifying novel diagnostics and therapies.

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FINALLY WE HAVE A COMMON METRIC FOR THE MEASUREMENT OF HOUSEHOLD FOOD SECURITY IN CANADA AND THE UNITED STATES: EXPLORING OPPORTUNITIES. *L McIntyre (University of Calgary, Alberta, Canada)

The purpose of this symposium is to inform researchers studying poverty, vulnerable populations, and food insecurity about new analytic opportunities presented by the introduction of the United States Department of Agriculture (USDA)-developed Household Food Security Survey Module to pan-Canadian health surveys datasets. The symposium brings together two well-established Canadian food security investigators, Valerie Tarasuk and Lynn McIntyre, with Craig Gundersen, a US authority in food security intervention research and Mark Nord, the staffperson who heads food security measurement, monitoring, and research at the USDA. McIntyre will lead off with an examination of constraints in investigating changes in food insecurity when non-comparable surveys are used as well as the types of analytic possibilities that are now presented in Canada with repeated use of the same survey and between Canada and the US given a common metric. Nord will present the technical issues and analytic highlights of the first Canada-US comparison of food insecurity from the Canadian Community Health Survey 2.2 and the US Census Bureau's Current Population Survey. Gundersen will follow with a presentation on lessons that can be drawn from the US food insecurity literature for Canada. Tarasuk will look at the population health significance of household food insecurity, considering evidence from both countries. Ample time will be provided for participants to ask questions and explore future analytic possibilities. Speakers: *Metric Solitudes: The Value of Internationally Comparable Food Insecurity Measures* - Lynn McIntyre (Dept of Community Health Sciences, Faculty of Medicine, University of Calgary) *Why Is Household Food Security Better in Canada than in the United States?* - Mark Nord (Economic Research Service, Food Assistance Branch, US Department of Agriculture) *Intervening to Address Food Insecurity in Canada: Potential Lessons from the U.S.* - Craig Gundersen (Dept of Agricultural and Consumer Economics, University of Illinois) *Crossing Borders: Unraveling the Relationship between Food Insecurity and Health* - Valerie Tarasuk (Department of Nutritional Sciences, University of Toronto)

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EPIDEMIOLOGIC METHODS ARE USELESS: THEY CAN ONLY GIVE YOU ANSWERS. *M Hernan (Harvard University, Boston, MA) and *J S Kaufman (McGill University, Montreal, Canada)

Criticisms of observational analyses are usually focused on confounding and other biases, and less often on the adequacy of the questions asked by those analyses. Yet all of us conducting observational studies occasionally report answers to questions that may be, if closely examined, of questionable interest for decision making. These questions may involve exposures for which an intervention is not available or known (e.g., socioeconomic status, race), or exposures for which an intervention exists but is not well defined (e.g., obesity, high cholesterol). If these questions are in fact inadequate to guide public health policy, the aims of a substantial proportion of epidemiologic research would need to be reassessed. Furthermore, one cannot rely on epidemiologic methods—no matter how sophisticated—to solve such problems, since methods can only answer, not ask, questions. This symposium explores the adequacy of common questions in epidemiologic research, and its implication for the daily work of practicing epidemiologists. Speakers: *Environmental Epidemiology* - Marc G Weisskopf *Perinatal Epidemiology* - Michael S Kramer *Social Epidemiology* - Sam Harper These practicing epidemiologists will describe the links between the policy questions that they would like to answer (e.g., the randomized experiments they'd like to conduct) and the questions that they are actually asking in their daily work. Discussant: James M Robins.

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METRIC SOLITUDES: THE VALUE OF INTERNATIONALLY COMPARABLE FOOD INSECURITY MEASURES. *L McIntyre (Dept of Community Health Sciences, Faculty of Medicine, University of Calgary, Calgary, Alberta)

From 1994 to 2001 Canadian national surveys used different measures of food insecurity with varying prevalences from survey to survey. The change in survey questions precluded direct comparisons over time in Canada and with the US, which introduced the USDA Household Food Security Survey module in 1995 in the Current Population Survey. This paper presents approaches for investigating changes in food insecurity when non-comparable surveys are used. It concludes with the types of analytic possibilities that are now presented in Canada with repeated use of the same survey and between Canada and the US given a common metric.

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WHY IS HOUSEHOLD FOOD SECURITY BETTER IN CANADA THAN IN THE UNITED STATES? *M Nord (Economic Research Service, Food Assistance Branch, US Department of Agriculture, Washington DC)

Food security, which is defined as consistent access to enough food for an active, healthy life, is essential for health and good nutrition. Based on comparable measures in nationally representative surveys in the middle of the last decade, the percentage of the population living in food-insecure households was lower in Canada than in the United States, and for children, the rate in Canada was about half that in the US. This paper will discuss measurement methodology and what it contributes to international comparability through an examination of different prevalence rates of food insecurity for Canadian and US households with similar demographic and economic characteristics. Specifically, multivariate analyses of the associations of food security with economic and demographic characteristics in the two countries might point to policy differences leading to differential vulnerability.

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CROSSING BORDERS: UNRAVELING THE RELATIONSHIP BETWEEN FOOD INSECURITY AND HEALTH. *V Tarasuk (Department of Nutritional Sciences, Faculty of Medicine, University of Toronto, Toronto, ON, Canada)

In both Canadian and US population health surveys, household food insecurity is independently associated with increased nutritional vulnerability; poorer physical, social, and mental health; and increased likelihood of several chronic diseases. While the cross-sectional nature of these surveys limits causal inferences, our recent analysis of the 2007-08 Canadian Community Health Survey provides evidence of a dose-response relationship between severity of household food insecurity and numerous indices of ill-health. Drawing upon these results and a review of US literature, we explore the health implications of household food insecurity and the food security implications of poor health.

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INTERVENING TO ADDRESS FOOD INSECURITY IN CANADA: POTENTIAL LESSONS FROM THE U.S. *C Gundersen (Dept of Agricultural and Consumer Economics, University of Illinois, Urbana, IL)

Food insecurity is a serious public health challenge facing millions of Americans. In response, a wide array of food assistance programs has been developed. Canada also faces problems with food insecurity. Their approach has been different from the US insofar as their social safety net has, in the main, used general safety net programs rather than food assistance programs. This paper will review key findings from the analyses of US national datasets measuring food insecurity on the connection between food insecurity and food assistance programs in the US. These findings will inform some of the lessons that can be drawn for potential Canadian approaches to addressing food insecurity which in turn can be tested using a common metric for food insecurity in Canada national datasets.

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OPPORTUNITIES AND CHALLENGES IN CONDUCTING EPIDEMIOLOGIC RESEARCH IN THE DEPARTMENT OF VETERANS AFFAIRS HEALTHCARE SYSTEM: A COMPARISON OF THREE DATASOURCES AND APPROACHES. *D White (Clinical Epidemiology and Outcomes Program, Houston VA Health Services, Houston TX)

The Department of Veterans Affairs (VA) medical system is the largest integrated healthcare provider in the U.S., serving over 7.5 million veterans. The VA's longstanding use of a comprehensive electronic medical record system as well as on-going collection of system-wide administrative and clinical data covering a large and diverse population makes it a unique and valuable source for performing clinical, epidemiologic and outcomes research. We propose to present three methods of utilizing VA data to perform epidemiologic studies in the veteran population. The first method entails the use of large, nationwide administrative databases including inpatient and outpatient diagnoses and laboratory and pharmacy data for VA clinical encounters. The second method entails use of the VA's nationwide structured, integrated and searchable electronic medical record. The third method entails identification and direct recruitment of members of this unique patient population. Examples of epidemiologic research using each of these sources will be discussed, including pros and cons. This symposium has applicability to researchers not currently accessing the VA because we will offer suggestions for making necessary connections to access these sources. Moreover, the challenges and opportunities of using these VA datasources have important implications for epidemiologists performing research in other large healthcare systems. Speakers: *Administrative Databases—Using system-wide VA administrative databases to answer epidemiological research questions* - Dr. Jessica Davila *Electronic Medical Record Review—Using system-wide VA electronic medical records to answer epidemiological research questions* - Dr. Jennifer Kramer *Direct Patient Recruitment—Using on-site recruitment at a VA hospital with patient interview and biological specimen collection—challenges in access and issues specific to research in high-risk veteran populations using the federal healthcare system* - Donna White

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RANDOMIZED TRIALS OF CANCER SCREENING: HOW USEFUL ARE THEY? *J Hanley (McGill University, Montreal, QC, Canada)

Pap-test-based screening was not evaluated by RCTs but is widely credited with reducing cervical cancer mortality. Despite costly trials intended to provide evidence for the current screening practice for cancers of the breast, lung, colon and prostate, we do not know many fewer cancer deaths there were in 2001, or will be in 2011 or 2021, because of past and future screening efforts in these domains. Trial shortcomings include: the (short) screening regimens tested in, and the variable age-at-entry into, most trials do not reflect the (longer) regimens and fixed age-at-first screening that would be used if the screening were to be implemented; data analyses ignore time-specificity in the mortality reductions; and – unlike abdominal aortic aneurysms – the long wait for reductions to become apparent means that screening modalities are outdated by the time trial results are clear. Aims: 1. Review why the confusion has arisen. 2. Develop clearer specifications for the inputs needed to project the mortality reductions that would ensue if a screening program were implemented. 3. Establish principles for deciding whether these inputs can only be produced by screening trials, or can/should be arrived at using other means. Session Chair: Stephen Walter Speakers James A. Hanley (McGill University) Olli S. Miettinen (McGill University.) Discussant Noel S Weiss (University of Washington and the Fred Hutchinson Cancer Research Center) Sponsoring Society: CSEB+.

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MORTALITY REDUCTION VS. CURABILITY GAIN AS MEASURES OF BENEFIT FROM SCREENING. *O S Miettinen (Department of Epidemiology, Biostatistics and Occupational Health, Faculty of Medicine, McGill University, Montreal, QC, Canada)

The prevailing orthodoxy has it that the intended consequence of screening for a cancer is reduction in mortality from the cancer, and that this consequence is to be studied by means of a randomized trial. An alternative to this community-medicine (epidemiologists') outlook is the clinical-medicine outlook of the ELCAP, in which the counterpart of that mortality reduction is gain in the rate of curability. Were the randomized trial to address the only genuine and meaningful parameter that it could address, it would thereby address the curability gain – which can best be studied by distinguishing between the diagnostic and prognostic issues concerning screening from the clinical vantage.

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HOW BIG ARE THE MORTALITY REDUCTIONS PRODUCED BY CANCER SCREENING? WHY DO SO MANY TRIALS SAY 20%? *J A Hanley (Department of Epidemiology, Biostatistics and Occupational Health, Faculty of Medicine, McGill University, Montreal, QC, Canada)

Influential reports on the reductions produced by screening for cancers of the prostate, colon and lung have appeared recently. The reported reductions in these randomized trials have been modest, and smaller than expected. But even more surprisingly, all three figures are very similar. I explain why these figures are underestimates and why the seemingly-universal 20% reduction is an artifact of the prevailing data-analysis methods and stopping rules. A different approach to the analysis of data from cancer screening trials is called for. References: (1) Hanley JA. Analysis of Mortality Data From Cancer Screening Studies: Looking in the Right Window. *Epidemiology* 2005; 16: 786-790. (2) Hanley JA. Mortality reductions produced by sustained prostate cancer screening have been underestimated. *Journal of Medical Screening* (2010), 17(3) 147-151. (3) Hanley JA. Measuring mortality reductions in cancer screening trials. To appear in *Epidemiologic Reviews* 2011; theme issue: screening.

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SHOULD “DISABILITY STATUS” BE A COVARIATE IN MOST EPIDEMIOLOGIC RESEARCH? *M M Adams (RTI International, Atlanta, GA 30341)

Similar to the impact of age, sex and race on epidemiologic analyses, accounting for disability status can influence the magnitude of associations and validity of results. This symposium will present the rationale and methods for epidemiologists' routine consideration of the presence/absence, type and severity of disabilities as potential confounders or effect modifiers. The first speaker will discuss concepts, definitions and measures of disability status. Measures will include the uses of medical diagnoses, functional abilities (mobility, cognitive, sensory), duration, severity and social and cultural perceptions. The next speaker will show the influence of accounting for disabilities by describing the role of disability status in injury research. The third speaker will discuss the benefits of routinely accounting for disability status in epidemiologic studies of clinical and public health problems. Do analytic adjustments for disability status influence interpretation of the results, even in biologically-oriented studies? Should persons with disabilities be excluded as study subjects? Can or should epidemiology be used to promote social justice for persons with disabilities? The last speaker will examine the difficulties of accounting for disability status, especially the logistical expense of measuring disability status. This speaker will also examine the magnitude of the effect of disability status on distorting the primary association of interest. Panelists will comment on the speakers' remarks and participate in discussions generated by questions from the audience.

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DISABILITY STATUS: AN IMPORTANT FACTOR IN INJURY EPIDEMIOLOGICAL RESEARCH. *H Xiang, L Stallones (Center for Injury Research and Policy, The Research Institute, Nationwide Children's Hospital, The Ohio State University College of Medicine, Columbus, OH)

Injuries are a leading cause of death and disability around the world. Recent research also shows that disability status, measured by the new conceptual definition based on the International Classification of Functioning, Disability and Health (ICF), is an important risk factor for injuries among children as well as among adults. In this presentation, the authors review research findings from their studies in the past decade about the association of disability and nonfatal injuries, identify gaps in the literature, and provide suggestions for future research. They conclude that disability status should be considered as an important covariate in injury epidemiological research, particularly in injury research among older population and population with special needs (such as Medicaid children). They suggest that future studies should continue to investigate the following: 1) the measurement of disability status in large epidemiology surveys; 2) the role of environment factors and disabilities in injury risk; and 3) the development and evaluation of injury prevention programs targeting individuals with disabilities.

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TECHNOLOGICAL INNOVATION AND INFECTIOUS DISEASE EPIDEMIOLOGY. *A Manges (Department of Epidemiology, Biostatistics & Occupational Health, McGill University, Montreal, QC, Canada)

This symposium will highlight several examples of recent technological innovations and their impact on the conduct/methods of infectious disease epidemiology and public health practice. Each speaker will introduce one or more innovation(s) in their field and provide a case study of the impact of these innovations. The examples will include automated disease surveillance, HIV and aging, infectious disease diagnostic technologies and evaluation, and metagenomic measurements in human microbiome research. Speakers: *Tackling the problems of an aging HIV epidemic: The role of multi-cohort collaborations?* - Marina Klein (McGill University Health Centre, Division of Infectious Diseases and Immunodeficiency Service) *Automated surveillance of clinical data* - David Buckeridge, MD, FRCP(C), PhD (Canada Research Chair in Public Health Informatics) *Assessing the impact of novel tuberculosis diagnostics* - Madhukar Pai, MD, PhD (Department of Epidemiology, Biostatistics & Occupational Health) *Epidemiology and the new world of human microbiome research* - Ameet R. Manges, MPH, PhD (Chair) (Department of Epidemiology, Biostatistics & Occupational Health)

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DO EPIDEMIOLOGISTS ALWAYS NEED TO CONSIDER DISABILITIES? *M M Adams (RTI International, Atlanta, GA 30341)

Accurately measuring disabilities is difficult, especially when epidemiologists need to ascertain potentially relevant details about disabilities. These details may include type, duration and severity of disabilities. Given this complexity, accounting for disabilities raises the cost of acquiring the data needed for epidemiologic studies. Can analysts justify these increased costs? Sometimes. Epidemiologic analyses include diverse activities: surveillance, monitoring, identifying health problems and factors associated with their occurrence as well as testing, targeting and evaluating health interventions. In the context of an aging population and likely increases in the prevalence of disabilities, we will contrast current needs for data about disabilities and future needs for this information.

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TRANSLATING EPIDEMIOLOGIC RESEARCH INTO POLICY: WHAT ARE WE LEARNING ACROSS DIVERSE TOPICS IN PUBLIC HEALTH? *R Brownson (Washington University in St. Louis, MO)

Epidemiology underlies sound public health practice, yet the process of translating epidemiologic research into policy, law, and regulation may be complex, uncertain, and daunting. The goal of this symposium is to review processes by which epidemiologic evidence is translated into policy and thereby to encourage epidemiologists to systematically evaluate their experiences and improve their practices. The panel will consist of four senior epidemiologists who have worked in the policy arena. A set of eight case studies has been developed across a wide range of public health issues (e.g., food policy, regulation of secondhand smoke, blood alcohol limits for drivers). Two of these case studies will be discussed in detail, one on HIV/AIDS prevention in international settings and another on breast and lung cancer screening. A set of cross cutting lessons across all eight cases will be synthesized. The audience and panel members will discuss the merits of evidence synthesis, the appropriate role of epidemiologists in policy-formulation, and future directions for epidemiology. Panelists: Ross C. Brownson (Washington University in St. Louis) Robert A. Hiatt (University of California San Francisco) Vickie M. Mays (UCLA School of Public Health) Olivia Carter-Pokras (University of Maryland College Park School of Public Health) Sponsor: ACE Board, ACE Policy Committee

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PROSPECTIVE STUDY OF THE ELDER SELF-NEGLECT AND EMERGENCY DEPARTMENT USE IN A COMMUNITY POPULATION. *X Dong, M Simon (Rush Institute for Healthy Aging, Chicago, IL)

Purpose: This study aimed to quantify the relation between elder self-neglect and rate of emergency department utilization in a community-dwelling population. Methods: Prospective population-based study is conducted in a geographically-defined community in Chicago of community-dwelling older adults who participated in the Chicago Health and Aging Project. Of the 6,864 participants in the Chicago Health and Aging Project, 1,165 participants were reported to social services agency for suspected elder self-neglect. The primary predictor was elder self-neglect reported to social services agency. Outcome of interest was the annual rate of emergency department utilization obtained from the Center for Medicare and Medicaid System. Poisson regression models were used to assess these longitudinal relationships. Results: The average annual rate of emergency department visit for those without elder self-neglect was 0.6 (SD, 1.3) and for those with reported elder self-neglect was 1.9 (3.4). After adjusting for sociodemographic, socioeconomic, medical condition, cognitive and physical function, elders who self-neglect had significantly higher rate of emergency department utilization (RR, 1.42, 95% CI, 1.29-1.58). Greater self-neglect severity (Mild: PE = 0.27, SE = 0.04, $p < 0.001$; Moderate: PE = 0.41, SE = 0.03, $p < 0.001$; Severe: PE = 0.55, SE = 0.09, $p < 0.001$) were associated with increased rates of emergency department utilization, after considering same confounders. Conclusion: Elder self-neglect was associated with increased rates of emergency department utilization in this community population. Greater self-neglect severity was associated with an greater increase in the rate of emergency department utilization.

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EFFECT OF WEIGHT LOSS IN ADULTS ON ESTIMATION OF RISK DUE TO EXCESS ADIPOSITY IN A COHORT STUDY. *N L Kyulo, S F Knutsen, G E Fraser, P N Singh, (Department of Epidemiology and Biostatistics, School of Public Health, Loma Linda University, Loma Linda, CA 92350)

The effect of overweight and obesity on the risk of fatal disease tends to attenuate with age. To evaluate whether this effect is partly attributable to disease-related weight loss, we examined the history of overweight/obesity and obesity-related disease in adults who were in the recommended range (19 to 25 kg/m²) or overweight (> 25 to 30 kg/m²) at baseline in a cohort study. We conducted an analysis of 7,855 adult cohort members of the Adventist Health Study I who had provided anthropometric data on surveys at baseline and 17 years prior to baseline. Among adults in the recommended range of BMI at baseline we found that 1) the prevalence of previous overweight/obesity (17 years prior to baseline) was 20.4% and increased with age (12.6% for < 65 yr; 27.7% for 65-84 years; 36.7% for > 85 years) 2) those with overweight/obesity were more likely to have currently diagnosed diabetes (OR = 2.83 95% CI = [2.11, 3.81]), coronary heart disease (OR = 1.91 95% CI = [1.47, 2.47]), and high blood pressure (OR = 1.52 95% CI = [1.26, 1.82]). In survival analyses, we found that current overweight or obesity was a risk factor for mortality after excluding subjects with previous overweight/obesity. Our findings indicate that among adults currently in the recommended range of BMI at baseline in a cohort study, a history of overweight or obesity can be a confounder when using this group to estimate the risk due to current adiposity.

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LIFE COURSE SOCIOECONOMIC POSITION AND INCIDENCE OF DEMENTIA AND COGNITIVE IMPAIRMENT WITHOUT DEMENTIA IN OLDER MEXICAN AMERICANS: RESULTS FROM THE SACRAMENTO AREA LATINO STUDY ON AGING. * A Zeki Al Hazzouri, M N Haan, J D Kalbfleisch, S Galea, L D Lisabeth, and A E Aiello (University of Michigan, Ann Arbor, MI 48109)

Few investigations have examined the link between changes in life course socioeconomic position (SEP) and cognitive decline or dementia incidence. This analysis examines the impact of changes in life course SEP on incidence of dementia and cognitive impairment without Dementia (CIND) over a decade of follow-up. Participants of Mexican origin (N = 1,789) were from the Sacramento Area Latino Study on Aging (SALSA). Dementia/CIND was ascertained using standard diagnostic criteria. SEP indicators at 3 life stages (childhood, adulthood, and mid-life) were used to derive life course cumulative SEP (ranges from 0 to 8) and SEP mobility. Nearly 24% of the sample was at low SEP throughout life. Hazard ratios (HR) and 95% confidence intervals (CI) were computed from Cox proportional hazards regression models. In fully adjusted models, participants with continuously high SEP across the life course had lower hazards of dementia/CIND compared to those with continuously low SEP across the life course (HR = 0.49; 95% CI = 0.24, 0.98; P = 0.04). Participants experienced a 16% greater hazard of dementia/CIND with every increase in one unit of cumulative SEP disadvantage across the life course (HR = 1.16; 95% CI = 1.01, 1.33; P = 0.04), in age-adjusted models. Early exposures to social disadvantage may increase the risk of late life dementia.

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ASSOCIATIONS BETWEEN CRANIAL MAGNETIC RESONANCE IMAGING AND ELECTROCARDIOGRAPHIC FINDINGS. *M Glymour, R A Kronmal, W Longstreth, A Fitzpatrick, P Gilsanz, and K K Patton (Harvard School of Public Health, Boston, MA)

Background: A reciprocal relationship between brain function and cardiac electrophysiologic regulation has long been suggested. We hypothesized that findings on cranial Magnetic Resonance Imaging (MRI) would be associated with electrocardiographic (ECG) abnormalities in Cardiovascular Health Study (CHS) participants age 65+. Methods: For participants (n = 2,713) with both MRI (conducted 1992-1996) and 12-lead ECG data, we examined 5 MRI findings: 10-point grades of sulci, ventricles, and white matter (WMG) and presence/absence of cortical and subcortical infarcts. ECG findings included: atrial fibrillation (AF), prolonged QT interval (LQT), ventricular conduction defect, AV block, and any major abnormality. We also used heart rate (HR) to indicate cardiac dysregulation. We used linear regression to predict HR and logistic to predict all other ECG outcomes, with adjustment for demographic and cardiovascular risk factors. Results: Prevalent major ECG abnormalities were associated with WMG (odds ratio [OR] = 1.08, 95% confidence interval [CI]: 1.02, 1.14) and cortical infarcts (OR = 2.39, 95% CI: 1.61, 3.53). LQT was associated with cortical (OR = 1.68; 1.09, 2.58) and subcortical (OR = 1.32; 1.07, 1.64) infarcts. AF was associated with cortical infarcts (OR = 3.12; 1.51, 6.43). Increased HR was associated with all indicators except cortical infarcts. Results changed little when excluding AF cases. Conclusions: We interpret findings cautiously due to multiple comparisons and exploratory analyses of cross-sectional relationships. As expected, the strongest association was for AF and cortical infarcts. On the other hand, MRI findings suggesting small vessel disease were associated with heart rate.

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CRANIAL MAGNETIC RESONANCE IMAGING FINDINGS AND INCIDENT ELECTROCARDIOGRAPHIC ABNORMALITIES. *K K Patton, M M Glymour, W Longstreth, A Fitzpatrick, and R A Kronmal (University of Washington Medical Center, Seattle, WA)

Background: Evidence suggests a reciprocal relationship between brain function and cardiac electrophysiologic regulation. We evaluated whether findings on cranial Magnetic Resonance Imaging (MRI) predicted development of new electrocardiographic (ECG) abnormalities over 5 years of follow-up in Cardiovascular Health Study (CHS), a longitudinal cohort study of participants 65 years and older at baseline. Methods: Data were from CHS participants with cranial MRI scans and at least one subsequent ECG on follow-up, which ranged from 1 to 7 years. We examined 5 MRI findings: 10-point grades of sulci, ventricles, and white matter (WMG) and cortical and subcortical infarcts. We examined onset of ECG-identified atrial fibrillation, prolonged QT interval, ventricular conduction defects, AV block, and any major abnormality, restricting analyses to those without these abnormalities at the time of MRI. We used discrete time hazard models with adjustment for demographic and cardiovascular risk factors. Results: None of the MRI findings predicted development of any of the ECG abnormalities except for prolonged QT interval. Prolonged QT interval was associated with WHG (HR = 1.23, 95% CI: 1.10, 1.37) and subcortical infarcts (HR = 1.50, 95% CI: 1.03, 2.17). Conclusions: MRI findings suggesting small vessel disease of the brain, high WMG and presence of subcortical infarcts, were associated with the risk of developing prolonged QT interval. Results should be interpreted cautiously due to the intermittent nature of most ECG abnormalities.

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HIGH BURDEN OF COMORBIDITY INCREASES RISK OF COGNITIVE IMPAIRMENT: THE MAYO CLINIC STUDY OF AGING. *R O Roberts, Y E Geda, D S Knopman, R H Cha, B F Boeve, W A Rocca, R C Petersen (College of Medicine, Mayo Clinic, Rochester, MN 55905)

Objective: To investigate the association of medical comorbidity with incident mild cognitive impairment (MCI) and its subtypes. Background: Apolipoprotein epsilon4 (APOE) allele predicts Alzheimer's disease and has also been associated with amnesic MCI (a-MCI), a prodromal stage for Alzheimer's disease. In contrast, the non-amnesic subtype (na-MCI) is hypothesized to have a more heterogeneous etiology. The association of comorbidity with MCI subtypes has not been fully examined. Methods: Participants were a prospective population-based cohort of Olmsted County, MN, residents aged 70–89 years on October 1, 2004. Participant evaluation at baseline and at 15-month intervals included a neurological evaluation and neuropsychological testing. Comorbid medical conditions were assessed from the medical record. A Charlson Comorbidity Index was computed and APOE genotyping was performed. Results: Over a median follow-up of 4.3 years (interquartile range, 3.9–4.9 years), there were 296 incident cases of MCI among 1,450 subjects who were cognitively normal at baseline. Presence of APOE epsilon4 allele was associated with a-MCI (hazard ratio [HR], 1.67; 95% confidence interval [CI], 1.19–2.34) but not with na-MCI (HR, 1.25; 95% CI, 0.70–2.26). In contrast, a high Charlson Index of Comorbidity (≥ 2) was strongly associated with na-MCI (HR, 3.41; 95% CI, 1.77–6.54), but was not associated with a-MCI (HR, 0.93; 95% CI, 0.69–1.25). Conclusions: Our findings confirm the hypothesis that a-MCI has a neurodegenerative etiology consistent with a prodromal stage of Alzheimer's disease whereas na-MCI has a more heterogeneous etiology associated with comorbid medical conditions.

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SELF-EVALUATED QUALITY OF LIFE AS A SURVIVAL PREDICTOR FOR THE ELDERLY. T Ruiz*, J E Corrente (Department of Public Health, Botucatu School of Medicine, UNESP, São Paulo, Brazil)

The demographic transition has been in evidence in the last few decades and, consequently, concern about quality of life has also increased in the last few years with respect to not only living longer, but also to living with one's additional years with quality. The aim of this work is to determine whether self-evaluated quality of life influences survival. The baseline of the study was a population inquiry in a city with 100,000 inhabitants in São Paulo state, Brazil, from which a sample size of 365 elderly individuals was estimated for non-defined prevalence. Quality of life was evaluated by using the instrument proposed by Flanagan (1972). Survival was studied seven years after the first inquiry. Flanagan's score was calculated based on the median of answers that had 7 choices for each item. The domains were studied separately in survival by the means of answers to each one, and Cox regression was used by always adjusting by gender and age. From the 365 elderly persons consulted, a median Flanagan's score of 75 points was obtained for the interval from 31 to 97. By using such median score, it was observed that the survival curves were significant by the log-rank test ($p = 0.02$) and showed proportional hazards, considering the quality-of-life evaluation by the elderly above and below the median. By constructing a Cox model for survival time and the five domains from the Flanagan's scale adjusted for gender and age, it was found that the domain for physical and material well-being was significant ($p = 0.0085$). The domains for personal development, social and community activities and relationships with other people did not show significance for the survival time investigated. The population's longer survival produces a prevalence of disabilities that lead to physical and psychic dependence. In our findings, physical and material well-being referring to one of the domains appears as a protective factor for survival (Hazard Ratio = 0.851). This means that when they report better quality of life as having more physical and material well-being, older individuals also live longer. This aspect has been observed where quality of life means being able to perform activities without interference from other people. We concluded that self-evaluation of health conditions can be considered as a survival predictor.

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VALIDATION OF A SCREENING TOOL IN GERIATRIC ONCOLOGY: A MULTICENTER PROSPECTIVE STUDY. *C Bellera, M Rainfray, S Mathoulin-Pélessier, P Soubeyran (Institut Bergonié, Comprehensive Cancer Centre, Bordeaux, France)

PURPOSE: The risk of cancer treatment-related toxicity increases with age and may lead to toxic death. Evaluation of the patient's status becomes mandatory. Comprehensive Geriatric Assessment (CGA) is an appropriate evaluation; however it is time-consuming and not essential for all. The G8, a screening tool for patients in need for a CGA (8 items; 0[poor]-17 [good prognosis]; cut-off 14) was developed based on earlier findings. OBJECTIVES: To assess classification performances and validate the G8 as a screening tool to identify among > 70 cancer patients those who need a CGA, with sensitivity being the primary focus. We evaluated the VES13 questionnaire as another potential screening tool. The ONCODAGE study was funded by a grant from the French National Cancer Institute. As a priority program of the National Cancer Plan, it was implemented in all French cancer geriatric units. METHODS: Multicentre prospective cohort study. Planned sample size was 1650 (> 70) with cancer: breast, prostate, lung, colon, head-neck, lymphoma. Subjects completed the screening tools with oncologists and underwent CGA with geriatricians. The gold-standard was a well-defined CGA including 7 assessments: CIRS-G, ADL, IADL, MMSE, MNA, GDS-15, Get up and Go. Abnormal CGA was defined as 1 abnormal score for at least 1 of the 7 assessments. Inclusions were consecutive. Screening tools and CGA were performed in a short time window, before treatment initiation or geriatric intervention. RESULTS: 1668 subjects included. Estimated G8 sensitivity and specificity: 77% and 64% (better than VES13). Results suggest that G8 is a sensitive and reproducible tool for screening vulnerable and frail elderly patients before cancer treatment.

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PREDICTORS OF MORTALITY IN THE GENERAL POPULATION. S Walter, J Mackenbach, A Hofman, *H Tiemeier (Department of Epidemiology, Erasmus Medical Center, Rotterdam, The Netherlands)

Risk factors of mortality are rarely analyzed comprehensively. Information about their comparative effect size and long-term predictive power is sparse. In particular, the value of genetic markers to predict mortality risk is unknown. We followed 5974 participants of 55 years or over for a median of 15.13 years (range, 0.05 – 19.45 years) of follow-up and related a total of 162 variables all-cause mortality. The variables were structured in seven groups: age and sex, genetics, social demographics, lifestyle, physiology, disease, and general health. We estimated hazard ratios for all variables and compared the predictive power of the groups using time-dependent receiver operating characteristic methodology. We observed 3174 deaths. Of all putative predictors for mortality, 108 were retained in the most parsimonious model and of these variables 36 were significantly associated to mortality ($p < 0.05$). Over the entire follow-up, the fully adjusted model (C-index (C15y): 0.80, 95% Confidence Interval (CI): 0.79-0.81) outperformed age and sex (C15y: 0.76, CI: 0.75-0.77). Most of the additional information stemmed from physiologic markers, prevalent diseases, and general health. While genetic factors predicted mortality independently (C15y: 0.56, CI: 0.55-0.57), their contribution if used in combination with other risk indicators is negligible.

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CORRECTION OF BIAS IN ESTIMATING MOBILITY DECLINE USING AUXILIARY TELEPHONE MOBILITY ASSESSMENT DATA. *C Wang and C Hall (Albert Einstein College of Medicine, Bronx, NY 10461)

Background: In longitudinal studies, missing data are common due to attrition caused by drop out, loss to follow-up, etc. Most commonly used likelihood-based analytic methods usually assume that the data are missing at random (MAR). This assumption is un-testable without further information, and might result in bias in the estimation of rates of mobility decline. Method: In a mobility study that is a part of the Einstein Aging Study, mobility ability measured primarily by walking speed is assessed annually in person. In addition, the Telephone Mobility Assessment Questionnaire (TMAQ) is given approximately every 2 months. Often, when participants miss their in-person mobility assessments, they have completed the TMAQ. This provides us the ability to test the MAR assumption under auxiliary variable MAR (A-MAR), and to correct the bias if it is violated. We used a multiple imputation model to utilize the TMAQ data to estimate mobility decline at 1 year follow-up compared to baseline. Findings: Participants with lower baseline walking speed and some impairment in the telephone mobility survey during the first year were more likely to have missing walking speed assessment at follow-up. The estimated decline in walking speed at 1 year follow-up compared to baseline using the naive model assuming MAR is 2.72 cm/sec (standard error (SE) = 0.693). In the multiple imputation estimate in which the telephone mobility survey data was utilized, the estimated decline is 3.39 (SE = 0.737) cm/sec. Conclusions: Naive estimates of mobility decline that ignore potentially informative missing data may be under-estimated. Utilizing the auxiliary TMAQ data has the potential to correct some of the bias.

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PROSPECTIVE STUDY OF DIETARY FIBER AND GLYCEMIC LOAD IN RELATION TO COGNITIVE DECLINE AMONG WOMEN WITH VASCULAR DISEASE OR RISK FACTORS. *J H Kang, M N Vercambre, F Grodstein. (Harvard Medical School, Boston, MA 02115)

Background: Intakes of dietary fiber and whole grains, which have cardiovascular benefits, may influence the rate of cognitive change among those at high risk due to vascular disease or risk factors. Methods: In 1995-1996, the Women's Antioxidant Cardiovascular Study began as a secondary prevention randomized trial of antioxidants and B vitamin supplements among women with cardiovascular disease or ≥ 3 coronary risk factors. Diet was assessed at randomization. From 1998-99, eligible participants (aged ≥ 65 years) completed a telephone cognitive interview including five tests of general cognition, memory and category fluency ($n = 2,551$). Tests were administered four times over 5.4 years. The primary outcome was a global composite score averaging z-scores of all tests. Multivariable generalized linear models for repeated measures were used to evaluate the difference in cognitive decline rates across tertiles of dietary fiber intake, whole grain intake, glycemic load and glycemic index. Results: Intakes of total carbohydrates, fiber and whole grain and glycemic load and glycemic index were not related to cognitive decline. However, women with a diet that was low in fiber and high in glycemic load showed significantly worse rates of cognitive decline compared to women with a diet that was high in fiber and low in glycemic load. The differences in rate of cognitive decline between these groups were cognitively equivalent to the rate differences observed with being 4-6 years younger. Conclusions: In women at increased risk of cognitive decline due to vascular disease or risk factors, a diet high in glycemic load and low in fiber was associated with worse 5-year cognitive change.

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CAROTID ATHEROSCLEROSIS AND INCIDENT COGNITIVE IMPAIRMENT. *W Zhong, C R Schubert, K J Cruickshanks, B E K Klein, R Klein, R J Chappell (University of WI-Madison, Madison WI 53705)

Aim: To determine the relationship between atherosclerosis and incident cognitive impairment. Method: The Epidemiology of Hearing Loss Study (EHLS) is a population-based study among residents in Beaver Dam, WI. Participants had a carotid ultrasound scan (Biosound AU4) at the 1998-00 EHLS exam. The intima-media thickness (IMT) was evaluated at 12 sites in the carotid artery (the near and far walls of common carotid artery, the bifurcation and the internal carotid artery on the right and left sides); and the mean IMT of the 12 sites was used as an indicator of atherosclerosis. Cognitive function was measured at three EHLS exams (1998-00, 2003-05, 2009-10); and cognitive impairment was defined as the Mini-Mental State Examination (MMSE) score < 24 out of 30, or a proxy report of dementia. Participants without cognitive impairment at baseline and with a least one follow-up visit were included ($n = 1651$, mean age at baseline: 67 years) in the analyses. The Cox proportional hazard model was used and the event's time was defined as the first examination at which a participant was cognitively impaired. Results: There were 14,470 person-years of follow-up, with 143 cases of incident cognitive impairment. After adjusting for age, sex and education, IMT at baseline was associated with the 10-year cumulative incidence of cognitive impairment (hazard ratio: 1.08, 95% confidence interval: 1.01-1.16, per 100 μ m). The association was similar when further adjusting for smoking, drinking, serum HDL-cholesterol, A1C, and SF-36 mental score at baseline. Conclusions: Carotid IMT was associated with the incidence of cognitive impairment, which suggests that interventions to prevent atherosclerosis may also have cognitive benefits.

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ASSOCIATION OF BLOOD COTININE LEVEL WITH COGNITIVE PERFORMANCE IN OLDER ADULTS. *W Z Akhtar, E M Andresen, M B Cannell, X H Xu (University of Florida, Gainesville, FL)

The purpose of this study is to assess the association of environmental tobacco smoke (ETS) with cognitive performance. Data on 2,957 participants of the 1999-2002 National Health and Nutrition Examination Survey was analyzed. ETS was calculated using blood cotinine concentrations divided into tertiles. Cognitive performance was assessed with the Digit Symbol Substitution Test (DSST). Data was weighted to take into account for the complex survey design to ensure accurate population-based estimates. Multiple linear regression models were used to assess the association. Increased cotinine tertiles were associated with decreased cognitive performance for never and former smokers (p for trend = 0.006 and 0.001, respectively). After adjusting for several potential confounders, including diabetes, hypertension, body mass index, and blood lead level, increased cotinine tertiles were still associated with decreased DSST score for never and former smokers (p for trend = 0.006 and 0.0048, respectively). Our study suggests that environmental tobacco smoke may contribute to cognitive impairment. Considering the cross-sectional design and the limitations of this study, it warrants further assessment.

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MEASURING CHANGE IN PAIN IN RHEUMATOID ARTHRITIS: COMPARISON OF TRAJECTORY RESULTS USING DIFFERENT MEASURES OF PAIN. *V Santiago, B Chewing (University of Wisconsin, Madison, WI 53726)

Background: Chronic pain is a significant public health problem associated with multiple conditions and disease states. How best to measure change in pain among individuals suffering from chronic pain is an important question that receives little attention in epidemiologic research. Rheumatoid arthritis is a chronic condition associated with significant levels of pain. This study of rheumatoid arthritis patients examines trajectories of pain over a year's time using three different measures of pain. Sample: The sample is from a randomized intervention trial designed to improve provider-patient communication in rheumatology visits ($N = 450$). Data were collected at three time points: baseline, 6 months and 12 months. Measures: Pain was measured using an 11-point numerical rating scale and the pain scale of the Arthritis Impact Measurement Scale-2 (AIMS2), which includes a pain verbal rating scale. Patient-reported arthritis related function was measured using various AIMS2 function scales and physician-rated patient global functional status was measured using the American College or Rheumatology Functional Class ratings. Methods: Latent class growth analyses using Mplus software is used to derive trajectories of pain based on the different measures of pain. The relationship of these trajectories and functional outcomes over time are examined to evaluate which pain measure best captures meaningful change in pain. Implications: Given the subjective nature of pain and its measurement, along with the lack of a gold standard, research that attempts to examine how best to measure change in pain among individuals suffering from chronic pain is important to ensure valid research and improve diagnosis and treatment.

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MULTIPLE CHRONIC CONDITIONS AND FUNCTIONALITY IN A COMMUNITY-BASED SAMPLE OF OLDER ADULTS IN NEW YORK CITY, 2009. *N Ralph, H Parton, R Greene, L E Thorpe. (City University of New York, School of Public Health, New York, NY 10010)

Between 60-75% of older adults have multiple chronic conditions (MCCs) in the US, with higher prevalence among low-income adults. The epidemiology of MCCs and their contribution to functional limitations has not been well characterized outside of clinical samples. Using data from a 2009 simple random sample telephone survey, we examined the association between self-reported diagnosed conditions (arthritis, osteoporosis, hypertension, cholesterolemia and diabetes) and functionality in 1,036 adults aged 65 and older living in New York City public housing. Limitations in any of 6 activities of daily living (ADL) were used to define functionality. We found 93% of residents reported at least one diagnosed chronic condition, 79% reported MCCs, and 29% reported having any ADL limitations. Prevalence of any ADL limitations increased with number of chronic conditions, ranging from 16% of those with 1 condition to 59% of those with 5 conditions. Adjusting for age, women were more likely to have MCCs (Adjusted Odds Ratio [AOR] = 3.0, 95% confidence interval [CI] 2.2-4.2) and more likely to report any ADL limitations (AOR = 1.7, 95% CI 1.2-2.3) than men. The odds for any ADL limitations were highest for arthritis (OR = 3.4, 95% CI 2.4-5.0) and diabetes with serious sequelae, such as neuropathy (OR = 3.7, 95% CI 2.2-6.0); lowest for hypertension (OR = 1.6, 95% CI 1.0-2.3). Of combinations of conditions, arthritis and osteoporosis had the strongest association to any ADLs (OR = 3.2, 95% CI 2.2-4.5). Among low-income older adults, poor functionality is directly linked to number of chronic conditions and disproportionately affects women.

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FUNCTIONAL CAPACITY OF OLDER RESIDENTS IN A CITY IN SÃO PAULO STATE, BRAZIL, AS EVALUATED BY THE KATZ INDEX AND LAWTON SCALE. L Bronzi de Souza and *J E Corrente (Department of Biostatistics, Biosciences Institute, UNESP, Botucatu, São Paulo, Brazil)

Ageing and its implications in morbidity rates are frequently associated with increased risk for food intake inadequacy of several nutrients. Hence, this study aimed at evaluating the prevalence of nutrient intake inadequacy in 96 older residents in the city of Botucatu, São Paulo, Brazil. To that end, nutritional data were obtained by applying three 24-hour recalls. The Nutwin software, v.1.5, was used to obtain the quantity of nutrients reported in the food inquiries. The data were processed by SAS for Windows, v.9.2. Nutrient intake distribution was estimated using the routines proposed by Toozee et al (A New Statistical Method for Estimating the Usual Intake of Episodically Consumed Foods with Application to Their Distribution, JADA, 2006). Inadequacy prevalence was estimated by using the values from the Dietary Reference Intake as cut-off points. The Adequate Intake (AI) was utilized when the nutrient did not have the Estimated Average Requirement (EAR) value. With respect to the prevalence of micronutrient intake inadequacy, approximately half of the nutrients evaluated showed low inadequacy prevalence (< 20%), namely: phosphorus, iron, riboflavin, thiamine, niacin and vitamin B12 for both genders, except for vitamin B6, which showed low intake inadequacy only for males. Folate, vitamin E and magnesium were the nutrients with the highest intake inadequacy prevalences. Calcium, pantothenic acid and manganese did not show EAR values; hence, it was not possible to reach any conclusions about its inadequacy prevalence. Calcium, pantothenic acid and manganese showed intake below AI. Policies encouraging the intake of healthy foods could help overcome the nutritional deficiencies herein described, thus improving older persons' nutritional status

WEIGHT VARIATION IN MIDLIFE IS ASSOCIATED WITH INCREASED RISK OF DEMENTIA THREE DECADES LATER. *U Goldbourt and M Schnaider-Beeri (Tel Aviv University, Tel Aviv 69978, Israel)

Measures of overweight and obesity have been implicated in the epidemiology of vascular disease. For the sake of simplicity, organizations have defined all individuals regardless of age, sex and health status as overweight, if their height and weights yielded a body mass index (BMI) > 25 Kg/Squared meter (with those over 30 being defined as obese). How mid-life weight and its variance are associated with declining cognitive function remains largely unknown. We undertook to study the association between body weight variability resulting from 3 successive weight recordings taken from 10,000 apparently healthy tenured civil servants and municipal employee males, aged 40-65 years in 1963, and the prevalence of dementia 36-37 years later. This was examined in approximately one sixth of them, who survived until 1999/2000 (minimum age 76 years) and underwent an evaluation of their cognitive status using screening by the Telephone Interview for Cognitive Status-modified and established dementia assessment tools. weight variation was defined as the between-exam SD, representing weight variation over examinations in 1963, 1965 and 1968. We could not trace a pattern of increasing or declining late-life dementia prevalence among men with "lean" (BMI < 20 Kg/sqM, 23.6%), "desirable" weight (BMI = 20 to 24.99 Kg/sqM, 17.7%), overweight (25-29.99 Kg/sqM, 17.6%) and obese counterparts (BMI ≥ 30kg/sqM, 23.0%), $p = 0.42$. Survivors' dementia prevalence rates in quartiles of weight variation, however, based on 4863 measurements in 1621 survivors who had participated in all three exams, yielded prevalence rates of 13.4, 18.3, 20.1 and 19.2% in the first to fourth quartile, respectively ($Z = 2.12$, $p = 0.034$ in non-parametric trend test). Multivariate analysis of odds ratios associated with each of the quartiles of weight variation adjusted for diabetes mellitus, body height and socioeconomic status. The adjusted odds were 1.42, 1.59 and 1.74, respectively, for quartiles 2, 3 and 4. A trend test for these rates yielded $z = 2.17$, $p = 0.032$. Adjustment for initial (1963) weight, blood pressure, serum cholesterol and smoking habits had negligible effect on the results. The area under the ROC curve for this model was 0.73 and the Hosmer-Lemeshow model fit test yielded $\chi^2(8) = 6.77$ (associated $P = 0.56$), consistent with adequate model fit. This is, to our knowledge, the first study indicating that smaller late-life dementia prevalence is associated importantly with small mid-life weight variation. Mechanisms linking weight instability at mid-life etiologically to increased risk for dementia remain unknown. The presented association marks a research topic with putatively long-term public health interest.

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THE ASSOCIATION BETWEEN COOKED MEAT AND BREAST CANCER IN A RACIALLY DIVERSE POPULATION. *K M O'Brien, L K Hawkins and R C Millikan (University of North Carolina, Chapel Hill, NC 27514)

High consumption of cooked meat may increase breast cancer risk, as well-done meats contain high levels of heterocyclic amines (HCAs), mutagenic chemicals with estrogenic properties. We used logistic regression to examine the relationship between breast cancer and meat type, doneness, cooking method, and quantity using data from the Carolina Breast Cancer Study, a racially diverse, population-based case-control study of incident breast cancer in North Carolina (1449 invasive and in situ cases, 1231 controls). Our results indicated null or slightly inverse associations between meat consumption and breast cancer. Total broiled or fried meat intake showed the strongest negative association (odds ratio [OR] = 0.6, 95% Confidence Interval [CI]: 0.4, 1.0 for > 14 ounces per week vs. none), while certain styles of chicken, fish, pork, and bacon were also associated with slight reductions in risk. Few racial differences were observed. These results suggest that high consumption of meat does not have a major effect on breast cancer risk in women in North Carolina. More refined methods of assessing meat consumption and preparation are needed to assess the link between HCAs and breast cancer.

PHYSICAL AND MENTAL RISK FACTORS FOR AGE AT ONSET AND PROGRESSION OF IADL DISABILITY AMONG OLDER ADULTS. *K B Rajan, C F Mendes de Leon, D A Evans (Rush University Medical Center, Chicago, IL)

Over 40 million individuals in the US, ages 65 years and older, are at high risk for disability. The cumulative effect of age has been widely reported as a major risk factor of disability among older adults. However, the role of cognition and physical function as risk factors for age at onset and progression thereafter has not been well investigated. Interestingly, since disability has shown a higher progression after onset, the focus of this study is to determine the relationship between age at onset, progression, cognition, and physical function. This study was based on a 10-year follow-up of 4,678 study participants ages 65 years and older enrolled in the Chicago Health and Aging Project. Disability was assessed using the instrumental activities of daily living (IADL) scale measured at one-year intervals. The mental and physical health risk factors associated with the age at onset and progression of the disability were studied using joint models, a survival regression method for age to onset measure and a negative binomial regression for progression of severity of symptoms modeled using a joint normal distribution for the two random effects. The results showed that black males with low education, low cognition, and low physical function had a lower age at onset of IADL disability. Physical function was associated with progression of disability. However, cognition was not associated with progression of disability over time. The results of the study show strong evidence for two independent risk factors for the age at onset and progression of disability among older populations.

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ALLERGY AND RISK OF CHILDHOOD LEUKEMIA: A POPULATION-BASED AND RECORD-BASED STUDY. *J S Chang, C R Tsai, J L Wiemels (National Health Research Institutes, Taiwan, R.O.C)

Abnormal immune development in early childhood due to reduced immune stimulation is a risk factor for both childhood leukemia and allergy. However, the majority of studies based on parental report have observed an inverse association between childhood leukemia and allergy. The current study utilized a population-based case-control design using medical claims data from the National Health Insurance Research Database of Taiwan to evaluate the association between allergy and childhood leukemia. 1,218 childhood acute lymphoblastic leukemia (ALL) and 359 childhood acute myeloid leukemia (AML) newly diagnosed during 2000 to 2008 and 6,282 controls (4,852 for ALL and 1,430 for AML) individually matched to the cases on sex, birth date, and time of diagnosis (reference date for the controls) were identified. Conditional logistic regression was performed to assess the association between childhood leukemia and allergy. An increased risk of ALL was observed with having allergy within the year before the case's ALL diagnosis [odds ratio (OR) = 1.9, 95% confidence interval (CI): 1.6-2.2], more than one year before the case's diagnosis (OR = 1.3, 95% CI: 1.1-1.5), and before one year old (OR = 1.3, 95% CI: 1.1-1.6). An increased risk of AML was observed with having allergy only within the year before the case's AML diagnosis [odds ratio (OR) = 1.9, 95% confidence interval (CI): 1.4-2.5], but not with having allergies more than one year before the case's diagnosis of AML or before one year old. In contrast to the results of most previous studies, the current study observed a positive association between allergy and childhood ALL. The discrepancy may be due to the difference between medically recorded allergy and allergy reported by the parents.

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LATE MORBIDITY LEADING TO HOSPITALIZATION AMONG 5-YEAR SURVIVORS OF YOUNG ADULT CANCER. *Y Zhang, M Lorenzi, M L McBride (Cancer Control Research, BC Cancer Agency, Vancouver, BC V5Z 3J2, Canada)

To estimate the risk of late morbidity leading to hospitalization among young adult cancer 5-yr survivors compared to the general population and to examine the long-term effects of demographic and disease-related factors on late morbidity, a retrospective cohort of 596 5-yr survivors of young adult cancer diagnosed between 1981 and 1995 was identified from BC Cancer Registry. A comparison group (N = 5960) frequency-matched by gender and birth year to the survivor cohort was randomly selected from the provincial health insurance plan client registry representing 95% of the BC population. All hospitalizations until the end of 2000 were determined from the BC health insurance plan hospitalization records. The Cox regression model was used to estimate the hazard ratios for late morbidity leading to hospitalization after adjusting for socio-demographic risk factors. Overall, 264(44.3%) survivors and 936(15.7%) individuals in the comparison group had 1 or more types of late morbidity leading to hospitalization. The adjusted risk of hospitalization for survivors was 4.5 times higher than for the comparison group [95% confident interval (CI), 3.9-5.2]. The highest risks were found for hospitalization due to blood diseases [hazard ratio (HR), 10.1; 95%CI, 2.0-50.9], neoplasms [HR, 27.5; 95%CI, 17.6-42.9], and endocrine, nutritional, and metabolic disorders [HR, 8.1; 95%CI, 2.5-26.7]. Survivors diagnosed with central nervous system tumors [HR, 8.1; 95%CI, 5.4-12.3], and bone tumors [HR, 8.9; 95%CI, 4.6-17.2] had the highest risks of having at least one hospitalization. These results emphasize the need for life-time systematic monitoring and follow-up for young adult survivors.

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A PILOT STUDY TO EVALUATE THE EFFECTS OF PURPLE GRAPE JUICE ON THE VASCULAR HEALTH OF CHILDHOOD CANCER SURVIVORS. *C Blair, A Kelly, J Steinberger, L Eberly, C Napurski, K Robien, J Neglia, D Mulrooney, J Ross (University of Minnesota, Minneapolis, MN 55455)

Childhood cancer survivors are at an increased risk of premature cardiovascular disease (CVD) due to cancer treatment, and few interventions have been tested to mitigate CVD in this population. Purple grape juice (PGJ) is a rich source of flavonoids with antioxidant properties that has been shown in adults to reduce oxidative stress and improve endothelial function, a key measure of vascular health. The effects of supplementing meals with PGJ on endothelial function and oxidative stress were examined in 24 cancer survivors ages 10 to 21 years (71% male) in a randomized controlled crossover study consisting of two 4 week intervention periods, each preceded by a 4 week washout period. Subjects were randomly assigned to 6 ounces twice daily of PGJ or clear apple juice (AJ, similar in calories but lower in flavonoids). Clinical measurements and blood samples were obtained before and after each supplementation period. Change in microvascular endothelial function, assessed using peripheral arterial tonometry in the fingertips, and change in plasma markers of oxidative stress (oxidized LDL (oxLDL), myeloperoxidase (MPO)) were evaluated using mixed effects analysis of variance. PGJ did not improve endothelial function compared with AJ (mean change: PGJ 0.06, AJ 0.22, $p = 0.25$), nor were significant improvements in oxidative stress biomarkers observed (mean change: oxLDL (U/L): PGJ 4.66, AJ 1.57, $p = 0.30$; MPO (ng/mL): PGJ 8.77, AJ 15.23 $p = 0.34$). After 4 weeks of daily consumption of flavonoid-rich PGJ, no measurable improvement in vascular health was observed in adolescent and young adult cancer survivors.

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RISK OF NON-HODGKIN LYMPHOMA AFTER RADIOTHERAPY FOR PRIMARY SOLID CANCERS. *C J Kim, D M Freedman, R E Curtis, A Berrington de Gonzalez, L M Morton (Division of Cancer Epidemiology and Genetics, National Cancer Institute, Rockville, MD 20852)

Ionizing radiation is an established risk factor for acute leukemia. Recent studies have suggested that radiation may also increase the risk of other hematologic malignancies such as chronic lymphocytic leukemia and possibly non-Hodgkin lymphoma (NHL). To further investigate high-dose ionizing radiation and NHL risk, we compared second primary NHL incidence among patients who were vs. were not initially treated with radiotherapy for a first primary non-hematologic malignancy during 1982-2006, as reported in 9 Surveillance, Epidemiology, and End Results population-based cancer registries. We identified 7,242 second NHL cases among 183,843 one-year survivors (11,339,950 total person-years at risk). Risk of NHL was increased for patients treated with radiotherapy for all solid tumors (unadjusted relative risk [RR]:1.12, 95% confidence interval [CI]:1.06-1.18). Similar results were observed after radiotherapy for colon (RR:1.58, 95% CI:1.04-2.41), rectosigmoid junction (RR:1.79, 95% CI:1.14-2.83), lung and bronchus (RR:1.37, 95% CI:1.06-1.77), and thyroid cancers (RR:1.48, 95% CI:1.03-2.14). Risks peaked 5-9 years following radiotherapy and were highest for younger patients (< 60 years). Preliminary analyses suggest higher risks for diffuse large B-cell lymphoma than other NHL subtypes. Additional analyses will use Poisson regression to evaluate radiotherapy risks adjusted for age, sex, latency, stage, year of diagnosis, and chemotherapy. This study could provide further insights into whether NHL is associated with radiation exposure.

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COMPARISON OF COLON AND RECTUM CANCER: SURVIVAL AND PROGNOSTIC FACTORS. Mohammad Reza Akhond, *A Kazemnejad, E Hajizadeh, A G Motlagh, M R Zali (Shahid Beheshti University of Medical Sciences, Tehran, Iran)

Introduction: Colorectal cancer is the most common cancer of the digestive system and also the fourth cause of cancer related deaths around the world. Different studies indicate that survival of patients with colorectal cancer has improved in some areas of the world. However, it remains unclear which factors are involved in this improvement. This study aims to investigate some clinical and pathologic factors associated with the prognosis of patients with colon and rectum cancers separately. Material and Methods: Data for 1194 patients with colorectal cancer registered in the Cancer Registry Center of the Research Center of Gastroenterology and Liver Disease were used in this study. Data analysis was performed using competing risks model. Software used for Data analysis included STATA, Version 11, and significance level was regarded as $p < 0.05$. Results: Body mass index (BMI), alcohol consumption, tumor site, inflammatory bowel disease, metastasis to lymph nodes and distant metastasis had a significant effect on death from colon cancer, while body mass index, distant metastasis and type of the first treatment had a significant effect ($p < 0.05$) on death from rectum cancer. Also, median survival was 7.75 ± 1.118 and 3.917 ± 0.26 years for patients with colon cancer and rectum cancer, respectively. Conclusion: According to the results of this study, some variables may have a different impact on colon and rectum carcinoma; therefore, the effects of these factors on different parts of the large bowel must be considered separately in future studies.

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COMPONENTS OF METABOLIC SYNDROME AND BREAST CANCER RISK IN THE STUDY OF OSTEOPOROTIC FRACTURES. *K W Reeves, *V McLaughlin, L Fredman, K Ensrud, J Cauley (University of Massachusetts, Amherst, MA)

Obesity and other components of metabolic syndrome are each associated with increased breast cancer risk. We evaluated the association of the number of metabolic syndrome criteria with breast cancer risk. Data were obtained from the Study of Osteoporotic Fractures, a prospective cohort of women age ≥ 65 (N = 9208). Metabolic syndrome criteria evaluated at baseline were: waist circumference ≥ 88 cm, systolic blood pressure ≥ 130 mmHg or diastolic blood pressure ≥ 85 mmHg or medication for hypertension, and self-reported diabetes. Data were not available on hyperlipidemia. Incident breast cancers were confirmed by pathology report. We compared women with 0, 1, and 2 or 3 metabolic syndrome criteria. We used Cox proportional hazards regression to calculate associations for all breast cancer and separately for estrogen receptor (ER)+ and progesterone receptor (PR)+ cases. At baseline 25.2% of participants met 2 and 3.4% met 3 metabolic syndrome criteria. A total of 551 breast cancer cases were identified over an average follow-up of 14.4 years. Women with 2 or 3 criteria had increased age-adjusted breast cancer risk compared to those with no criteria (hazard ratio [HR] 1.2, 95% confidence interval [CI] 1.0-1.6). Age-adjusted risk of ER+ (HR 1.4, 95% CI 1.0-1.8) and PR+ (HR 1.4, 95% CI 1.0-1.9) cancer was elevated for women with 2 or 3 criteria. These results became attenuated and not statistically significant when adjusted for additional confounders such as body mass index. Metabolic syndrome components may be associated with increased breast cancer risk, though the association was not independent of other factors. Future work must elucidate the causal pathway relating metabolic syndrome and its components to breast cancer risk.

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CANCER SURVIVORS IN THE UNITED STATES, 2007. *A W Phillip, L A Pollack, J H Rowland, A Mariotto, H K Weir, C Alfano (Centers for Disease Control and Prevention, Atlanta, GA 30341)

Cancer incidence and mortality data do not adequately reflect the burden of cancer on the U.S. population and health care system. To better identify the level of burden from cancer, we used a 3-step method to estimate U.S. cancer prevalence, the number of persons living with a history of cancer (cancer survivors). First, we used incidence and survival data from 9 Surveillance, Epidemiology, and End Results Program (SEER 9) cancer registries, which have the longest follow-up and represent approximately 10% of the U.S. population, to estimate the number of people alive on January 1, 2007 in whom cancer had been diagnosed during 1975-2006, accounting for cases lost to follow-up. Second, while controlling for age, sex, and race, we applied these estimates to the average of U.S. population estimates for 2006 and 2007. Third, we used a completeness index, a statistical model which also accounted for survivors whose cancer was diagnosed prior to 1975, to estimate the total number of U.S. cancer survivors by cancer site, survivors' age, and time since diagnosis. We estimated that 11.7 million U.S. residents were living with cancer in 2007; that breast, prostate, and colorectal cancers were the most common types of cancer represented among these survivors (22.1%, 19.4%, and 9.5%, respectively); that 60.0% were aged 65 years or older; and that 64.8% had been living with cancer for 5 or more years. Cancer disproportionately affects the elderly, a growing segment of the U.S. population, and most cancer survivors can expect to live years beyond their initial cancer diagnosis. Understanding the needs of cancer survivors should be a major public health focus given this large prevalence, especially among the elderly.

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POSTMENOPAUSAL HORMONE USE AND RISK OF NON-HODGKIN LYMPHOMA. *L R Teras, A V Patel, J Hildebrand, S M Gapstur (American Cancer Society, Atlanta, GA 30303)

Human and animal studies suggest that sex steroid hormones may have important immune-modulating effects, and a possible role in lymphogenesis. Results from case-control studies show a weak inverse or no association between ever postmenopausal hormone (PMH) use of any type and non-Hodgkin lymphoma (NHL). Results from two cohort studies are consistent with these findings; however, two others suggest that risk of NHL may be increased by estrogen-alone use. To help clarify this issue, associations of estrogen (E)-alone and estrogen plus progestin (E+P) with NHL incidence were examined in the American Cancer Society Cancer Prevention Study II Nutrition Cohort. Between 1992 and 2007, 543 cases of NHL were identified among 65,951 postmenopausal women who were cancer-free at baseline. PMH use was updated during follow-up. Using extended Cox regression, we observed a 27% higher risk (95% confidence interval (CI) 0.97-1.68) of NHL for current E-alone compared to never use. This increased risk of NHL for E-alone use was restricted to follicular lymphoma (FL, Hazard Ratio (HR) = 2.60, 95% CI 1.32-2.14) and diffuse large B-cell lymphoma (DLBCL, HR = 1.87, 95% CI 1.03-3.38). These results suggest that exogenous estrogen use might play an important role in NHL etiology, particularly FL and DLBCL. Time trends in NHL incidence support this association; unlike rates in men which slowed dramatically and then plateaued in 1991, rates in women slowed in 1990 but continued to increase until 2004 when they began to decline. The timing of this decline coincides with the drastic reduction in PMH use following publication of the Women's Health Initiative randomized trial showing adverse effects of PMH on coronary heart disease and breast cancer incidence in 2002.

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ASSOCIATION BETWEEN VOLTAGE OF OVERHEAD TRANSMISSION POWER LINES WITH OCCURRENCE OF CHILDHOOD ACUTE LYMPHOBLASTIC LEUKEMIA. *M-R Sohrabi, T Tarjoman (Shahid Beheshti University of Medical Sciences, Tehran, Iran)

This study aimed to assess relationship of voltage of overhead transmission power lines with risk of occurrence of childhood acute lymphoblastic leukemia (ALL) in Tehran, the capital of Iran. Through a case-control study 320 children aged 1-18 years with confirmed ALL selected from all referral teaching centers for cancer. They interviewed for history of living near overhead high voltage power lines during at least past two years. They compared with 300 controls which were individually matched for sex and approximate age. Then we obtained the grid references of all pylons concerned from the records of National Grid Transco "National Electrical map". Using the subjects' living addresses, we identified subjects' place of residence on the map and calculated the distance to any kind of the overhead high voltage transmission power lines (123 and 230 volts). Logistic regression, chi square and paired t-test were used for analysis when appropriate. Case group were living closer to the power lines than control group (P < 0.001). More than half of the cases were exposed to two or three types of the power lines (P < 0.02). The odds ratio estimated as 9.9 (95%CI: 3.5 to 28.5) for 123 KV and 10.8 (95%CI: 3.8 to 31) for 230 KV. This study focused on causality criteria of dose-response and temporality and supports the previous findings. The odds ratio was increasing as the voltage of power lines increased. Key words: Acute Lymphoblastic Leukemia, Electromagnetic Field, Risk Factors, Case-Control Study, Iran

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VARIATION IN BREAST CANCER RISK FACTORS BY MODE OF DETECTION. *B L Sprague, A Trentham-Dietz, J M Hampton, K M Egan, L Titus-Ernstoff, P L Remington, P A Newcomb (University of Vermont, Burlington, VT)

Some breast cancer risk factors, such as postmenopausal hormone use, are known to influence the sensitivity of screening mammography. We investigated the influence of this phenomenon on epidemiologic risk factor associations by examining breast cancer risk factors according to mode of detection. We used data from a sequential series of population-based case-control studies conducted between 1988 and 2006 in Wisconsin, Massachusetts, and New Hampshire, which included 21,875 breast cancer cases and 25,006 controls, aged 40-79 years. The percent of cases detected by screening mammography rose from 36% in 1988 to 54% in 2006. In multivariable adjusted models, risk estimates did not vary by mode of detection for family history of breast cancer, age at menopause, and parity. However, several risk factors were more strongly associated with risk of screen-detected breast cancer compared to symptomatically-detected breast cancer, including age at menarche, age at first birth, use of postmenopausal hormones, alcohol consumption, and body weight (all $P < 0.05$). Among postmenopausal women, use of estrogen plus progestin hormones (never) appeared to be a stronger risk factor for screen-detected (OR = 1.58; 95% CI: 1.45-1.73) than symptom-detected breast cancer (OR = 1.38; 95% CI: 1.25-1.53; $P < 0.05$). Elevated body weight (≥ 30 vs. 18.5-24.9 kg/m²) increased the risk of screen-detected breast cancer (OR = 1.48; 95% CI: 1.34-1.62) among postmenopausal women while the relation was inverse for symptom-detected breast cancer (OR = 0.89; 95% CI: 0.80-0.98; $P < 0.05$). These results suggest that the strength of risk factor associations in a given study population is influenced by screening utilization patterns.

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COMPARISON OF SELF AND REGISTRY-REPORTED RACE AND ETHNICITY AMONG CHILDREN WITH LEUKEMIA. *K Bartley, M Does, S Selvin, P Reynolds, P Buffler (University of California, Berkeley, School of Public Health, Berkeley, CA)

Background: Childhood leukemia incidence, derived from cancer registry, differs up to 4-fold by race/ethnicity. Registry-based ethnicity is classified using medical records which may differ from self-report. This study compares self-report race/ethnicity to registry classification to determine whether observed higher childhood leukemia in some ethnic groups can be explained by misclassification. To date, no similar study has been reported for any pediatric cancers. Methods: We compared parent-reported race/ethnicity of 972 case participants of the California Childhood Leukemia Study, to that reported in the California Cancer Registry (CCR). Concordance was assessed using sensitivity, specificity, positive predicted value, and kappa coefficients (κ). Predictors of registry misclassification by race/ethnicity were assessed using loss-based cross validation methods. Results: Concordance was high for Hispanics ($\kappa = 0.85$) and for Asian Pacific Islander (API), Black, or White race ($\kappa = 0.76, 0.73, \text{ and } 0.75$ respectively), and low for Native Americans ($\kappa = 0.17$) and children of mixed race ($\kappa = 0.10$). For Hispanic, Black and Native American children, misclassification was not predicted by any of the characteristics assessed; among White, API, and children of mixed race, father's race and country of origin were significantly predictive. Conclusions: Race/ethnicity in the CCR reflects self-reported race/ethnicity, with the exception of Native American and children of mixed race, among children with leukemia. Misclassification is unlikely to account for observed differences in incidence by race/ethnicity.

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DIFFERENTIAL RISK OF MALIGNANT MELANOMA BY SUNBED EXPOSURE TYPE. *M A Papas, A H Chappelle, (Chappelle Toxicology Consulting, Chadds Ford, PA), and WB Grant (Sunlight, Nutrition and Health Research Center, San Francisco, CA)

Background: A 2006 International Agency for Research on Cancer (IARC) meta-analysis reported a weak positive association between sunbed use and cutaneous malignant melanoma (meta-odds ratio = 1.2, 95% confidence interval: 1.0, 1.3). The lack of detailed measurement of sunbed usage is a key limitation of this meta-analysis. Distinct differences exist between unsupervised use of home sunbeds, regulated usage of professional salon sunbeds, and sunbeds used by doctors as medical devices. The resulting misclassification may bias reported estimates for overall sunbed exposure and risk of melanoma. Methods: We abstracted additional data from the 19 studies identified by the IARC meta-analysis. Sunbed exposure was classified with three alternative categories not considered by the published meta-analysis: home, professional salon, and medical office. Summary odds ratios (OR) and 95% confidence intervals (CI) were computed by pooled analysis. Results: Five studies had data available on the type and setting of tanning bed usage most commonly reported. The pooled OR for ever-use of home sunbeds was 1.4 (95% CI: 1.2, 1.7); while that for ever-use of sunbeds in a professional salon was 1.1 (95% CI: 0.9, 1.2); and that for medical office sunbeds was 2.0 (95% CI: 0.9, 4.3). Conclusion: Detailed exposure information is a critical limitation for observational studies of sunbed usage. The reported association between sunbed usage and risk of melanoma may be biased by exposure misclassification. When professional sunbed usage is considered independent of home and medical exposures there is no association with melanoma.

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EXPOSURE TO MULTIPLE PESTICIDES AND RISK OF NON-HODGKIN LYMPHOMA IN MEN FROM SIX CANADIAN PROVINCES. *K Hohenadel, S A Harris, J M McLaughlin, J J Spinelli, P Pahwa, J A Dosman, P A Demers, A E Blair (Occupational Cancer Research Centre, Toronto, ON, Canada)

A number of individual pesticides have been linked to non-Hodgkin lymphoma (NHL) with variable consistency. However, the impact of exposure to multiple pesticides has not been well studied. Data from a six-province Canadian case-control study conducted between 1991 and 1994 were analyzed to investigate the relationship between NHL and exposure to: (a) the total number of insecticides, herbicides, and fungicides used; (b) the number of potentially carcinogenic pesticides used; and (c) commonly used pesticide combinations. Cases ($n = 513$) were identified through provincial cancer registries and controls ($n = 1506$), frequency matched by age and region, were obtained through provincial health records, telephone listings or voter lists. In multiple logistic regression analyses, risk of NHL tended to increase with the number of pesticides used. Participants reporting exposure to a single pesticide were not at increased risk of NHL (odds ratio [OR] = 0.80, 95% confidence interval [CI] = 0.44-1.47), while those exposed to two to four (OR = 1.39, CI = 1.02-1.91) or five or more pesticides (OR = 1.63, CI = 1.20-2.21) were at greater risk. Similar results were obtained in analyses restricted to herbicides and insecticides. Odds ratios increased further when only pesticides designated as potentially carcinogenic by the International Agency for Research on Cancer were considered (OR[1 pesticide] = 1.30, CI = 0.90-1.88; OR[2 to 4] = 1.54, CI = 1.11-2.12; OR[5 or more] = 1.94, CI = 1.17-3.23). Since exposure to multiple pesticides is common among commercial applicators and agricultural workers these results underscore the importance of not restricting our assessment of cancer risk to single exposures.

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ASSOCIATION BETWEEN TIMING OF ADJUVANT TREATMENT AND SURVIVAL: A POPULATION-BASED STUDY OF COLORECTAL CANCER PATIENTS IN ALBERTA. *I Lima, Y Yasui, A Scarfe, M Winget. (University of Alberta, Edmonton, AB, Canada)

Surgery followed by adjuvant treatment has been the treatment recommendation for stage III colon cancer and stage II/III rectal cancer since 1990. Clinical trials have not assessed the time by which adjuvant treatment should be started relative to surgery for optimal survival benefit. Residents of Alberta diagnosed with stage III colon cancer and stage II/III rectal cancer in 2000-2005 who had surgery were included in the study. Patients were identified from the Alberta Cancer Registry and linked to hospital data and data from the 2001 Canadian Census. Cox proportional hazards models were used to estimate hazard ratios (HR) of death by the timing of adjuvant treatment. A total of 2,332 patients were included in the study. Stage III colon cancer patients who received adjuvant chemotherapy 12-16 weeks after surgery or more than 16 weeks/no treatment had a 43% and 107% higher risk of dying compared to those treated within 8 weeks of surgery (HR = 1.43, 95% confidence interval (CI) 0.96-2.13 and HR = 2.07, 95%CI 1.56-2.76, respectively). Similarly, stage II/III rectal cancer patients who received adjuvant treatment more than 12 weeks after surgery or did not receive it had a 40% and 60% higher risk of rectal cancer death compared to those who received it within 8 weeks. Analyses were controlled for age, year, and region of residence at diagnosis; sex; neighbourhood-level socioeconomic factors; and number of co-morbidities. The results of this study are consistent with current guideline recommendations in Alberta. Adjuvant treatment for patients with stage III colon cancer and stage II/III rectal cancer should be initiated within 12 weeks after surgery to maximize treatment benefits.

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VITAMIN D-RELATED GENETIC VARIANTS, VITAMIN D EXPOSURE AND BREAST CANCER RISK AMONG CAUCASIAN WOMEN IN ONTARIO. *L N Anderson, M Cotterchio, D E C Cole, J A Knight (Cancer Care Ontario, Toronto, ON, Canada)

Vitamin D, from diet and sunlight exposure, may be associated with reduced breast cancer risk. To investigate if candidate gene variants in vitamin D pathways are associated with breast cancer risk, or modify the associations with vitamin D exposure, we used a population-based case-control study (Ontario Women's Diet and Health Study). Breast cancer cases aged 25-74y were identified from the Ontario Cancer Registry (2002-2003) and controls were identified through random digit dialling of Ontario households. Saliva DNA was available for 1,777 cases and 1,839 controls. Multivariate logistic regression was used to evaluate associations between 23 single nucleotide polymorphisms (SNPs) in vitamin D related genes, including vitamin D binding protein (GC), vitamin D receptor (VDR), cytochrome P450 type 24A1 (CYP24A1), and CYP27B1. Interactions between vitamin D exposure variables and each SNP were evaluated using likelihood ratio tests. Preliminary results suggest that some SNPs thought to be associated with lower serum 25-hydroxyvitamin D levels are indeed associated with increased breast cancer risk, consistent with the vitamin D hypothesis. For example, breast cancer risk was associated with the GC rs7041 TT genotype (age-adjusted odds ratio (OR) = 1.23; 95% CI: 1.01, 1.51) and the VDR Fok1 (rs2228570) CC genotype (OR = 1.42; 95% CI: 1.14, 1.76). Few of the inverse associations between vitamin D (food, supplements or sunlight exposure) and breast cancer risk were modified by these genetic variants, suggesting lack of effect modification. Our findings support and extend previous results suggesting that vitamin D-related genetic variants are associated with breast cancer risk.

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TRENDS IN COLORECTAL CANCER DETECTION, INVESTIGATION, TREATMENT AND RELATIVE SURVIVAL BETWEEN 1998 AND 2003 IN QUEBEC. *L Perron, J M Daigle, D Major, J Brisson (Institut national de santé publique, Québec, QC, Canada G1V 5B3)

Colorectal cancer (CRC) detection, investigation, treatment and survival in Quebec, between 1998 and 2003, were examined using two random samples of about 20% of all men and women diagnosed with CRC (1998, n = 942; 2003, n = 1,097). Cases were identified through national computerised databases. Two cancer registrars extracted data from the medical charts using a developed standardized form. Patterns of investigation and treatment were examined in light of international guidelines published in the late 1990's. Absolute differences observed between 1998 and 2003 and their 95% confidence interval (CI) were estimated using Sudaan software. Relative survival was assessed using an adapted version of Ederer II method. The proportion of cases diagnosed at early stage (TNM I-IIA) remained stable during study period. CRC cases investigated in accordance with the recommendation to examine at least 12 lymph nodes increased by 14 percentage points (CI: 8-20) between 1998 and 2003, but remained below rates measured in North American cancer excellence centers. Proportion receiving chemotherapy in stage III colon cancer (72%) and in stage II-III rectal cancer (57%) did not change between 1998 and 2003, and were slightly lower than those observed elsewhere. Overall 5-year relative survival reached 59%, ranging from 92 to 6% from TNM I to IV and remained stable over time. CRC cases aged 70-79 were significantly less likely to receive adjuvant treatment in accordance with guidelines. In Quebec from 1998 to 2003, opportunistic screening for CRC was infrequent. In Quebec, screening and compliance with investigation and treatment guidelines, especially among the oldest CRC patients, appear in need of improvement.

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PASSIVE CIGARETTE SMOKE EXPOSURE, GENETIC VARIANTS AND BREAST CANCER RISK AMONG ONTARIO WOMEN WHO NEVER SMOKED. *L N Anderson, M Cotterchio, L Mirea, H Ozcelik, N Kreiger (Cancer Care Ontario, Toronto, ON, Canada)

The association between passive smoke exposure and breast cancer risk is unclear and may be modified by variants in carcinogen metabolizing genes. Lifetime passive cigarette smoke exposure, 36 variants in 12 carcinogen-metabolizing genes, and breast cancer risk were investigated using a population-based case-control study of Ontario women. DNA (saliva) was available for 920 breast cancer cases and 960 controls who had never smoked. Detailed information about passive smoke exposure was collected for multiple age periods (childhood, teenage years, and adulthood) and environments (home, work, and social). Adjusted odds ratios (OR's) and 95% confidence intervals (CI's) were estimated by multivariable logistic regression, and statistical interactions were assessed using the likelihood ratio test. Among premenopausal women, long duration (19-40 years) of passive smoke exposure at work was associated with increased breast cancer risk (OR = 2.27; 95% CI: 1.19-4.31); no associations were observed for other age periods or environments, or among postmenopausal women. Many significant interactions were observed between certain passive exposures during childhood, teenage, and adulthood and genetic variants in CYP1B1, CYP2E1, NAT1, NAT2, and UGT1A7. These findings suggest that for women carrying certain genetic variants, passive smoke exposure during multiple age periods may be associated with increased breast cancer risk among both pre- and postmenopausal women.

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MENOPAUSAL HORMONE THERAPY AND MELANOMA RISK: A PROSPECTIVE COHORT OF FRENCH WOMEN. *M Kvaskoff, A Bijon, A Fournier, S Mesrine, M C Boutron-Ruault, F Clavel-Chapelon (Inserm U1018, Team 9, Villejuif, France 94805)

Melanoma risk has been suspected to be influenced by female hormones. However, a potential association with menopausal hormone therapy (MHT) is unclear, especially since few prospective studies are available, with small melanoma series and conflicting results. We studied melanoma risk in relation to MHT use in a prospective cohort of French women aged 40-65 years at inclusion in 1990. Detailed qualitative and quantitative data on MHT use were regularly collected from 1992. Over 1992-2008, 376 melanoma cases were ascertained among 72,863 postmenopausal women. We computed relative risks (RRs) and 95% confidence intervals (CIs) using Cox regression models. MHT ever-use was associated with a higher melanoma risk (RR = 1.39, 95% CI = 1.09-1.77), similarly in past and current users (p for homogeneity = 0.98) and for all durations of use; risk only decreased toward unity after 6 years since last use (RR = 1.10, 95% CI = 0.68-1.77). Weak (topical) estrogens were not significantly associated with melanoma risk (RR = 0.76, 95% CI = 0.48-1.21) whereas other MHTs were (RR = 1.46, 95% CI = 1.15-1.86) (p for homogeneity = 0.01). In a sub-cohort of 1070 women (n = 226 cases) with lifetime sun exposure history, number of sunburns between ages 15-25 years was significantly associated with MHT ever-use but only in women living in areas with lower sun exposure (< 2.48 kJ/m²). However, in the sub-cohort, the association between MHT use and melanoma risk was not substantially modified by additional adjustment for number of sunburns in childhood, adolescence, or adulthood. These findings from a large prospective cohort suggest an association between MHT use and melanoma risk, although some residual confounding cannot be ruled out.

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GENETIC POLYMORPHISMS IN HORMONE RECEPTOR GENES AND COLORECTAL CANCER SURVIVAL IN WOMEN. *M N Passarelli, K J Wernli, A I Phipps, K W Makar, C M Hutter, A E Coghill, P A Newcomb (Fred Hutchinson Cancer Research Center, Seattle, WA 98109)

Prior studies have suggested that polymorphisms in genes controlling hormone metabolism are associated with colorectal cancer (CRC) risk in women. The role of genetic variation in these genes in relation to survival after CRC diagnosis, however, remains unclear. We assessed the association between 130 tag single nucleotide polymorphisms (SNP) in four candidate genes for steroid hormone receptors (*AR*, *ESR1*, *ESR2*, *PGR*) and CRC survival. The cohort included 650 women diagnosed with non-metastatic incident invasive CRC between 1997-2002 from the 13 Washington State counties that participate in the Surveillance, Epidemiology, and End Results (SEER) program. Women were followed-up for vital status through December 31, 2009. During a median 6.4 years of follow-up, 174 deaths occurred, including 97 from CRC. Proportional hazards regression was used to estimate hazard ratios (HR) and 95% confidence intervals (CI) for CRC-specific and overall survival. Models were adjusted for age at diagnosis and race. A synonymous coding SNP in *PGR* (rs1042839) was associated with an increased risk of death from CRC (HR for CT/TT vs CC = 2.01, CI: 1.33-3.03, P = 0.0009), and death from any cause (HR for CT/TT vs CC = 1.42, CI: 1.04-1.94, P = 0.03). Also, a 3' untranslated region coding SNP in *ESR2* (rs4986938) was associated with a decreased risk of death from CRC (HR for AG/AA vs GG = 0.59, CI: 0.39-0.88, P = 0.001), but was not significantly associated with overall survival (HR for AG/AA vs GG = 0.76, CI: 0.56-1.02, P = 0.07). Further research is needed to elucidate mechanisms by which these polymorphisms in steroid hormone receptors influence CRC prognosis.

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ASSOCIATION BETWEEN OXIDATIVE STRESS AND BREAST CANCER. *R T Fortner, S E Hankinson, T Wu, A H Eliassen (Brigham and Women's Hospital and Harvard University, Boston, MA)

Reactive oxygen species (ROS) are generated through normal biologic processes, but may damage DNA, lipids and proteins within cells. ROS are kept in balance through enzymatic mechanisms and exogenous antioxidants; imbalance results in oxidative stress. Breast cancer risk factors such as estrogen, alcohol and ionizing radiation may increase oxidative stress and an association between oxidative stress and breast cancer is possible. Retrospective case-control studies suggest higher oxidative stress in cases than in controls. To date no prospective studies have been conducted. We evaluated the association between pre-diagnostic fluorescent oxidation products, a global biomarker of oxidative stress incorporating oxidative damage of lipids, DNA and proteins, and breast cancer in a nested case-control study in the Nurses' Health Study. A total of 32,826 blood samples were collected in 1990, with two-thirds of these women providing samples in 2000. 337 of these women developed breast cancer between 2002 and 2006. These cases are matched to 337 controls. Fluorescent oxidation products were measured in the 1990 and 2000 samples. We used logistic regression models controlling for breast cancer risk factors. The ICC between the 1990 and 2000 samples was 0.3 (95% CI: 0.2-0.4). We found no association between fluorescent oxidation products and breast cancer risk in the 1990 or 2000 samples (1990, RR: 0.9, 95% CI: 0.6-1.5; 2000, RR: 0.8, 95% CI: 0.5-1.4, 4th vs. 1st quartile) for all breast cancers, invasive and ER+/PR+ cancers. Analyses are ongoing, however these preliminary analyses suggest no association between fluorescent oxidative products and breast cancer.

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WITHDRAWN

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DNA METHYLATION AND HORMONE RECEPTOR STATUS IN BREAST CANCER. *G H Rauscher, H Ahsan, M Kibriya, Y Dai, E Wiley, A Kajdacsy-Balla, V Macias, V Levenson, D Tonetti, M Ehrlich (Division of Epidemiology and Biostatistics, University of Illinois at Chicago, IL)

PURPOSE: We examined whether differences in tumor DNA methylation were associated with more aggressive hormone receptor negative breast cancer. **METHODS:** DNA was extracted from paraffin-embedded samples on 75 patients (21 White, 31 African-American and 23 Hispanic) enrolled in a larger breast cancer disparities study. Hormone receptor status was defined as negative if tumors were negative for both estrogen and progesterone receptors ($N = 22/75$). We analyzed DNA methylation at 1505 CpG sites within 807 genes (Cancer Panel 1) using the Illumina Golden-Gate assay. The assay generated 1505 continuous values (one per CpG). We defined a set of 807 promoter-specific variables by averaging across CpG sites within promoters. We examined methylation one promoter at a time in relation to receptor negative disease and then used the classification method of Random Forests (RF) to identify important predictors. **RESULTS:** In crude analyses, 6.3% of promoter methylation variables (51/807) were associated with receptor status at $p < 0.05$; for 88% of these (45/51), greater methylation was associated with receptor positive disease. In RF analyses, promoter methylation levels for the 22 most informative promoters classified receptor status with 77% accuracy (95% CI: 75–81, based on 100 replications). Greater methylation of RAB32, FZD9, TES, EVI1 (associated with receptor positive disease), and TFF1 and SEPT5 (associated with receptor negative disease) appeared to be the most important predictors based on 100 RF replications. **CONCLUSION:** Differential tumor DNA methylation within a subset of gene promoters may be associated with receptor positive breast cancer.

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VARIATION OF SECOND CANCER RISK BY MUTATION TYPE AMONG LONG-TERM SURVIVORS OF RETINOBLASTOMA. *R A Kleinerman, C-L Yu, M Little and M Tucker (National Cancer Institute, Rockville, MD 20852)

Long-term survivors of bilateral retinoblastoma (Rb), a pediatric eye cancer caused by germline mutations in the RB1 gene, are at high risk of second cancers (SC), such as bone, soft tissue sarcomas and melanoma. This risk has been attributed to genetic susceptibility and radiation. Past studies of Rb patients have not assessed how the risk of second cancers varies according to whether the RB1 mutation is inherited or de novo, which could provide new biological insights. Because genotype testing data were not available, we used family history of Rb as a surrogate for mutation type in our large cohort of 1-year Rb survivors ($n = 1036$) diagnosed between 1914 and 1996 at two large US institutions. There were 278 survivors with positive family history (presumed inherited mutation), and 758 survivors with no family history (presumed de novo mutation). We used a Poisson regression model to estimate the risk of SC according to mutation type adjusted for age at Rb, sex, treatment and attained age. An adjusted relative risk [RR of 1.10 (95% Confidence interval [CI], 0.84-1.44) for SCs was related to family history of Rb compared to those without, indicating that an inherited germline mutation may predispose survivors to a greater risk of second cancers, especially for melanoma (RR = 2.38, 95% CI 1.04-5.09). The cumulative incidence of second cancers at 50 years after diagnosis of Rb was higher for those with a family history (44.5%, 95% CI 35%-54%) than those without a family history (37.8%, 95% CI 31.2-44.3%). These data indicate that survivors with an inherited germline mutation may be at slightly higher risk of a second cancer, in particular melanoma, perhaps due to shared genetic alterations.

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EPIDEMIOLOGIC STUDIES OF CHRONIC MYELOID LEUKEMIA (CML) IN INDIA. *P H Levine, H Hoffman, A M Mendizabal, V Venkateshand P Garcia-Gonzalez (The George Washington University, Washington, DC)

Background: Data from 13,790 Indian patients with CML have been collected by The Glivec® International Patient Assistance Program (GIPAP) which supplies doses of Imatinib free of cost in developing countries. The available information from this project has allowed us to look at environmental factors and age at onset in regard to possible etiologic agents and response to treatment. **Methods:** Pts were enrolled in GIPAP starting in 2002 after a diagnosis of CML (Philadelphia Chromosome + or BCR-ABL1 +) and completion of a financial evaluation confirming the inability to pay for treatment with Imatinib. Overall survival (OS) for pts enrolled between 2003 and 2007 was estimated using the Kaplan-Meier method considering the time from approval in the program until death or censored at the date of last contact. Cox Proportional Hazards models were created stratified by age group. **Results:** Of the 13,790 Indian pts with CML entered into GIPAP, 586 were < 15 yo and 996 were > 60 . The median age of 32 was significantly less than the U.S. median age (66). Age of onset increased as income level increased. Phase of CML at diagnosis was predominantly in the chronic phase (84.4%) followed by blast crisis (5.7%) and accelerated phase (5.5%). OS was poorest in pts > 65 and best in pts 15-64. Delay in treatment had a significant effect on survival and decreased 2002-2007. **Conclusions:** Environmental factors such as socioeconomic status appear to contribute to early age of onset and differences in 1-year OS exist by age. Advanced phase of disease at diagnosis and longer time from diagnosis to initial dose were associated with poorer outcomes.

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THE RISK OF NON-LUNG CANCER CAUSES OF DEATH FOLLOWING SCREEN-DETECTED EARLY-STAGE LUNG CANCER. *V P Doria-Rose, P M Marcus, P C Prorok, NS Weiss (NCI, Bethesda, MD)

The most widely-accepted endpoint in randomized controlled trials of cancer screening is cancer-specific mortality. However, this outcome may fail to capture fatal events that occur as a result of screening but that are removed temporally from the screening/diagnosis/treatment process. This may be a particular problem for lung cancer screening, both because there is compelling evidence of overdiagnosis and also because screening is targeted at smokers, a high-risk group that may be especially susceptible to harmful side-effects of invasive medical interventions. We examined the subsequent risk of non-lung cancer mortality among participants diagnosed with early-stage lung cancer in the Johns Hopkins and Mayo Lung Projects and the Memorial Sloan-Kettering Lung Study, three randomized trials of chest x-ray and sputum cytology screening conducted in the 1970s-80s. The analysis considered persons with screen-detected stage 0 or 1 non-small cell lung cancer that was completely resected and who survived for at least 30 days following surgery. Age-, smoking-, trial-, and calendar year-standardized mortality ratios (SMR) were used to compare mortality rates in the case group to the mortality experience of the other trial participants. 232 persons with early-stage lung cancers were included, of whom 32 (14%) died due to causes other than lung cancer during follow-up (32 per 1,000 person-years); the expected mortality rate was 25 per 1000 person-years (SMR 1.3, 95% CI 0.9-1.8). While based on relatively small numbers, these results suggest that persons who undergo surgery for early-stage lung cancer are at a slightly increased risk of subsequent death due to causes other than lung cancer.

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EFFECT OF MENOPAUSAL HORMONE THERAPY ON RISK OF DUCTAL OR LOBULAR BREAST CANCER AND TUMOR CHARACTERISTICS. *G M Monsees, P L Porter, K L Cushing-Haugen, M G Lin, X Yuan, K E Malone, C I Li (Fred Hutchinson Cancer Research Center, Seattle, WA 98109)

Combined estrogen-progesterone hormone therapy (CHT) has been shown to be more strongly associated with risk of invasive lobular breast cancer (ILC) than invasive ductal breast cancer (IDC). However, little is known about biological factors underlying these differences, such as how CHT use influences the molecular characteristics of ILC and IDC. We conducted a population-based case-control study of 384 women with estrogen receptor positive (ER+) IDC and 261 women with ER+ ILC diagnosed from 2000 to 2004 and 445 controls ages 55-74 years old. Tumor specimens underwent centralized histopathologic review and testing for ER, p21, p27, and Ki-67. Odds ratios (OR) and 95% confidence intervals (CI) were calculated using polytomous logistic regression. Current CHT use was associated with an elevated risk of ILC (OR = 2.54 CI: 1.54-4.18) but not of IDC. The risks associated with current CHT use were stronger for more severe ILC tumors: node positive, higher stage, higher grade, larger size, or lower p21 or higher p27 expression (OR ranging from 2.62-3.71). Current un-opposed estrogen use was associated with a lowered risk of IDC (OR = 0.48 CI: 0.29-0.78) but not of ILC. The lowered risks associated with current un-opposed estrogen use were stronger for more severe IDC tumors: higher grade, or higher Ki-67, higher p21, or lower p27 expression (OR ranging from 0.25-0.47). These findings contribute to our understanding of mechanisms, such as cell cycle regulation and proliferation, through which hormone therapies may differentially contribute to breast cancer risk.

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PARENTAL TOBACCO SMOKING AND RISK OF CHILDHOOD LEUKEMIA: A SYSTEMATIC REVIEW AND META-ANALYSIS. *A Kang, C Metayer, P Buffler (University of California, Berkeley, CA 94720)

Background: Tobacco smoke is linked to myeloid leukemia in adults, but evidence in children remains unclear. Paternal prenatal smoking and maternal smoking during pregnancy directly affects parental germ cells and fetal development, while children's postnatal exposures to smoke are analogous to secondhand smoke in adults. Objective: We conducted a meta-analysis to elucidate the role of critical periods of children's exposure to parental tobacco smoke in the etiology of leukemia. Methods: We identified 30 relevant publications (3 cohort, 20 case-control studies, 1957-2009) examining the relationship between parental smoking and risk of childhood leukemia and subtypes (i.e., acute lymphocytic leukemia [ALL]; acute myeloid leukemia [AML]) from databases (e.g. EMBASE, PUBMED). We used fixed and random effects models to calculate summary relative risk estimates (odds ratio, OR) and 95% confidence intervals (CIs). Heterogeneity, potential for publication bias, and impact of study design were assessed. Results: Lifetime paternal smoking increased the risk of ALL (OR 1.16; 95% CI 1.09-1.24; 14 studies); similar risk was observed with pre-conception smoking, though statistically significant associations did not persist for smoking during and after pregnancy. Postnatal paternal smoking was associated with an increased risk of AML based on four studies only (OR 1.19; 95% CI 1.04-1.35). Maternal smoking was not associated with disease. Conclusion: The results suggest that exposure to paternal smoking is associated with an increased risk of childhood leukemia, though the magnitude of risk is small. Timing of exposure in paternal smoking may play a critical role in the development of childhood ALL or AML.

1019-S

EXPOSURE TO HERBICIDES IN HOUSE DUST AND RISK OF CHILDHOOD LEUKEMIA. *H D Reed, C Metayer, J Colt, P A Buffler, S Selvin, M H Ward. (University of California, Berkeley, CA)

BACKGROUND: Case-control studies of self-reported herbicide use and childhood leukemia are inconsistent. OBJECTIVES: We estimated the risk of childhood acute lymphoblastic leukemia (ALL) in relation to herbicide concentrations in house dust. METHODS: A subset of 269 ALL cases and 333 healthy controls (< 8 years of age at diagnosis/reference date and residentially stable) was selected from a case-control study in California (2001-2006). Carpet dust samples were collected using a high-volume surface sampler or from the household vacuum cleaner. Herbicides were selected for analysis based on frequency of use in California and feasibility of laboratory quantification, including agricultural herbicides (alachlor, bromoxynil, simazine, and pendimethalin) and lawn and garden herbicides (cyanazine, trifluralin, MCPA, MCPP, 2,4-D, dacthal, and dicamba). Statistical analyses were conducted using unconditional logistic regression. Models included log-transformed herbicide concentrations, adjusted for child's age, sex, race/ethnicity and household income. RESULTS: Simazine, 2,4-D, MCPP, and trifluralin were detected in the highest percentage of households (84%, 84%, 73%, & 56% respectively). We did not observe increased risks of childhood ALL with increasing herbicide dust concentrations. Results did not change after adjusting for season and year of dust sampling, age, location, and type of residence, and self-reported weed treatment. CONCLUSIONS: This study is unique in that we used herbicide measurements for exposure assessment, not self-reports; however, our results provide no evidence of an association between the herbicides analyzed in this study and the risk of childhood leukemia.

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CIGARETTE SMOKING, VARIATION IN *N*-ACETYLTRANSFERASE 2, AND RISK OF NON-HODGKIN LYMPHOMA: AN INTERLYMPH POOLED ANALYSIS. *T Gibson, P Bracci, B Chiu, D Hein, H Hjalgrim, A Krickler, A Nieters, N Rothman, J Sampson, S de Sanjose, C Skibola, S Slager, K Smedby, C Vajdic, S Wang, Y Zhang, T Zheng, L Morton, for the InterLymph Consortium (<http://epi.grants.cancer.gov/InterLymph/>)

Cigarette smoke contains numerous carcinogens, including aromatic and heterocyclic amines that are detoxified or activated by the *N*-acetyltransferase (NAT) enzymes. We conducted a pooled analysis of four case-control studies of NHL in the InterLymph consortium to examine the association between cigarette smoking and NHL risk and whether this association is modified by NAT2 activity. Original data on smoking and other NHL risk factors were collected from each study, along with NAT2 genotype data that were used to classify cases (N = 3966) and controls (N = 3648) as slow, intermediate or rapid acetylators. Unconditional logistic regression models with adjustment for age, sex, and study center were used to calculate odds ratios (ORs) and 95% confidence intervals (CIs) to estimate the relative risk of NHL. Consistent with previous literature, we observed a weak association between current cigarette smoking and NHL risk (OR = 1.17, 95% CI = 1.04-1.33). The results differed significantly by NAT2 activity ($P_{\text{interaction}} = 0.03$), with increased risks for current smoking evident among intermediate/rapid acetylators (OR = 1.34, 95% CI = 1.13-1.59) but not among slow acetylators (OR = 1.03, 95% CI = 0.84-1.27). These results suggest that cigarette smoking may increase NHL risk, particularly among those with NAT2 genotypes that result in rapid acetylation. Our pooled analysis allows the unique opportunity to further examine this gene-environment interaction by NHL subtypes, which have been shown to be etiologically heterogeneous.

1022

PREVENTIVE VACCINATIONS IN PROSTATE CANCER SURVIVORS. *S J Jacobsen, J M Slezak, L P Wallner, R Haque, H F Tseng, R K Loo, V P Quinn (Kaiser Permanente Southern California, Pasadena, CA 91101)

It is well known that most men diagnosed with prostate cancer die from other causes. However, concerns have been expressed that the diagnosis often focuses subsequent care on prostate-related issues. We sought to determine if the use of general preventive care, as measured by influenza and pneumococcal vaccination, was diminished in a cohort of men following their diagnosis of prostate cancer. We used information collected as part of the California Mens Health Study, a prospective cohort study of over 40,000 men ages 45-69 years at baseline in 2002 who were recruited through the Kaiser Permanente Southern California Health Plan. We identified all 1312 men who were newly diagnosed with prostate cancer from 2002 through 2007 and examined the use of influenza and pneumococcal vaccine in the two years prior to and subsequent to their cancer diagnosis. Of the 1312 men with prostate cancer, 613 (48%) had an influenza vaccine in the two years prior to diagnosis compared to 844 (66%) in the two years following (Matched odds ratio = 3.78, 95% CI = 2.97-4.82). For pneumococcal vaccine, there was a similar proportion receiving vaccine in the two years before and following diagnosis (17% for both). Similar results were seen when vaccinations were restricted to one year before and after diagnosis and when restricted to men ages 67 years and older at diagnosis. These data suggest that once diagnosed with prostate cancer, no less attention is paid to preventive care as measured by influenza and pneumococcal vaccination. As more men with prostate cancer die from causes other than their cancer, this is encouraging, although there remains room for improvement in vaccination rates.

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ASSOCIATION OF NINE MOLECULAR MARKERS WITH FATAL PROSTATE CANCER AFTER PROSTATECTOMY. *S Weinmann, R Haque, B Kallakury, K Richert-Boe, D Berry, S Van Den Eeden (Kaiser Permanente, Portland, OR 97227)

Aside from Gleason grade, there are no established biomarkers to differentiate life-threatening from indolent disease in early-stage prostate cancer. Such markers are needed to guide patient selection for aggressive or conservative treatment. In the population of three integrated managed care organizations, we conducted a case-control study to evaluate the predictive value of immunohistochemical expression of nine molecular markers in tumor tissue from prostatectomy specimens. Cases included 286 men whose prostate cancers progressed to death between 1971 and 2001 and 344 controls with prostate cancer who lived longer after diagnosis than their matched cases. Controls were matched to cases on age, race/ethnicity, tumor stage, and diagnosis year. All pathology slides were reviewed by a single expert to determine Gleason grade and select the highest grade tumor specimen for analysis. Formalin-fixed paraffin-embedded tissue sections were immunostained using antibodies against Ki-67, P53, P27, BCL-2, EZH2, E-cadherin, PIM-1, PTEN, and ZAG. Immunoreactivity was scored semi-quantitatively based on intensity and percentage of positive cells. Using unconditional logistic regression analysis, we identified Ki-67, P53, BCL-2, and ZAG as predictors of prostate cancer mortality after adjustment for the matching variables. After further adjustment for Gleason grade, Ki-67 (odds ratio = 12.0, 95% CI 5.2-27.5) and P53 (odds ratio = 1.6, 95% CI 1.1-2.3) were associated with prostate cancer death. Results stratified on race were similar. We conclude that Ki-67 and P53 are independent predictors of aggressive prostate cancer and may have an important role in the selection of the most appropriate therapeutic option.

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ARE RISK FACTORS FOR BREAST CANCER IN WOMAN < 50 YEARS OF AGE DIFFERENT THAN FOR WOMEN OVER 50? *A Trentham-Dietz, B Sprague, J Hampton, D Miglioretti, H Nelson, L Titus-Ernstoff, K Egan, P Remington, P Newcomb (University of Wisconsin, WI 53726)

Experts widely believe that breast cancer (BCA) in younger women is a different disease than BCA in older women. While most studies of biological variability in BCA have focused on features of the tumors, we examined whether established risk factors for BCA differ according to age. Data from 5 population-based case-control studies conducted during 1988-2007 were combined. Cases (N = 21,867) were identified from 4 state tumor registries, and controls (N = 24,927) were randomly selected from driver's license and Medicare files. All women completed interviews regarding risk factors. Logistic regression was used to estimate odds ratios (OR) and 95% confidence intervals (CI) adjusted for age, state, and year; models were stratified by age (40-49, and 50-79). P-values shown are for tests of interaction. The relation between most factors and BCA risk did not differ by age including age at menarche (P = 0.6), parity (P = 0.3), age at first birth (P = 0.2), lactation (P = 0.6), and oral contraceptive use (P = 0.3). Family history was more strongly associated with BCA in younger women (40-49: OR 1.91, CI 1.69-2.16; 50-79: 1.63, CI 0.55-1.72; P = 0.02). Body mass index was inversely associated with BCA among younger women and positively associated with risk for older women (P < 0.0001). Recent alcohol intake was more strongly related to BCA among older women (OR 1.56, CI 1.41-1.73 for 14+ drinks/week vs 0) than younger women (OR 1.29, CI 1.02-1.63; P < 0.0001). In summary, most risk factors for BCA did not vary by age, but family history was more strongly related to BCA in women < 50 while obesity and alcohol were more strongly related to increased BCA risk in women ≥ 50 years of age.

1025

OVARIAN CANCER SPECIFIC SURVIVAL; MULTI-LEVEL MODELING AND GIS APPROACH. *C E Joslin, S Kim, I B Chukwudozie, F G Davis (University of Illinois at Chicago, Chicago, IL)

Purpose: Racial differences exist in ovarian cancer survival. Here, we examine neighborhood- and individual-level variables of disadvantage to assess their contribution to survival disparities. Methods: Ovarian cancer survival among 351 women diagnosed with epithelial ovarian cancer during 1994 - 1998 was examined using a 2005 national death index search to ascertain death and Census 2000 data. Census-tract level (medically underserved area (MUA), percent poverty rate, percent white, percent female headed household, percent unemployed and percent less than high school education) and individual-level (married, greater than high school education) variables of disadvantage were analyzed using a multi-level modeling approach (HLM 6; Lincolnwood, IL) to assess the contribution of disadvantage variables to the duration of survival after diagnosis, controlling for race, late diagnosis stage and age at diagnosis. Results were mapped using geographic information systems (GIS; ArcMap 10; ESRI, Redlands CA) for spatial comparison. Results: In addition to late diagnosis stage (p < 0.001) and age at diagnosis (p = 0.045), only the census tract variable percent white (p = 0.014) was significantly associated with a shorter duration of survival in a multi-level model that includes explanatory variables of disadvantage. Conclusion: Findings indicate the important contribution of neighborhood- and individual-level variables in assessing duration of ovarian cancer survival.

1026-S

IMPACT OF YOUNGER AGE AT DIAGNOSIS OF CHRONIC MYELOID LEUKEMIA (CML) AMONG PATIENTS IN DEVELOPING COUNTRIES. *A M Mendizabal, W F Anderson, P Garcia-Gonzalez and P H Levine (The George Washington University, Washington, DC)

Background: Age at diagnosis of CML in developing countries is shifted to an earlier age. The Glivec® International Patient Assistance Program (GIPAP) supplied doses of Imatinib free of cost in developing countries. This study investigated the effect of age on the outcome of CML. Methods: Patients (pts) with CML who met financial criteria were enrolled in GIPAP. Overall survival (OS) was estimated by the Kaplan-Meier method. Cox models were created to assess prognostic factors. Results: 33,985 pts from 94 countries received Imatinib from 1/2002 to 8/2010. Pts were from Asia (79%), Africa (9%), Latin America (9%) and Europe (3%). 61% were male. Median age at diagnosis was 38y (8% < 20y and 5% > 65y) compared to 66y in the United States. 78% were diagnosed in the chronic phase, 9% accelerated phase and 7% blast crisis. 85% had a delay in treatment > 1y post-diagnosis in 2002; decreasing to 16% in 2010. 1-year OS was 92.5% (95% CI, 92.1%-92.9%). In multivariate models, pts > 65y of age at diagnosis had worst outcomes (p < 0.01), risk of death progressively increased as the time from diagnosis to approval increased (p < 0.01), and more advanced phase of disease had poorer outcomes (p < 0.01). Pts treated after 2006 had an 88% reduction in death (p < 0.01). Conclusions: CML consistently presents at an earlier age at diagnosis among pts in GIPAP. Age at diagnosis and phase of disease was similar across countries. The risk of death differed by age at diagnosis, phase of disease, time from diagnosis to initial dose and more contemporary patients.

1028

AUTISM SPECTRUM DISORDERS (ASD) AND MATERNAL OCCUPATIONAL EXPOSURES DURING PREGNANCY. *G C Windham, J K Grether, A Sumner, S Xu, L Katz, L A Croen (California Department of Public Health, Richmond, CA 94804)

To understand the rise in the number of children reported with ASDs, it is important to examine the role of exogenous exposures. We analyzed whether mothers of children with ASD were more likely to work in occupations with potential neuro- or repro-toxic exposures during pregnancy. Subjects were 284 children with ASD identified through records-based surveillance and 659 gender-matched controls, born in 1994 in the San Francisco Bay Area. Parental occupation and industry were abstracted from birth certificates and potential exposure was coded blindly by an Occupational Medicine physician and checked by an industrial hygienist. Up to 3 exposures to any of 7 chemical groups were also coded (exhaust/combustion, solvents, pesticides, heavy metals, cooling fluids, disinfectants, and auto paint). Odds ratios (AORs) were calculated adjusting for maternal age, education and child race. Among the 60% of employed mothers, 11.3% of case mothers worked in chemically-exposed occupations compared to 4.3% of controls (AOR 2.8; 95% CI 1.4-5.5). The exposure categories with the highest and statistically significant AORs were exhaust and disinfectants, but metals and solvents also had slightly elevated AORs. Occupation in the medical/dental field was highly related to ASD, but based on small numbers (AOR 11.3; 95% CI 1.3-99). Work in laboratories or as chemists was also three times more likely in mothers of cases than controls, but was not statistically significant. Although exposure assessment was rudimentary, use of birth certificates allows ascertainment of occupation before a child is diagnosed with ASD, which may affect subsequent maternal employment. These descriptive data indicate areas for additional study.

1027

CHANGES IN CIRCULATING HORMONE LEVELS AND WEIGHT AMONG WOMEN WITH EARLY STAGE BREAST CANCER. *C C Hong, C Ambrosone, A Ceacareanu, Z Wintrob, K Kokolus, W Davis, D H Bovbjerg, F J Jenkins, S Edge, S Kulkarni, T O'Connor. (Roswell Park Cancer Institute, Buffalo, NY 14263)

Weight gain after breast cancer diagnosis may be associated with treatment-related declines in ovarian function and increased cortisol levels. We examined post-diagnostic changes in weight, body mass index (BMI), and body composition among 264 incident non-metastatic breast cancer patients. To determine changes in hormone levels, biospecimens were collected at initial cancer diagnosis and post 12 months. Clinical data was obtained from the Department of Breast Surgery. Post-diagnostic changes in weight, BMI and body composition (measured by bioelectrical impedance) were not associated with estrogen receptor status, cancer stage, treatment with AC-based chemotherapy, or use of hormonal therapy. In adjusted analyses, serum follicle-stimulating hormone (F = 2.36, p = 0.07, p-trend = 0.01) and luteinizing hormone (F = 3.78, p = 0.01, p-trend = 0.002) levels at the time of cancer diagnosis were inversely associated with 12 month changes in percent body fat. None of the other sex hormones assayed, including estradiol and estrone, were related to changes in weight or body composition. Cortisol and cortisol binding globulin (CBG) levels at cancer diagnosis were not associated with changes in weight, BMI, or body composition. Increases in CBG levels, however, were associated with declines in BMI over 12 months (F = 3.38, p = 0.02, p-trend = 0.02). No associations were observed with changes in total cortisol level. This study is the first to show that hormone levels at breast cancer diagnosis and/or changes occurring after diagnosis may influence post-diagnostic changes in weight and body composition among women with breast cancer.

1029

INDOOR AIR EXPOSURES AND HEALTH IN THE UNITED ARAB EMIRATES (UAE). *K B Yeatts, A F Olshan, M El-Sadig, W E Funk, D Leith, S Ng, T Zoubedi, F Al-Maskari, R Chan, D Couper, I Rusyn, J MacDonald. (University of North Carolina, Chapel Hill, NC)

Introduction: In the last forty years, the UAE has undergone rapid transition to become an industrialized nation. Little is known about the indoor air pollutant exposures and potential health effects in the Gulf region. Methods: We conducted a cross-sectional study in a stratified sample of 628 households in all seven emirates in the UAE from October 2009 to May 2010. Indoor air pollutants (NO₂, SO₂, CO, formaldehyde, PM) were measured using passive diffusion samplers over a seven-day period in a common living area. Information on environmental exposures, respiratory symptoms was collected from selected household members in each family via in-person interviews using validated questionnaires. Results: Of the 827 households invited to participate, 628 agreed, yielding a response rate of 75%. Ninety-four percent of households reported burning incense at least once a week, and 44% burning incense every day. Family members in households with secondhand smoke (SHS) exposure were twice as likely to report doctor diagnosed asthma, dry coughing, shortness of breath, and breathing difficulties in the last 12 months as those in households without SHS exposure. While incense use was not associated with respiratory symptoms, daily incense use was associated with symptoms of headaches (Prevalence Odds Ratio (POR) 1.9 [95% Confidence Interval (CI) 1.17, 3.22], forgetfulness (POR 2.7 [95% CI 1.52,4.87], and difficulty concentrating (POR 3.1, [95%CI 1.76,5.62]). Our research found this Gulf nation population has both common (second hand tobacco smoke) and unique (incense burning) indoor air exposures. Further research is needed to better characterize the health effects of incense burning in this population.

1030-S

LOW TEMPERATURES DURING THE COLD SEASON AND HOSPITALIZATIONS DUE TO ACUTE MYOCARDIAL INFARCTION IN NEW YORK STATE, 1991-2004. *A Soim, S Lin, S A Hwang (New York State Department of Health, Troy, NY 12180)

Background: The relationship between meteorological factors and acute myocardial infarction (AMI) is not well understood. Few studies have evaluated the effect of cold temperatures on AMI hospitalizations. The objective of this study was to evaluate the effects of winter temperatures on admissions due to AMI and to examine the interactive effects between weather factors and demographics in relation to AMI. Methods: A time-stratified case-crossover design was employed. The study population included hospitalizations from 14 New York State weather regions with a primary diagnosis of AMI during the cold season, 1991-2004. The temperature indicators assigned for each region were apparent daily average temperature (UATavg), which includes relative humidity and wind speed; 3-day moving average UATavg; and extreme temperature, defined as the 10th percentile of UATavg distribution. Exposure odds ratios (OR) and 95% confidence intervals (CI) were calculated using conditional logistic regression after controlling for other weather factors. Results: UATavg below 35F increased the odds of being hospitalized due to AMI with the strongest effects when UATavg was -15F (OR = 1.35, 95%CI: 1.08-1.68) 4-6 days prior to hospitalization. The moving averages and extreme temperature also showed similar associations with AMI for the same 4-6 day lags. Being male, white, 45-74 years old, Medicaid insured, and residing in the Binghamton region increased the odds of AMI hospitalization at UATavg below 30F. Conclusion: Temperatures below the freezing point are associated with AMI hospitalizations 4-6 days later, and certain demographic factors may change the temperature – AMI association.

1032-S

INDOOR SMOKE EXPOSURE AND RISK OF ANTHRACOSIS. *M Qorbani¹, M Yunesian, K Amoli, G Derakhshan (Tehran University of Medical Sciences, Tehran, Iran)

Introduction: Anthracosis, characterized by black pigmentation of lung parenchyma or bronchial mucosa which is attributed to soot inhalation. Coal mining, urban air pollution and tobacco smoking has been recognized as the main factors of anthracosis aetiology. According to the previous case-series studies in Iran instead of these factors, exposure to smoke while cooking home made bread in ground oven was found to be affluent in anthracotic patients. The aim of this study was to quantify association between exposure to soot while cooking bread in ground oven and anthracosis. Material and Methods: We conducted hospital-based case-control study to identify risk factors for anthracosis in Imam Khomai hospital in Tehran. An interview was conducted using a modified questionnaire recommended by American Thoracic Society. We compared 83 cases (anthracosis confirmation by bronchoscopy) with 72 controls from surgical and medical ward which were frequency matched by age. Multivariate analysis (MA) was performed by Mantel-haenszel method and logistic regression. Results: Univariate analysis showed that wood use for cooking home made bread (OR: 4.46, $P < 0.01$) and occupation exposure to dust (OR: 2.82, $P < 0.01$) were associated with anthracosis in contrary to tobacco use and gender. After MA, only wood use for cooking home made bread in oven (OR: 4.02, $P < 0.01$) remain significant. Conclusion: The results of this study show that exposure to soot while cooking home made bread in oven is associated with anthracosis. Key words: Anthracosis, indoor air pollution, smoke exposure

1031-S

MERCURY AND MEASLES VIRUS ANTIBODIES IN US CHILDREN. *C M Gallagher, J R Meliker (Stony Brook University, Stony Brook, NY)

Environmental toxins, pathogens and host susceptibility are cofactors that may interact to contribute to disease. In vitro mercury exposure inhibits antiviral cytokines in human cells; however, little is known about the relationship between mercury and viruses in children. Children are particularly susceptible to mercury neurotoxicity; lower vitamin B-12 and folate levels and higher homocysteine levels may represent susceptibility cofactors. This study aimed to evaluate associations between total blood mercury (Hg) and measles antibodies, and the influence of susceptibility cofactors. Cross-sectional data on these analytes, including methylmalonic acid (MMA, indicator of B-12 deficiency), were obtained from the 2003-2004 National Health and Nutrition Examination Survey for children aged 6-11 years with measles seropositivity ($n = 692$). We used linear regression to evaluate relationships between measles antibodies and continuous Hg and Hg quartiles (Q, $\mu\text{g/L}$) Q1: $\text{Hg} \leq 0.20$; Q2: $0.20 < \text{Hg} \leq 0.40$; Hg Q4: stratified by sex, MMA \geq , folate $<$, and homocysteine \geq sample medians, adjusted for demographic, nutritional and environmental cofactors. Continuous Hg was inversely associated with measles antibodies in non-stratified analysis, yet positively associated among the subset of boys with higher MMA and lower folate ($n = 98$); among subset boys with higher homocysteine levels ($n = 61$), correlations were positive across all Hg quartiles relative to Q1: Q2: $\beta = 5.90$ (2.44, 9.37); Q3: $\beta = 8.00$ (4.73, 11.27); Q4: $\beta = 5.55$ (2.55, 8.54) ($p_{\text{trend}} = 0.105$). These results suggest that mercury may be associated with levels of serum measles antibodies. This is important because additional research is needed to clarify this relationship.

1033

ASSOCIATION BETWEEN INDOOR AIR POLLUTION AND RESPIRATORY SYSTEM DISEASES. M Qorbani, *M Yunesian, K Amoli, G Derakhshan (Department of Environmental Health, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran)

Introduction: Biomass fuels are used extensively in rural areas of developing countries like Iran. Indoor air pollution is resulting from the combustion of wood smoke and biomass fuels during baking bread and cooking food has been reported as one of the main cause of respiratory system diseases. This study was designed to evaluate association between exposure to smoke while cooking bread in ground oven as indoor air pollution and respiratory system diseases. Material and Methods: In this hospital-based case-control study 83 cases with respiratory system diseases selected from Pulmonary ward of Imam Khomai hospital in Tehran via random sampling methods and 72 frequency matched by age subjects without respiratory system diseases were selected from surgical and medical ward. An interview was conducted using a modified questionnaire recommended by American Thoracic Society. Logistic regression model was fitted to data to estimate crude and adjusted odds ratio (OR) and 95% confidence interval (95%CI). Results: Univariate analysis showed that wood use for cooking home made bread (OR: 2.44, CI: 1.26- 4.73) and occupation exposure to dust (OR: 2.41, CI: 1.10- 5.53) were associated with respiratory system diseases in contrary to tobacco use and gender. After adjustment only wood use for cooking home made bread in oven (OR: 3.40, CI: 1.48-7.80) remain significant. Conclusion: Exposure to smoke while cooking home made bread in oven is strongly associated with respiratory system diseases in Iran. Key words: Respiratory system diseases, Biomass fuels, smoke exposure

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WITHDRAWN

1036

LUNG FUNCTION RESPONSE TO DRAMATIC CHANGE IN PARTICULATE MATTERS (PM) AIR POLLUTION PRE-, MID- AND AFTER BEIJING OLYMPICS. *L Mu, F Deng, M Bonner, L Tian, Y Li, J Ying, Z Zhang (Department of Social and Preventive Medicine, University at Buffalo, Buffalo, NY)

To investigate the effects of PM air pollution on lung function in healthy adults, we took advantage of the artificial controlled changes in air pollution levels that occurred during the 2008 Beijing Olympic Games, and conducted a longitudinal study in which we enrolled a cohort of 201 participants residing in Beijing, China. Longitudinal data and PM measurements were collected in one baseline and two follow-ups occurring before, during and after the Olympics. Linear mixed model was run to compare the variables across the three time points after adjusting the confounding factors. PM levels of different sizes were decreased by half during the Olympics, and increased again after the Olympics. The mean values of Peak Expiratory Flow (PEF), an indication of lung function, were 346.1 L/min, 399.3 L/min and 364.1 L/min over the three study periods. Increased PEF levels were seen in 78% of participants in comparison of mid- with pre-Olympics, while decreased PEF levels were observed in 80% of participants when post- and mid-Olympics were compared. Percentage of normal breath rate among participants varied from 91%, 95%, to 71% over the three time points. Statistically significant differences were identified when compare during- to pre- or post- games in both PEF ($P < 0.0001$) and breath rate ($P < 0.0001$), among both smokers and non-smokers. The results indicate that exposure to different air pollution level has significant effects on respiratory function.

1035-S

ASSOCIATIONS OF POLYCYCLIC AROMATIC HYDROCARBON (PAH) EXPOSURE FROM TRAFFIC EMISSIONS AND BIOMARKERS OF OXIDATIVE STRESS AND ANTIOXIDANT STATUS. Y Li, J Nie, J Beyea, C Rudra, R Browne, M Bonner, L Mu, M Trevisan, JL Freudenheim (Dept of Social and Preventive Medicine, Univ. at Buffalo, Buffalo, NY)

Oxidative stress has been implicated as a possible mechanism in adverse health effects from PAH exposure. We assessed associations of PAH exposure from traffic emissions with blood biomarkers of oxidative stress (thiobarbituric acid-reactive substances (TBARS)) and anti-oxidant capacity (glutathione, glutathione peroxidase, trolox-equivalent antioxidant capacity (TEAC)) among 1810 healthy women randomly selected from two counties in Western New York. A geographic traffic emission and meteorological dispersion model was used to estimate annual PAH exposure from traffic emission for each woman based on current residence. PAH estimates were categorized into quartiles and treated as dummy variables in multiple regression analyses with adjustment for potential confounders. PAH estimates were not associated with TBARS or TEAC. They were associated with decreased glutathione (4th quartile (Q4) vs. 1st quartile (Q1), $\beta = -4.40$, SE = 1.66, $p < 0.01$) and increased glutathione peroxidase (Q4 vs. Q1, $\beta = 24.58$, SE = 9.50, $p < 0.01$). In analyses limited to never smokers without secondhand smoke exposure, we found stronger associations of PAH exposure with levels of glutathione (Q4 vs. Q1, $\beta = -9.40$, SE = 2.66, $p < 0.001$) and glutathione peroxidase (Q4 vs. Q1, $\beta = 39.42$, SE = 14.1, $p < 0.01$). These findings suggest that PAH exposure from traffic emissions may affect anti-oxidative capacity among healthy women, particularly non-smokers.

1037

INCREASED STROKE MORTALITY AMONG RESIDENTS OF SURFACE COAL MINING AREAS. *A Sergeev (Ohio University, Athens, OH 45701)

Previous studies have reported that environmental exposure to particulate matter air pollution is associated with atherosclerosis and cardiovascular disease. We hypothesized that residency in surface coal mining areas would be associated with an increased cerebrovascular disease (stroke) mortality. METHODS: We conducted a county-level population-based study of stroke mortality among 25 years and older adults during a seven-year period (2000-2006) in relation to residency in surface coal mining counties. Stroke death data were obtained from the Centers for Disease Control and Prevention, National Center for Health Statistics. Relative risks (RR) of stroke death, with 95% confidence intervals (CI) were estimated by multivariable Poisson regression, adjusting for known confounders. Generalized estimating equations (GEE) method was used to adjust for clustering. RESULTS: Crude stroke death rates were higher in surface coal mining counties (91.42; 95% CI: 90.68-92.16, per 100,000 p-yrs) compared to non-coal mining counties (72.96; 95%CI: 72.82-73.10, per 100,000 p-yrs, $P < 0.001$). Adjusted for age, gender, and race, stroke death rates remained statistically significantly higher in surface coal mining counties (adjusted RR = 1.071; 95%CI: 1.024-1.121, $P < 0.003$). Adjusted stroke mortality was higher in females than in males (adjusted RR = 1.047; 95%CI: 1.040-1.054, $P < 0.001$). Also, adjusted stroke mortality was statistically significantly higher in African Americans than in any other racial group, and it increased with age (P trend < 0.001). CONCLUSIONS: Our findings support the hypothesis that air pollution due to surface coal mining constitutes a cerebrovascular health risk. Promotion of cerebral atherosclerosis is the likely biological mechanism responsible for increased stroke mortality.

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FINE PARTICULATE MATTER SPECIES, SOURCES AND CARDIOVASCULAR MORBIDITY AMONG POTENTIALLY SENSITIVE GROUPS. *M L Clark, J L Peel, S Y Kim, M P Hannigan, S J Dutton, R Piedrahita, J Milford, S Miller, L Sheppard, S Vedal (Colorado State University, Fort Collins CO 80523)

Evidence suggests that health risks associated with exposure to ambient air pollutants are not uniform across individuals; however, there is considerable uncertainty in estimates for susceptible populations. We conducted a five-year study (2003-07) examining the association of fine particulate matter (PM) mass and chemical speciation with cardiovascular hospital admissions in Denver, Colorado. Daily 24-hour concentrations of fine PM mass, elemental carbon (EC), organic carbon (OC), sulfate, and nitrate were measured, and daily PM source apportionment was conducted. We are investigating the relationships between daily counts of cardiovascular disease hospital admissions and daily concentrations of fine PM species and sources among potentially sensitive subgroups. Mean levels of fine PM mass were relatively low (mean $8.0 \mu\text{g}/\text{m}^3$; standard deviation $5.1 \mu\text{g}/\text{m}^3$). We observed increases in hospital admissions for cardiovascular disease, particularly for ischemic heart disease, in relation to increases in same-day fine PM mass, EC, and OC concentrations as well as several of the PM source factors. For the PM species, the associations were strongest for EC (relative risk [RR per interquartile range] = 1.019; 95% confidence interval [CI] 1.010 – 1.028 per $0.33 \mu\text{g}/\text{m}^3$ increase) and OC (RR = 1.017; 95% CI 1.006 – 1.028 per $1.7 \mu\text{g}/\text{m}^3$ increase). We will present results examining the heterogeneity of these associations by comorbid diseases (e.g., hypertension, diabetes), age, race, sex, and socioeconomic status. This is an abstract for a proposed presentation and does not necessarily reflect the policies of the U.S. Environmental Protection Agency.

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ANALYSIS OF THE BERG BALANCE SCALE AS A PREDICTOR OF FALLS IN ELDERLY DIZZY. *R C Traballi, R F R Medeiros, J D Leandro, A de Queiroz, C R R da Silva, T L di Pietro Carneiro (Universidade Paulista - UNIP, Sao Paulo, Brazil)

Objective: The objective of this study is to analyze the capacity of the Berg Balance Scale in identifying older persons with vestibular chronic dizziness, and with no history of falls. Methods: A retrospective exploratory study, which evaluated 76 patients aged over 65 years, with complaints of chronic dizziness, and with no history of falls last year, of both sexes, with 49 female and 27 male, underwent functional evaluation of the balance through the Berg Balance Scale. Data were analyzed with respect to sensitivity, specificity, positive predictive value, negative predictive value and accuracy at various cutoff points. The Chi-Square was used to measure the association of the cutoff stipulated in the literature. Results: The major findings in this study were related to the cutoff of the Berg Balance Scale, established in the literature showed that setting a cutoff of 48, we will have a sensitivity of 77.8% and a specificity of 58.0 %, thus identifying the elderly prone to falls with greater security. Conclusion: Patients older than 65 years, suffering from vestibular disease present alterations in the balance that can lead to a fall, applying the Berg Balance Scale and raising the cutoff to 48, identifies more accurately those who are more predisposed to fall.

1039-S

ENVIRONMENTAL EXPOSURE TO ASBESTOS-CONTAMINATED VERMICULITE AND PREVALENCE OF RESTRICTIVE LUNG DISEASE. *C Lambert, L L F Scott, K Raleigh, J Adgate, G Ramachandran, J H Mandel, J Johnson, R Messing, B H Alexander (University of Minnesota School of Public Health, Minneapolis, MN)

Community exposure to asbestos from contaminated vermiculite mined in Libby Montana is a significant concern in communities where the vermiculite was processed. We assessed prevalence of restrictive lung disease (RLD) in members of a community surrounding a vermiculite processing plant who did not work at the plant or live with a plant worker. Data was collected via self-administered questionnaire and a clinical evaluation, which included pulmonary function tests (PFT). Exposure models were developed to estimate (fiber/cc*months) as a function of background concentrations from air dispersion models and self-reported activity patterns. Prevalence odds ratios (ORs) and ninety-five percent confidence intervals (CIs) were calculated to assess the association between total activity-based (TAB) and cumulative environmental (CE) exposures to asbestos and RLD. Clinic visits were completed by 460 participants. Approximately 15% of participants were classified with RLD based on their PFT results. TAB and CE exposures ranged from 0 to 15.0 and 0.4×10^{-5} to 16.0 fiber/cc*month, respectively. No association between RLD and asbestos exposure was observed, whether analyzed categorically (TAB: $\text{OR}_{\text{trend}} = 1.08$, 95% CI = 0.79-1.47; CE: $\text{OR}_{\text{trend}} = 1.04$, 95% CI = 0.75-1.43) or continuously (TAB: OR = 1.01, 95% CI = 0.98-1.04; CE: OR = 1.07, 95% CI = 0.93-1.22). Our results indicate that non-occupational community exposure to asbestos from contaminated vermiculite is not sufficient to cause restrictive lung disease.

1041

WITHDRAWN

1042

ARE THE EQUALLY ILL EQUALLY LIKELY TO REPORT POOR HEALTH? FOCUS ON HISPANICS. *J Brewer, G Miyasato, M Gates, S Hall, J McKinlay (New England Research Institutes, Inc., Watertown, MA 02472)

Prior studies have found that Hispanics report worse self-reported health (SRH) even when controlling for socioeconomic status (SES), immigration, or certain comorbidities. This study provides a unique assessment of factors associated with SRH, including multiple comorbidities, immigration and depression statuses across a diverse population. Our analysis used baseline data from the Boston Area Community Health Survey, a bi-lingual population-based survey of adults aged 30-79 years in 2002-05. The sample (n = 5,502) included 3,201 women and 1,767 black, 1,859 white and 1,876 Hispanic participants. We used multiple logistic regression (weighted to the general population of Boston) to examine the association between race/ethnicity and Fair/Poor (F/P) SRH adjusting for gender, age, SES, immigration and depression statuses, and number of comorbidities (0-3, vs. 4+). The comorbidities included were arthritis, asthma, chronic lung disease, diabetes, high blood pressure, and myocardial infarction. After adjusting for potential confounders, Hispanics remained 4 times as likely to report F/P SRH (Odds Ratio = 4.6, 95% confidence interval: 3.1, 6.8) compared to whites. Because we observed interactions between race/ethnicity and depression and immigration status, we stratified on these covariates and observed a stronger association with Hispanic ethnicity in immigrants and in non-depressed individuals. The increased likelihood of F/P SRH persisted in the Hispanic group even after adjustment for 4 or more major comorbidities, SES, age, depression, and immigration status. These findings have methodologic implications for epidemiologists who use self-reported health across diverse study populations. Supported by Award Number U01DK056842 from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (NIH). Content is solely the responsibility of the authors and does not necessarily represent the official views of NIDDK or NIH.

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SOCIO-DEMOGRAPHIC DIFFERENCES IN BODY MASS INDEX CHANGES AMONG U.S. ADULTS IN THE BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM DATA (BRFSS). M G Qayad, P P Chowdhury, G M Town, L S Balluz (Centers for Disease Control and Prevention, Atlanta, GA 30329)

Changes in obesity and overweight status of the U.S. adults differ among socio-demographics. Understanding such differences contribute to better planning of obesity and overweight intervention programs. This study examines socio-demographic differences in the percent changes of the body mass index (BMI) of U.S. adults. Data was obtained from 2007 BRFSS, a state based random-digit-dialed telephone survey for non-institutionalized adults' age ≥ 18 years. We estimated the percentage of U.S. adults whose BMI classifications changed from normal weight (BMI ≤ 24.9) to overweight (BMI 25.0-29.9) and from overweight (BMI 25.0-29.9) to obese (BMI > 30.0) in 2007 from last year (2006) by socio-demographics factors and leisure-time physical activity. Women were significantly more likely to move from overweight to obese and from overweight to normal BMI category as compared to men. Respondents with at most high school education, black non-Hispanics and Hispanics were more likely to become overweight (from normal weight) or become obese (from overweight) as compared to their counterparts. Both men and women of < 45 years old were significantly more likely to become obese from overweight. Women who became overweight from normal weight and both men and women who became obese from overweight were significantly less likely to participate in leisure-time physical activity. Black non-Hispanic women were least likely to move from obese to overweight BMI category as compared to Hispanics and white non-Hispanics. Appropriate weight reduction and maintenance of normal weight programs should target black non-Hispanic and Hispanic women to address these disparities.

1043

MINERAL AND OTHER NUTRIENT INTAKES OF CHINESE UNIVERSITY STUDENTS. *Y Neggers and X Junjia (University of Alabama, Tuscaloosa, AL 35487)

This study was conducted to evaluate mineral and selected nutrient intakes of Chinese students attending the University of Alabama during 2009. Ninety seven (49 males, 48 females) students participated in the study. Participants kept food intake records for three days. Food records were analyzed for minerals, energy and selected nutrients. There was no significant difference in the mean age between males and females (24.1 ± 4.7 vs. 22.7 ± 4.8 years). The BMI for males and females were 22.8 ± 3.4 and 20.1 ± 2.4 respectively. Chinese males and females on average consumed only 1.0 and 0.8 servings/day respectively of milk and milk products. For both genders, the mean number of servings of fruits and vegetables were lower than the recommended intake. The mean energy and protein intakes for both genders were higher than 2/3 of the Dietary Reference Intakes (DRI). Total fat intakes of males were significantly higher than those of females (106.6 ± 19.0 vs. 76.3 ± 12.2 g, $p < 0.05$). The mean sodium (Na) intakes of males (4485.8 ± 1077.2 mg) and females (3570.2 ± 859.6 mg) were significantly higher while the mean calcium (Ca) and potassium (K) intakes of both genders were significantly lower as compared to the adequate intakes (AI). Sixty eight percent of females and 43% of males had calcium intakes lower than the AI. Intakes of trace minerals iron and zinc were more than 2/3 of DRI. Since a high Na to K ratio and low intakes of Ca are associated with increased risk of hypertension, comprehensive studies are needed to evaluate the effects of intakes of these minerals in Chinese students.

1045-S

ENVIRONMENTAL RACISM RESEARCH IN CANADA. *O Nnorom, D C Cole. (Dalla Lana School of Public Health, University of Toronto, Toronto, ON, M5T 3M7, Canada)

BACKGROUND: Environmental racism (ER) research, exploring whether certain racialized populations have been disproportionately exposed to environmental hazards, has only recently been conducted in Canada. PURPOSE: To conceptualize the relationships between race, socioeconomic status (SES) and environmental health in a Canadian context. METHODS: Bibliographic search for USA ER studies, commentaries and critiques and Canadian ER epidemiological studies. Narrative review of theories, frameworks, methods and challenges. RESULTS: Among USA ER studies, when racism is explored as a proximal, direct factor, (such as an industrial siting decision), SES could arguably be treated as a confounder. When institutionalized racism, an upstream, indirect factor is investigated as a cause of differential hazard exposure, the relationship between race and SES is not confounding, but involves interaction. In Canadian ER, use of Geographical Information System-mapping techniques and air pollution as a primary exposure of interest dominated. The association between SES and hazard exposure was consistently found to be significant, but the relationship between race and hazard exposure was not. The direct application of USA ER theories was problematic because in Canada, many racialized populations are immigrants. Were environmental inequities due to recent immigration or institutionalized racism? Further, although racialized neighbourhoods exist in Canada, the degree of segregation may not lend itself as readily to mapping techniques as in the USA. CONCLUSION: Canadian relationships between SES, recent immigration, institutionalized racism and environmental hazards must be further explored and critically examined as part of meaningful ER research.

1046

NEIGHBOURHOOD INCOME AND SUBSITE-SPECIFIC COLORECTAL CANCER INCIDENCE IN ONTARIO, CANADA, 1990-2006. *E Candido, L Marrett (Cancer Care Ontario, Toronto, ON, Canada, M5G 1X3)

Socio-economic status has been shown to influence colorectal cancer incidence; few studies have explored this relationship by anatomic subsite. We examined subsite-specific colorectal cancer incidence in Ontario over time by neighbourhood income. Colorectal cancer cases diagnosed in Ontario during 1990-2006 were identified from the Ontario Cancer Registry. Census-based neighbourhood income quintiles were assigned based on postal code at diagnosis and nearest census. Sex- and subsite-specific age-standardized incidence rate ratios (RRs) comparing the poorest income quintile to the richest and 95% confidence intervals (CIs) were calculated for time periods 1990-1993, 1994-1998, 1999-2003, 2004-2006. In males, rectal cancer incidence rates were significantly higher in the poorest neighbourhoods compared to the richest, with the disparity decreasing over time (1990-1993: RR = 1.30, 95% CI: 1.18-1.43; 2004-2006: RR = 1.08, 95% CI: 0.98-1.19). Although neighbourhood income was less strongly related to male colon cancer incidence, the disparity between income quintiles also decreased over time (1990-1993: RR = 1.10, 95% CI: 1.01-1.18; 2004-2006: RR = 1.02, 95% CI: 0.95-1.11). In females, the relationship between both colon and rectal cancer incidence and neighbourhood income was weaker than in males and was generally not statistically significant. Higher colorectal cancer incidence in the poorest neighbourhoods compared to the richest likely reflects a higher prevalence of colorectal cancer risk factors (e.g. obesity, smoking) in this group. The relatively strong association between neighbourhood income and incidence of rectal cancer in males may also be explained by higher prevalence of rectal cancer risk factors, especially smoking, in males.

1048

ADOLESCENCE TO YOUNG ADULTHOOD: EMERGENCE OF SOCIO-ECONOMIC DISPARITIES IN SUBSTANCE USE. *R Widome, M Wall, M Eisenberg, M Laska, D Neumark-Sztainer (Dept. of Veterans Affairs, Minneapolis, MN 55417)

Introduction: Emerging adulthood is a time when substance use behaviors tend to arise, cease, and/or solidify. Objective: To compare substance use trends from adolescence to adulthood in three socio-economic groups: individuals who by young adulthood are enrolled in, or graduates of, either: 1) 4-year colleges, 2) 2-year colleges, or 3) no postsecondary education. Methods: Adolescents participating in Project EAT were surveyed in 1999, when they were in either middle or high school, and followed up five and ten years later, to early and middle stages of young adulthood ($n = 1902$). Logistic regression models, adjusted for age and gender, were used to assess longitudinal changes in cigarette, alcohol, and marijuana use. To determine whether trends for the three educational groups differed we tested a time \times educational attainment interaction. Results: The shapes of the cigarette and marijuana trend curves were similar for all three groups with increasing use through adolescence and leveling off or decline in young adulthood. However, at all timepoints, those with less eventual education attainment were more likely to use cigarettes or marijuana. The probability of weekly drinking was lower among adolescents who would attend 4-year college in the future compared to those who would not, but by young adulthood, the 4-year college group reported far more weekly alcohol than the no postsecondary education group (52% vs. 36%, $p = .0001$). However, the no postsecondary education group reported more daily alcohol use (9% vs. 5%, $p = 0.05$). Conclusions: The three eventual educational attainment groups displayed different substance use patterns which began in early adolescence and persist through young adulthood.

1047

SOCIOECONOMIC INEQUALITY IN AIDS DEATHS BEFORE AND AFTER THE INTRODUCTION OF HAART IN CANADA. *J Etches and C A Mustard (Institute for Work & Health, Toronto, ON, Canada M5G 2E9)

Income, education and occupation have strong associations with mortality. One mechanism by which such inequalities may be generated is by socio-economically differential benefit from innovations in medical technology. The introduction of Highly Active Anti-Retroviral Therapy (HAART) in 1996 sharply reduced mortality rates due to Human Immunodeficiency Virus (HIV) infection. We examine socioeconomic inequality in AIDS deaths before and after 1996 in Canada. A cohort study over an 11-year period among a representative 15% sample of the non-institutionalized male population of Canada aged 25-54 at cohort inception in 1991. Age-standardized mortality rates (ASMR) for AIDS and non-AIDS death according to education, personal income, family income and four measures of occupational hierarchy are estimated for both periods. The strong positive association of AIDS mortality with education present in the 1991-1996 period is eliminated afterwards, while negative gradients with personal and household income are attenuated, and moderate heterogeneity across occupations is also attenuated. After the introduction of HAART, large mortality differences by marital status, employment and self-reported disability were also attenuated or eliminated. The social distribution of AIDS deaths in the general population was initially unusual due to the social characteristics of the population at high risk of infection. After the introduction of HAART, overall AIDS deaths were dramatically reduced, relative inequalities in AIDS deaths were largely eliminated, and absolute mortality differences between groups greatly reduced.

1049

TIME-SERIES SMOKE LOAD/CANCER MORTALITY ASSOCIATIONS IN THE US, CANADA, AND GERMANY. *B Leistikow and R Khan (University of California, Davis, CA 95618)

BACKGROUND: Sources of temporal changes in non-lung cancer death rates have not been well explored. So we assessed if cumulative tobacco smoke damage (smoke load), as measured by lung cancer death rates, might explain much of temporal and international differences in non-lung cancer death rates. METHODS: United States (US), Canada, and German males were studied. Death rates adjusted to the world age standard (rates) were obtained and lung/non-lung cancer rate linear regressions run. Given the associations seen, smoking-attributable fractions (SAFs) of male all sites cancer rates were estimated using the formula $SAF = 1 - \text{unexposed}/\text{observed cancer rate}$. Unexposed' cancer death rate were estimated from the lung/non-lung cancer rate regression line (sensitivity range (SR) the upper and lower 95% confidence limits) and estimated unexposed lung cancer rates of 4 (sensitivity range 2-10) deaths per 100,000, near never-smoker levels. RESULTS: Both lung and non-lung male cancer death rates per 100,000 rose in the 1980s then fell in the nations studied. Tight lung/non-lung cancer death rate associations were seen in the US from 1980-2005 (slope 1.15 (95% confidence interval (CI) 1.07-1.24) correlation coefficient ($r = 0.99$), Canada from 1980-2004 (slope 0.83 (CI 0.71-0.94) $r = 0.95$), and Germany (slope 1.81 (CI 1.62 -2.00) $r = 0.97$), persisted after adjustment for autocorrelation, and suggested terminal year SAFs of 64% (SR 56-70%), 50% (SR 53-56%), and 66% (SR 53-76%), respectively. DISCUSSION: Strong, consistent, graded lung/non-lung cancer death rate associations in US, Canada, and German males suggest high SAFs of cancer mortality. These findings are consistent with new evidence of measurement and selection bias in past cohort-based SAFs.

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SMOKE LOAD/MORTALITY ASSOCIATIONS ACROSS GENDER, RACE, SMOKING STATUS AND EDUCATION IN THE UNITED STATES. *B Leistikow and R Khan (University of California, Davis, CA 95618)

BACKGROUND: Recently published but dated and unrepresentative data suggests that tobacco smoke exposure dominates socioeconomic status (SES) as a cause of SES-related mortality disparities. So we assessed smoke load/mortality associations in the more recent, representative United States (US) 1997-2004 National Health Interview Survey (NHIS) cohort, using lung cancer hazard ratios (HRs) as a bio-index of cumulative tobacco smoke damage (smoke load). **METHODS:** Age-adjusted lung cancer and all other except homicide and HIV (Total less LungCancer+HomHIV) death hazard ratios (HRs) by gender-race (white, non-white)-education (0-12, 13+ years)-smoking status (never-, ex-, 1-14, 15+ cigarettes/day smoker) were calculated from the 2006 NHIS mortality follow-up. Those lung cancer HRs were then used as independent smoke load measures and multivariate education level, race/Total less LungCancer+HomHIV associations assessed after adjustment for lung cancer HR and gender. **RESULTS:** Relative to white never-smoker females educated 13+ years, HRs ranged for lung cancer from 0.85 in educated non-white female never smokers to 4.8 in heavy smoker least educated non-white males and for Total less LungCancer+HomHIV, 1.3 to 4.7. In multivariate analyses adjusted for smoke load and gender, education ($p = 0.06$) and race ($p = 0.08$) had borderline associations with Total less LungCancer+HomHIV HR. **DISCUSSION:** Recent representative US data shows strong associations between smoking and Total less LungCancer+HomHIV mortality and comparatively modest associations between education and race and Total less LungCancer+HomHIV mortality after adjustment for smoke load and gender. These findings are consistent with new evidence of measurement bias in past cohort-based SES/mortality associations.

1052-S

INFORMED CONSENT FOR RECORD LINKAGE: A SYSTEMATIC REVIEW AND META-ANALYSIS. *M Silva; C Coeli, M Magnanini, T Coeli, M Ventura, Palacios M, K Camargo Jr (Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil, 21941-598)

Background: Record linkage (RL) has been used as a useful tool in health research. Despite potential benefits of applying RL, its use raises discussions of privacy issues, such as whether a written informed consent for access to health records and linkage should be obtained. This article aims to systematically review studies that assess consent rates to RL applications. **Methods:** Eight databases were searched up to September 2010 to find articles which presented consent rates to RL. Screening, eligibility and inclusion were conducted by two independent reviewers. Disagreements between reviewers were resolved by a third independent reviewer. Pooled proportion estimate and 95% confidence interval (95% CI) were calculated using random effect models. **Results:** Of the 129 studies identified only 11 presented empirical consent rates and were included in the systematic review. Most articles were published after 2000, coinciding with the introduction of laws of privacy on health information in different countries. Regarding the population asked to consent, 72.2% were adult or elderly. The remaining (27.2%) were parents or caregivers responsible for children. Pooling the proportion estimates of consent to RL yielded an overall proportion of 83% (95% CI: 71% to 91%). **Conclusion:** The overall consent rate for RL showed that individuals addressed in studies using primary data tend to consent.

1051-S

WEIGHING THE ETHICAL AND EPIDEMIOLOGICAL RIGOUR IN RCTS OF EARLY CHILDHOOD DEWORMING: A FINE BUT NECESSARY BALANCE TO SUPPORT EVIDENCE-BASED POLICY. *S A Joseph, T W Gyorkos (McGill University, Montreal, QC, Canada H3A 1A2)

International organizations such as the World Health Organization recommend mass deworming of children in endemic areas, including preschool-age children as of 1 year of age. Still, there remain important knowledge gaps regarding the most appropriate treatment regimes, delivery strategies and outcomes of interest, particularly for preschool-age children. The unique nutritional demands and growth pattern in early childhood, especially in children under two years of age, warrant the need for new trials rather than merely extrapolating results from older children. But how then do we ensure that we provide the most rigorous epidemiologic evidence while balancing the ethical concerns inherent in a study in which some children receive deworming treatment while others do not? A deworming RCT that is being conducted in 12 to 24 month old children in Iquitos, Peru will be used as a case study to discuss these important considerations, including: deciding on the most appropriate comparison group(s), including the use of a placebo control and provision of standard of care services; conducting a blinded or open-label study; obtaining high participation rates and maintaining low loss to follow-up and high compliance of children when not all will receive active treatment; determining if and when to collect, analyze and store stool samples; among other issues. Taking into account the unique ethical and epidemiological characteristics of RCTs of deworming in young children will ensure that the results obtained will properly inform and support global evidence-based policy recommendations, reduce the burden of intestinal parasite infection and ultimately improve early childhood growth and development.

1053

AN ETHICAL FRAMEWORK FOR PUBLIC HEALTH EVALUATIVE ACTIVITIES. *D Willison, N Ondrusek, A Dawson, C Emerson, L Ferris, R Saginur, H Sampson, R Upshur. (Ontario Agency for Health Protection and Promotion, Toronto, ON, Canada M5G 1V2)

The ethical principles commonly applied to clinical research do not always fit well in the public health context. Further, public health research and other evaluative activities, such as surveillance, quality improvement, and program evaluation often present similar risks to those who participate in these activities. The traditional application of ethics review only to those activities labelled "research" leads to uneven protections of participants in the face of equivalent risks. Finally, ethical scrutiny is often seen by researchers as an activity that occurs at one point in the lifecycle of a project, conducted by an external body. Drawing on a wide range of theory, best practices and experiences from the field, we have developed a framework and process designed to guide ethical examination of public health evaluative activities that: 1) are founded on a core set of values reflecting a public health perspective; 2) extend beyond research to include quality improvement, program evaluation and surveillance, while minimizing bureaucracy; and 3) foster a culture of ethical reflection integrated throughout the lifecycle of a project, rather than a culture of compliance with an external ethics review body. The framework consists of a set of questions that aid deliberations regarding the ethical acceptability of a particular evaluative activity and that are grounded in values that we argue are particularly relevant to evaluations in public health. This framework will be used as part of a process for ethics support of public health activities in Ontario, from the initial development of an inquiry through to the exchange or application of knowledge generated.

1054

THE ROLE OF EPIDEMIOLOGICAL STUDIES IN CLINICAL MEDICINE. *M Root (University of Minnesota, Minneapolis, MN 55455)

Proponents of evidence-based medicine often maintain that, if available, evidence from epidemiological studies (and randomized controlled trials in particular) should be the basis on which clinicians choose a treatment (a therapy, diagnosis or prognosis) for a patient. However, epidemiological studies compare the effectiveness of treatments for a population while clinicians are interested in what treatment will be most effective for an individual patient. Clinicians can rely on epidemiological evidence to choose between treatment guidelines but have non-epidemiological evidence that a patient will respond differently to a treatment than the participants in a study. As a result, for clinicians to always or routinely base their choice of treatments for a patient on epidemiological evidence or the studies of populations would be unreasonable. Moreover, two ethical principles, beneficence and non-maleficence, can require clinicians to ignore a guideline and recommend a treatment that, according to the epidemiological evidence, is not the most effective. Medical decisions, I argue, should be based on the best available evidence but what evidence is best depends on whether the choice is between treatments for an individual or group. When treating a patient, evidence from epidemiological studies is relevant but rebuttable and can be overruled by non-epidemiological evidence, evidence that, according to the standards of evidence-based medicine, is at or near the bottom of a hierarchy of evidence. Finally, the most effective treatment for a patient might not be the best for him, since what is best depends on additional factors like cost, convenience and a patient's attitudes and epidemiological evidence might not bear on these at all.

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WITHDRAWN

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TRUST: A KEY ISSUE IN ETHICAL EPIDEMIOLOGICAL RESEARCH? *A Dawson, D Willison, and C Emerson (Keele University, Staffordshire, ST5 5BG, UK.)

Trust is often held to be a necessary feature of platforms where patient samples and/or data are stored (e.g. cancer registries, biobanks, and longitudinal cohort studies etc). On this view, much epidemiological research requires that large numbers of patients participate, and that this is only possible if there is widespread trust by the public in the security of the platform, and that the relevant benefits will be derived from the research. This paper begins by exploring the nature of trust and trustworthiness, as well as both interpersonal (person-to-person) trust and public trust, and suggests how these distinctions relate to work in epidemiology. It proceeds to explore reasons why we might think that trust is ethically important in epidemiology, before critically engaging with the literature exploring what factors may increase or decrease trust. The broad conclusion of the paper is that we have some evidence that, in general, the public are trusting of medical research, including epidemiological studies. Whilst such trust can be lost, where this happens, it tends to be both local and temporary. Whilst some believe that tightening-up governance and procedural aspects of epidemiological research will result in greater trust, there is little evidence that this is so. Indeed, we might just as well conclude that such activities might damage existing trust.

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SECURE LOGISTIC REGRESSION OF HORIZONTALLY PARTITIONED DATA FOR PHARMACOVIGILANCE. *K El Emam, SSamet C Earle (University of Ottawa, Ottawa, ON, Canada)

With the increasing use of conditional drug approvals by regulators and the known weaknesses of pre-market clinical trials to detect rare adverse events, pharmacovigilance studies are becoming important. The detection of rare adverse drug events requires large data sets, which may need to be pooled across providers, jurisdictions, or countries. However, the sharing of data in this way is often challenging because of privacy concerns. We propose a privacy preserving protocol for performing logistic regression on such horizontally partitioned data using a homomorphic cryptosystem. Such a cryptosystem allows the performance of mathematical operations on encrypted data. Our protocol allows the parties to share encrypted values and collaboratively compute the parameters of the model. Because only encrypted data are shared, there is no disclosure of personal health information. The performance and complexity of the proposed protocol are evaluated. The protocol is compared to alternatives, such as a meta-analysis of separate models and de-identification. The privacy-preserving protocol provides a practical approach to detect adverse events without a loss in precision and protects the identity of the patients.

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RISK-BASED DE-IDENTIFICATION OF HEALTH DATA.
*K E I Emam (University of Ottawa, Ottawa, ON, Canada)

Health information custodians are increasingly reluctant to disclose identifiable data for research and public health purposes. Therefore, more emphasis is being placed on methods to de-identify health data while retaining its utility (e.g., minimize the loss of precision in that data). In this presentation we describe a risk-based de-identification method which ensures that the amount of distortion is proportionate to the amount of risk. Three dimensions are considered in the evaluation of risk: the security and privacy practices of the data recipient, the extent of invasion-of-privacy if there was an inappropriate disclosure, and the motives and capacity of the data recipient to re-identify individuals. Instruments to assess these dimensions have been developed, as well as metrics to measure the probability of re-identification under different methods of attack. Real examples of de-identifying and disclosing data from the birth registry of Ontario and provincial cancer registries will be presented to illustrate the method.

1059-S

A "BIKEABILITY" PLANNING TOOL TO SUPPORT CITY DESIGN FOR HEALTHY TRAVEL. *M Winters, M Brauer, E Setton, K Teschke (University of British Columbia, Vancouver, BC, Canada V6T1Z9)

Cycling is a sustainable transportation option with great health benefits over the car. Yet cycling rates in Canadian cities are low compared to certain European cities (2% modal share, versus 15-30%), a disparity explained in part by differences in urban form and cycling infrastructure. Evidence indicates that aspects of the built environment have a significant influence on decisions to cycle. Geospatial data describing these environmental features are increasingly available. The promotion of walking has capitalized on this, creating walkability indices and mapping tools such as "WalkScore". To date, there has been little effort to define and map bikeability as an approach to promote active transportation. Our goal was to build an evidence-based tool to identify areas more and less conducive to cycling. We developed a bikeability index and used GIS to map it for Metro Vancouver. An opinion survey, travel behavior studies, and focus groups were used to identify components of the index (bicycle facility density, bicycle facility separation, street connectivity, topography, destination density) and their relative importance. Pertinent data layers were scored and combined using a flexible weighting scheme to create a composite map highlighting both high and low bikeability areas. An evaluation of the scores for individual component layers can guide local strategies to improve conditions. Mapping bikeability provides a powerful visual aid to identify zones that need improvement to support healthy travel choices. A key strength is that it reliance on widely available data, facilitating easy application in other cities. Furthermore, the flexible parameters and weighting scheme enable users elsewhere to tailor it to local preferences and conditions.

1060

DEVELOPMENT AND APPLICATION OF A MOVEABILITY INDEX TO QUANTIFY POSSIBILITIES FOR PHYSICAL ACTIVITY IN THE BUILT ENVIRONMENT OF CHILDREN. *I Pigeot, C Buck, H Pohlabein, I Hyubrechts, Y Pitsiladis, I de Bourdeaudhuij, L Reisch, on behalf of the IDEFICS Consortium (*BIPS, University Bremen, 28359 Bremen, Germany)

Many studies showed evidence of urban forms being environmental correlates of physical activity (PA). Studies that used geographic information systems (GIS) to objectively assess urban forms are mostly carried out in the US or Australia, but rarely in Europe. Findings from these studies cannot be adopted in a straightforward manner, because the environments in the US and Australia differ from urban areas in many European cities. Built environments do have a different impact on PA across different countries. We adapted the concept of walkability and included recreational facilities offering possibilities for PA particularly for children to investigate the impact of the built environment on PA of children in Germany. Considering multiple urban forms, e.g. footpaths, intersections, and playgrounds, we used a kernel density approach and combined standardized density measures of urban form to develop a moveability index that assesses the opportunities for PA in the German intervention region of the IDEFICS study. The index was applied to PA data of 344 school children reported in the IDEFICS baseline survey conducted in 2007/08. Using multilevel regression models, odds ratios (OR) and regression parameters with 95% confidence limits were estimated to investigate the impact of the built environment on measures of PA and childrens' travel mode to school. After adjusting for sex, age, parents' education and income, the moveability index showed a significant positive effect ($\beta = 0.18$, $p < 0.005$) on childrens' reported hours of PA per day. Funding: EC FP 6, Contract No. 016181 (FOOD)

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REMOTE MONITORING OF INHALED BRONCHODILATOR USE AND WEEKLY FEEDBACK ABOUT ASTHMA MANAGEMENT IMPROVES MEASURES OF ASTHMA MORBIDITY. *S Magzamen, D Van Sickle (University of Wisconsin, Madison, WI)

Numerous studies suggest that a majority of people with asthma do not have adequate control of their disease. The objective of this study was to investigate the use of a device to objectively monitor the time and location use of inhaled bronchodilators as a measure of asthma control. We sought to determine whether provision of information about use of inhaled bronchodilators via weekly email reports was associated with improved scores on composite measures of asthma control and reports of asthma morbidity. We recruited adults with a diagnosis of asthma who used an inhaled bronchodilator from a variety of clinical and community settings. Data were collected on the time and location of use of inhaled bronchodilators using a small, portable GPS-enabled electronic monitor over a four month period. After completing the first month of the study, participants began to receive weekly email reports displaying maps and charts of their usage, and access to an online interface with similar features. The communications also provided a basic assessment of their asthma control. A total of 32 individuals completed the study, with an average age of 35.5 (range: 19-74); 52% of respondents were female. Results of a repeated measures analysis indicate that study participation was associated with significant reduction in day time asthma symptoms ($b = -1.007$, 95% CI: -1.71, -0.30), nocturnal awakenings due to asthma ($b = -0.677$, 95% CI: -1.08, -0.26), and a non-significant reduction in activity limitations due to asthma ($b = -0.026$, 95% CI: -0.32, 0.27). Receipt of weekly email reports summarizing use of inhaled bronchodilators was associated with a decline in day-to-day asthma morbidity.

1062-S

HIV/AIDS AMONG THAILAND MARGINAL POPULATION: SURVIVAL ANALYSIS. *T Apidechkul (Mae Fah Luang University, Tambon Tasood, Thailand)

The retrospective cohort study design aimed to studies of current situation of HIV/AIDS, sexual behaviors, access to care and survival time in the six main hilltribe peoples in Thailand; Akha Lahu Karean Mong Yao and Lisaw, where the most epidemic of HIV/AIDS in Thailand. The study was divided into 2 phases. The first phase was a systematic extraction of data from medical records of hilltribe HIV/AIDS patients from a total 37 hospitals. The second phase, studied risk factors in hilltribe people by using a questionnaire derived by fact-to-fact interview. The questionnaires had been tested for validity and reliability. Statistic analyses were contribute by Survival Analysis and Cox-Regression. The results found that totally 608 cases from 37 hospitals, but only 581 cases were included in the analysis. The first cases of HIV/AIDS found Maesuai Hospital in 1990. 48.02% lived in Chiang Mai, 39.59% were aged 26-35 years at diagnosis. 64.89% was female, 36.14 was Lahu, 29.78 was Karean. 80.90% were still alive. 34.94% believed to have contacted the infection from their spouse, 22.55% were infected by sexual intercourse, 6.20% by IDU. 48.89% received ARV and 47.05% received OI drug. Survival Analysis found that those who received ARV presented 50% survival time at 12.39 years (p -value ≤ 0.00) and who had received OI presented 50% survival time at 5.99 years (p -value ≤ 0.00). Cox-Regression showed that having receiving ARV, OI, female sex, religion were factors favoring good survival time. Risk behavior in male were: 24.40% regular drank alcohol, 18.89% gave history of drug use, 63% had first sexual experience below 20 year of age, 23% had 2 or more partners, 3% had male homosexual, and only 27.00% reported using condom. Risk factors in female were: 22.58% illiterate, 9.68% had work as masseuses, and 3.23% as sex worker, 50.41% had first sexual experience between 16-20 years, 15.70 % always used condom, and 46.66% married to debut partner. This study shows that a given knowledge of HIV/AIDS, peer education and its prevention for male and female among hilltrib people are necessary, especially condom use within the condition of language and hard of transport.

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FACTORS AFFECTING START OF TREATMENT FOR HIV PATIENTS, SAN FRANCISCO, 2004-2009. *P L Chu, G M Santos, S Pipkin, L Hsu; (Department of Public Health, San Francisco, CA 94102)

Background: HIV treatment guidelines have shifted toward treating HIV patients with antiretroviral therapy (ART) earlier in the course of their infection, starting from International AIDS Society-USA's 2004 recommendations. We examined factors that may affect ART uptake for persons diagnosed with HIV using a population-based HIV surveillance registry. Methods: We selected persons diagnosed with HIV in San Francisco between 2004-2009 and calculated the time between the date of HIV diagnosis and ART initiation. Persons not receiving ART were censored at the time of death or last health status update. Using Cox proportional hazards regression, we assessed differences in ART start time by demographics and risk behaviors. Results: A total of 3,762 persons were diagnosed with HIV between 2004-2009. Mean months from diagnosis to ART was 11.0 (Standard Deviation = 14.7). In univariate Cox models, injection drug use, no and unknown insurance and homelessness were factors associated with delayed ART ($p < 0.05$). Factors associated with earlier ART were Latino, older age and men who have sex with men ($p < 0.05$). In multivariate Cox modeling, characteristics associated with delayed ART included homeless (Hazard Ratio [HR] = 0.78; 95% Confidence Interval [CI] = 0.63-0.96); and unknown insurance status (HR = 0.53; CI = 0.41-0.69) and no insurance (HR = 0.82; CI = 0.73-0.93). Conversely, factors associated with earlier ART initiation included Latino (HR = 1.35; CI = 1.19-1.52); public insurance (HR = 1.17; CI = 1.01-1.34); and older age (HR = 1.02; CI = 1.01-1.02). Conclusions: Some sociodemographic factors negatively affected receipt of timely ART. Structural interventions addressing homelessness and insurance type should be developed to alleviate treatment disparities.

* = Presenter; S = The work was completed while the presenter was a student

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SYSTEMATIC REVIEW OF HEPATITIS C INFECTION IN HEMODIALYSIS PATIENTS IN IRAN. SM Alaviana, *A Kabir, A Bahrami Ahmadi, K Bagheri Lankarani, MA Shahbabaie, M Ahmadzad-Asl (Research Center for Gastroenterology and Liver Disease, Baqiyatallah University of Medical Sciences; Nikan Health Researchers Institute, Tehran, Iran)

Background: Hemodialysis (HD) patients are recognized as one of the high risk groups for hepatitis C virus (HCV) infection. Prevalence of HCV infection varied widely between 5.5% and 24% among different Iranian populations. Preventive programs for reducing HCV infection prevalence in these patients need accurate information. In the present study we estimated HCV infection prevalence in Iranian hemodialysis patients. Methods: In this systematic review, we collected all published or unpublished documents related to HCV infection prevalence in Iranian HD patients from April 2001 to 2008. We selected descriptive/analytic cross-sectional studies/surveys that have sufficiently declared objectives, proper sampling method with identical and valid measurement instruments for all study subjects and proper analysis methods regarding sampling design and demographic adjustments. We used meta-analysis method to calculate nationwide prevalence estimation. Results: Eighteen studies from 12 provinces (consist 49.02% of Iranian total population) reported prevalence of HCV infection in the Iranian HD patients. The HCV infection prevalence in Iranian HD patients is 7.61% (95% CI: 6.06%–9.16%) with RIBA (Recombinant Immunoblot Assay) method. Conclusion: HCV infection prevalence in Iranian HD patients is among countries with lower ones.

1065

CHARACTERISTICS OF MALES INFECTED WITH COMMON NEISSERIA GONORRHOEA SEQUENCE TYPES—SAN FRANCISCO, 2009. J L Marcus, P M Barry, *K T Bernstein, M W Pandori, S Buono, D Hess, S S Philip (San Francisco Department of Public Health, San Francisco, CA)

Molecular typing of *Neisseria gonorrhoeae* can be combined with epidemiologic data to help characterize sexual networks and monitor population-level changes in the organism. We conducted a retrospective, cross-sectional study of urethral gonorrhea specimens collected from symptomatic males at San Francisco's municipal sexually transmitted disease clinic during 2009 to describe characteristics of patients infected with common sequence type (ST) families. Isolates were typed using *N. gonorrhoeae* multiantigen sequence typing (NG-MAST) and grouped by similarity (identical basepairs). Of 266 isolates, 153 (57.5%) were clustered in 6 common ST groups: ST2992 ($n = 60$), ST3935 ($n = 25$), ST4254 ($n = 24$), ST730 ($n = 20$), ST28 ($n = 13$), and ST1407 ($n = 11$). Of those isolates, 122 (79.7%) were from men who have sex with men (MSM). Compared with heterosexual males, MSM were more likely to be infected with ST2992 (44.3 vs. 19.4%), ST3935 (20.5 vs. 0%), ST730 (13.9 vs. 9.7%), and ST28 (9.8 vs. 3.2%) ($P < .001$). MSM reporting fellatio as their only urethral exposure in the prior 3 months were more commonly infected with ST2992 (62.5 vs. 35.7%), and less commonly infected with ST730 (0 vs. 19.1%) and ST28 (3.1 vs. 13.1%), compared with MSM reporting other types of sex ($P = .024$). Among MSM, ST group was also associated with race/ethnicity ($P < .001$) and a mosaic *penA* gene previously linked to decreased oral cephalosporin susceptibility (100% infected with ST1407; $P < .001$). These data suggest that San Francisco has distinct *N. gonorrhoeae* transmission networks that are characterized by different sexual behaviors and markers of antimicrobial resistance.

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A META-ANALYTIC APPROACH TO ESTIMATING THE RELATION BETWEEN INITIATING CD4 COUNT AND MORTALITY. *M P Fox, O Mearthy, M Over (Boston University, Boston, MA)

To estimate the impact of increasing starting CD4 count on mortality, we estimated 1-year mortality rates on antiretroviral therapy (ART) and propose a new method for adjusting for mortality among those lost to follow-up (LTFU). We identified reports of mortality by initiating CD4 count on ART. For each reported CD4 strata we recorded the 1-year mortality and % LTFU. Exact CD4 values were estimated for all CD4 strata using multiple imputation. We regressed the log of mortality adjusted for LTFU on the log of initiating CD4 count (as a continuous predictor) using meta-analysis weighting by sample size and varied mortality among those lost from 0-100%. We included 23 reports of data on 62,159 patients from 13 countries and 61 CD4 count observations. Reported 1-year mortality ranged from 0.14% to 40% and 1-year LTFU ranged from 0.3% to 24%. Ignoring mortality among those lost, those with a CD4 count ≤ 200 cells/mm³ predicted 1-year mortality was $> 4\%$ and increased sharply with lower CD4 count. The best fitting model occurred assuming mortality among those lost was 60%. In this model, predicted mortality was higher with less reduction in mortality associated with increasing baseline CD4 count. Predicted 1-year mortality among those with a baseline CD4 < 200 cells/mm³ and > 500 was between 9-13.4% and $< 7\%$ respectively. Comparing those starting ART < 500 to those at 50 cells/mm³, 1-year mortality was reduced by half (13.4 vs. 6.8%). Regardless of CD4 count, mortality was roughly twice that in the model ignoring patients lost (CD4 50 cells/mm³: 13.3% vs. 7.4% respectively and 500 cells/mm³: 6.8 vs. 3.0% respectively). Our findings demonstrate patients initiated at lower CD4 counts are still at highly increased risk of death over 1-year on ART.

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WITHDRAWN

1068-S

EXCESS HIV DEATHS ASSOCIATED WITH LIVING IN STATES WITH HIGH CASE-FATALITY RATES, 37 U.S. STATES, 2001-2007. *D B Hanna, R M Selik, T Tang, S J Gange (Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205)

US HIV case-fatality rates vary almost three-fold by state of residence. National policy priorities aim to reduce such disparities. We combined vital statistics and HIV surveillance data from 37 states to calculate the population attributable fraction (PAF) and excess deaths associated with states with higher versus lower rates, to estimate how many deaths could be prevented if rates were reduced to those in states in the lowest quartile. Numerators for rates were deaths due to HIV disease reported on death certificates in 2001-2007 among state residents, and denominators were cumulative diagnoses of HIV infection reported to HIV surveillance programs among state residents alive at the start of each year. The PAF was estimated by $1 - \sum(p_i/RR_i)$, where p_i = proportion of deaths in each quartile i and RR_i = relative case-fatality rate for i modeled by negative binomial regression adjusting for age, sex, race/ethnicity and year. From 2001 through 2007, 60,223 residents of the 37 states died due to HIV disease, based on 3,096,729 HIV-infected person-years. Compared with rates in the lowest quartile, RRs in the three highest quartiles were 1.76 (95% confidence interval [CI] 1.70-1.82), 1.49 (CI 1.44-1.53) and 1.22 (CI 1.17-1.27) respectively. Over 1/4 of deaths due to HIV disease (26.9%, CI 25.3-28.6) could be hypothetically prevented if rates in states with higher rates were reduced to those in states in the lowest quartile, representing 5,669 deaths overall or 809 deaths annually. The PAF ranged from 10.5-33.8% depending on choice of reference group. Understanding the factors leading to state-level differences is crucial to addressing these disparities and reducing preventable HIV deaths nationally.

1069-S

META-ANALYSIS OF RANDOMIZED TRIALS OF PROPHYLACTIC ACYCLOVIR AND HIV-1 VIRAL LOAD AMONG INDIVIDUALS CO-INFECTED WITH HSV-2. *C Ludema, S R Cole, C Poole (University of North Carolina, Chapel Hill, NC 27599)

We summarize the randomized evidence regarding the association between acyclovir use (or its prodrug valacyclovir) and HIV-1 disease progression among individuals co-infected with HSV-2. In June 2010, we searched multiple databases for published trials using search terms: "HIV" or "AIDS", "HSV" or "herpes simplex virus", and "acyclovir" or "valacyclovir". Seven trials met the inclusion criteria including reporting viral load as an outcome, acyclovir use as prophylaxis among individuals co-infected with HIV-1 and HSV-2 who were ineligible for highly active antiretroviral therapy. The random-effects summary estimate of the mean viral load difference was $-0.33 \log_{10}$ copies/mL (95% confidence interval -0.56 to -0.10 , 95% population effects interval: -0.74 to 0.08), translating to an approximate halving of plasma viral load. However, there was marked heterogeneity among studies (homogeneity P value < 0.001) so a single summary estimate may be inappropriate. Stratified and meta-regression analyses found larger decreases in viral load in trials with older median age, valacyclovir, higher compliance, earlier publication date, and shorter treatment length. These meta-regression analyses, of necessity unadjusted because of the small number of trials, are prone to meta-confounding and should be interpreted with caution. The inverse trend in the association with publication year and results from a trim-and-fill imputation method suggest there may be publication bias. In the absence of publication bias, current evidence suggests a favorable effect of acyclovir on plasma HIV-1 viral load among those co-infected with HSV-2, but the observed heterogeneity suggests this effect may only apply to unidentified subgroups.

1070-S

WITHDRAWN

1072-S

ENVIRONMENTAL RISK FACTORS FOR MYCOBACTERIUM AVIUM COMPLEX(MAC) LUNG DISEASE IN HIV-NEGATIVE ADULTS. *M Ashworth Dirac, A Lakey, K Horan, D Park, K Winthrop, J S Meschke, N S Weiss, G A Cangelosi (University of Washington, Seattle, WA 98195)

Background: There is evidence that the incidence of Mycobacterium avium complex (MAC) lung disease is increasing in North America, particularly in older, HIV-negative adults. Several host traits have been identified as risk factors. Potential environmental and behavioral risk factors have been proposed, including exposure to MAC in drinking water and soil, but none have been evaluated in an epidemiologic study. Methods: Cases are recruited from three academic medical centers and via informal referrals from community practices in Washington and Oregon. Controls are recruited via random-digit dialing and matched to cases by age, gender and the first seven digits of telephone number. Exposures of interest include aerosol-generating activities in the home and garden and MAC in home tap water, soil, and bathroom aerosols. Behavioral exposures are measured by interview, as are suspected confounding and effect-modifying variables. Presence of MAC is assessed by sample collection and microbiologic culture. By the study's end, 50-75 matched case-control pairs are anticipated. Among the 41 cases for whom data-collection is complete, the average age is 70 (range 45-94); 78% are female; 95% are white and 5% are Asian. Associations will be measured as odds ratios, and multivariate logistic regression will be employed to adjust associations for confounders. Smoking, preexisting lung disease and gender will be evaluated as potential effect-modifying variables. This study will be the first to examine these potential risk factors for MAC by comparing similarly ascertained exposure histories in a broad group of cases and controls.

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WITHDRAWN

1073-S

COMPARISON OF THREE VERSUS FOUR DRUGS AS INITIAL HAART. *M A Jhaveri, S R Browning, H Bush, A Thornton, R N Greenberg (University of Kentucky, Lexington, KY 40536)

Background: Although established in controlled studies that there is no advantage to 4-drug highly active antiretroviral therapy (HAART) or regimens with or without protease inhibitors (PIs), we questioned this finding in a clinical setting (ie, no inclusion criteria). Methods: This is a single clinic retrospective cohort study that included all patients over 18 years who started HIV treatment after 1998. Data collected from subject's medical records during their first year of HIV treatment. A viral load < 400 copies/mL at the end of the first year of HAART was considered a successful primary outcome. Analyses used chi-square for categorical variables and T-test for continuous variables. Multiple logistic regressions were performed to control for potential confounding variables. Results: 190 subjects were available for analysis with 168 attaining a viral load < 400 copies/mL at the end of a year of HAART; 111 of 129 (86%) that used 3-drugs and 57 of 61 (93%) that used 4-drugs succeeded (P = 0.13). 60 of 72 (83%) who used a PI vs. 108 of 118 (92%) who did not use a PI succeeded (P = 0.08). Controlling for baseline viral load, there was no difference in outcome or percentage change in CD4 counts whether 3- or 4-drugs were used or if a PI was used. Multiple logistic regression analysis did not identify any significant variables for a successful outcome except male gender and exposure time. Failures were due to side effects (50%), non-adherence (45%), and drug allergy (5%). Conclusions: These results support current guidelines of 3-drug HAART as initial treatment. It is apparent there is no additional benefit derived from 4-drug HAART over 3-drug HAART as initial treatment and initial HAART without a PI was as successful as with a PI.

1074

EFFECT OF ADMINISTRATION OF HBIG DURING PREGNANCY ON HBV INTRAUTERINE INFECTION IN TAIYUAN, CHINA. *S-P Wang, Ting Hu, Tao Ji, J-N Wei, Bo Wang, L-P Feng (Department of Epidemiology, Shanxi Medical University, Taiyuan, Shanxi, 030001 China)

The aim of the study is to evaluate the role of administration of hepatitis B immunoglobulin (HBIG) during pregnancy in prevention hepatitis B virus (HBV) intrauterine infection in newborns of hepatitis B surface antigen (HBsAg) positive women. 832 asymptomatic HBsAg positive pregnant women who were consecutively collected and administered with HBIG during late pregnancy from August, 2003 to December, 2008. The pregnant women were injected with HBIG 3 times or more during pregnancy as multiple injections of HBIG group and others as control. HBsAg and HBV DNA in HBsAg positive mothers and their newborns were detected with ELISA and RT-PCR. HBV intrauterine infection occurrence was defined if the HBsAg and/or HBV DNA of newborns were positive in their serum. The total proportion of multiple injections of HBIG in HBsAg positive pregnant women was 54.09% (450/832) and it was gradually increased from 40.40% to 64.80% from 2003 to 2008 (trend $\chi^2 = 21.321$, $P < 0.001$). The rate of HBV intrauterine infection in newborns was 9.25% (77/832) and its range was between 8.00% and 10.00% with no significant difference. 9.11% (41/450) in newborns of multiple injections of HBIG group and 9.42% (36/382) in control were detected as occurrence of HBV intrauterine infection and the difference was non significant by Chi-square test. 53.20% (41/77) of mothers whose infants had HBV intrauterine infection and 54.20% (409/755) of mothers whose newborns had not HBV were administered with HBIG three times or more during pregnancy. There was no significant difference between them. It is suggested the protective effect of HBIG administration during pregnancy to prevent HBV intrauterine transmission is not found.

1076-S

PREVALENCE OF HEPATITIS B AND C AMONG PREOPERATIVE CATARACT PATIENTS OF KARACHI. *E U Siddiqui and S S Naeem (Dow University of Health Sciences, Karachi, Pakistan 74200)

Both hepatitis B and C are serious public health problems and among the leading causes of morbidity and mortality, worldwide as well as in Pakistan. We intended to find out the prevalence of hepatitis B and C among preoperative cataract patients in Civil Hospital, Karachi. It is hypothesized that a high proportion of patients undergoing elective cataract surgery are infected with hepatitis B and C, with majority being asymptomatic. Thus, it is imperative to come up with frequency along with factors to design strategies to decrease the burden and adverse effects associated with this disease, which has harmful sequelae. A descriptive study was conducted among 240 patients presenting for cataract surgery to Civil Hospital, Karachi. The patients were screened for Hepatitis B and C infections and findings were recorded on a structured compilation sheet. Diagnosis was made on the criteria that a patient must be positive for either HBsAg or Anti-HCV, or both. Convenience sampling was done to recruit the participants aged 18 years and above after getting written informed consent. Overall, 5 out of 235 (2.13%) patients were found to be HBsAg positive and 29 out of 239 (12.13%) were Anti-HCV positive. Only 1 patient had a co-infection with both HBsAg and Anti-HCV positive. This shows that high proportion of Hepatitis B and C are reported among preoperative cataract patients of Karachi. Routine serological screening prior to surgery should be made mandatory so that standard precautions could be taken to avoid hazards and asymptomatic carrier patients would no longer pose a threat to its spread. Key health messages regarding preoperative screening may help in curtailing the burden of this disease which has adverse consequences.

1075-S

TRANSMISSION DYNAMIC MODEL TO PREDICT THE IMPACT OF BEHAVIORAL INTERVENTIONS ON HIV/AIDS PREVALENCE IN UGANDA. *A Owora and H Carabin (Oklahoma University Health Sciences Center, Oklahoma City, OK 73104)

The HIV sero-prevalence among pregnant women is used as a surrogate measure of overall prevalence in Uganda and in most low income countries. Using surveillance data, the objective of this study was to replicate prevalence trends observed since 1985 through to 2005 and explore potential impacts of various behavioral prevention strategies to identify the strategies with the largest effectiveness in reducing HIV prevalence in both the short and long term. We developed a simple deterministic mathematical model of HIV transmission dynamics including two risk groups. Data from the HIV sero-prevalence surveys among pregnant women from 1985-2005 and the Sero-Behavioral Survey conducted in 2004-2005 among selected sites in Uganda were used to parameterize the model. The impact of condom use, rate of sexual partner changes and reduction of number of sexual partners assuming different mixing patterns, levels of antiretroviral therapy (ART) coverage, and varying parameter estimates on prevalence levels were investigated over time. Our model simulation estimates closely replicate observed sero-prevalence trends reported in the literature for the period 1985-2005. Decreasing partner change rate especially in the high activity groups had a greater impact on lowering the overall prevalence estimates in both the short and long term than condom use assuming other model parameters remained constant. Irrespective of the year of initiation of either intervention, partner change rate had a more substantial overall impact on HIV prevalence projections. Our simulations show that without efforts targeted at decreasing partner change rate, the effects of condom use and ART on prevalence projections are negligible.

1077-S

CORRELATES OF HIV TYPE 1 AND TYPE 2 SHEDDING IN THE ORAL CAVITY IN THE PRESENCE OF MISSING DATA AND MULTIPLE DETECTION LIMITS. *P B Pavlinac, G S Gottlieb, A Gaye, C F N Diaye, C W Critchlow, P S Sow, Q Feng, NB Kiviat, S E Hawes (University of Washington, Seattle, WA 98195)

To quantify the burden and correlates of human immunodeficiency virus type-2 (HIV-2) and HIV-1 RNA in the oral cavity, 190 ART-naïve HIV positive Senegalese adults received clinical and oral exams and provided blood and oral wash samples for viral load and plasma CD4 count ascertainment. We used interval regression to identify univariate and multivariable associations between oral HIV RNA and various immuno-virologic, local, and demographic factors in the presence of multiple detection limits that differed based on assay and HIV-type. Imputation by Chained Equations (ICE) was also used to multiply impute the missing values for model covariates. Presence of detectable oral HIV RNA was less common in HIV-2 infected compared to HIV-1 infected study participants (33% vs. 67%, p -value < 0.05). HIV-type was no longer associated with oral shedding of HIV when plasma viral load and CD4 count were considered. In multivariable analysis, increased plasma viral load ($\beta = 0.47$, 95%CI: 0.34, 0.59 per \log_{10} increase), presence of periodontal disease ($\beta = 0.42$, 95%CI: 0.09, 0.74), more advanced stage of HIV-disease ($\beta = 0.24$, 95% CI: 0.04, 0.44 per stage), and decreased age ($\beta = -0.03$, 95%CI: -0.04, -0.01 per year) were each associated with (\log_{10}) increases in salivary HIV viral load. Similar to shedding of HIV in other bodily compartments, both systemic and local factors are associated with shedding of HIV in the oral cavity. Finally lower levels of HIV-2 in the oral cavity, compared to HIV-1, appear to be a consequence of lower overall viral burden.

1078

THE EFFECT OF EFAVIRENZ VERSUS NEVIRAPINE-CONTAINING REGIMENS ON ALL-CAUSE MORTALITY OF HIV PATIENTS. *L E Cain, M A Hernán for the HIV-CAUSAL Collaboration (Harvard School of Public Health, Boston, MA 02115)

Most HIV guidelines recommend first-line regimens consisting of a non-nucleoside reverse transcriptase inhibitor with ≥ 2 nucleoside reverse transcriptase inhibitors (NRTIs). The results of observational studies, but not randomized clinical trials, suggest benefits of efavirenz (EFV) over nevirapine (NVP)-containing regimens. However, many of these studies had small sample sizes and short follow-ups. We used observational data from the HIV-CAUSAL Collaboration to address this issue. Antiretroviral-therapy naïve individuals were followed from the time they started a NRTI, EFV or NVP, and were given 6 months to complete a regimen consisting of ≥ 2 NRTIs plus either EFV or NVP. Individuals were classified as following one or both types of regimens at baseline, and were censored when they started an ineligible drug or at 6 months if they had not yet completed their regimen. We used inverse probability weighting to adjust for potential bias introduced by censoring. Under the assumption of no unmeasured selection bias and unmeasured confounding, we estimated the "intention-to-treat" mortality hazard ratio for NVP versus EFV regimens via a weighted Cox model that adjusted for baseline covariates. 14381 individuals initiated EFV regimens (4277 were censored within 6 months) and 8467 individuals initiated NVP regimens (3763 were censored within 6 months). During a median follow-up of 14 months, 292 of those who initiated EFV regimens and 202 of those who initiated NVP regimens died, respectively. The mortality hazard ratio (95% confidence interval) for NVP versus EFV regimens was 1.40 (1.13, 1.74). In conclusion, our findings suggest a 40% survival advantage of EFV over NVP.

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WITHDRAWN

1080-S

EXAMINING HEALTH CARE PRIORITIES AND CARE SEEKING BEHAVIORS AMONG MEN WHO HAVE SEX WITH MEN. *M Lowe, L Payne (University of Utah, Salt Lake City, UT 84108)

The Centers for Disease Control and Prevention recommends annual HIV testing in health care settings for men who have sex with men (MSM). These recommendations in part depend on MSM placing value on routine medical care and then subsequently being able to access medical care services. Using data from a 2009 state-wide, cross sectional survey of 986 MSM, we examined the relationship between having a primary care provider and the priority placed on health issues among MSM. Overall significant differences were identified between persons with regular health care providers and those without among respondents of different race/ethnicity and age groups ($p < 0.001$ and $p = 0.037$ respectively). The groups with the highest proportion without primary medical care providers were Hispanics (48% without a provider), Native Americans (53%), and the 20 and under age group (54%). Rank-ordered priorities were grouped into health and non-health priorities. The overall health priority category included HIV/AIDS, physical health, mental health, fitness, and STDs as priorities. After ranking the primary concerns, the following were consistently among the top priorities: money/finances, health, family, and job/school. For respondents who ranked health-related issues as their top priority, 68% had a primary care provider. These findings suggest that more effective methods need to be developed to link MSM with primary medical care providers.

1081-S

JOINT EFFECTS OF ALCOHOL CONSUMPTION AND SEXUAL RISK BEHAVIOR ON HIV SEROCONVERSION IN MEN WHO HAVE SEX WITH MEN. *P M Sander, S R Cole, D G Ostrow, L M Johnson-Hill, R K Bolan, R Stall, L P Jacobson (University of North Carolina, Chapel Hill, NC 27599)

Previous findings linking alcohol and HIV seroconversion among men who have sex with men have been inconsistent despite the well-recognized link between alcohol consumption and high risk sexual behavior. We apply marginal structural models to estimate the hazard of HIV seroconversion due to the joint effects of alcohol consumption and the number of partners with whom unprotected receptive anal intercourse is practiced (henceforth, partners). At entry, 3,725 HIV seronegative men enrolled in the Multicenter AIDS Cohort Study had a median age of 33 years (quartiles: 28, 40), 94% were White and 77% used illicit drugs. Baseline self-reported alcohol consumption was a median 8 (2, 16) drinks per week and 30% reported > 1 partner. Between 1984 and 2008, there were 529 HIV seroconversions in 35,870 person-years of follow-up. A joint marginal structural model with inverse-probability weights for alcohol consumption, partners, death and censoring was fit accounting for age, race, ethnicity, study site, depression (Center for Epidemiologic Scale Depression score > 16), college graduation, smoking and any drug use. Hazard ratios (95% confidence intervals) for heavy (> 14 drinks/week) and moderate drinking (1-14 drinks/week) compared to abstinence were 1.8 (1.2, 2.7) and 1.2 (0.8, 1.6), respectively (P value for trend = 0.002). The hazard ratios for heavy drinking compared to abstinence among participants with > 1 , 1 or no partners were 1.5 (0.8, 2.9), 1.8 (0.8, 3.9) and 1.8 (1.0, 3.2), respectively (P value for interaction = 0.740). In conclusion, we found an association between heavy alcohol consumption and HIV seroconversion; this association did not differ by the number of risky sex partners.

1082-S

TRENDS AND RISK FACTORS FOR NEWLY REPORTED HEPATITIS B AND C INFECTION IN VANCOUVER, BC. *R A Schmidt, T Chu, S Forsting, and J Sandhu (Vancouver Coastal Health, Vancouver, BC, Canada)

To investigate risk factors and trends for infection, all newly reported acute and chronic hepatitis B (HBV) (N = 4,479) and C (HCV) (n = 4,038) cases collected through routine surveillance between 2003-2009 in Vancouver were analyzed. Cases were matched by postal code to 2005 census data to obtain proxy measures for socioeconomic status (SES). Risk and demographic information of cases from the Downtown East Side (DTES) was compared with all other Vancouver cases. Odds ratios (OR) and 95% confidence intervals (CI) were calculated, and $p < 0.05$ was considered statistically significant. Reports of acute and chronic HBV decreased from 2003. Chronic HCV cases decreased, but acute HCV increased from 2003-2009 (from 3.4 to 4.5 per 100,000 population). Sixty-seven percent of HBV cases originated from endemic areas. Sexual risk factors were most frequently reported for acute and chronic cases of HBV. The second most reported risk factor for acute cases was a history of health care risks, followed by injection drug use (IDU) and non-injection drug use (NIDU). The most commonly reported risk factor for acute and chronic HCV cases was a history of IDU. NIDU was the second most commonly reported risk factor for both acute and chronic HCV, but a larger proportion of acute cases (40% vs. 19%) reported a history of NIDU. The census areas in the lowest SES quartile reported the highest rate of new infection across the SES indicators for HBV and HCV. DTES cases of HCV were significantly more likely to be male (OR = 1.22; CI = 1.07-1.39), report a history of IDU (OR = 2.51; CI = 2.14-2.96) and NIDU (OR = 1.39; CI = 1.17-1.67). Vancouver faces challenges with HBV and HCV due to high rates of injection drug use and immigration from hepatitis endemic countries.

1084

ON THE LINK BETWEEN SUFFICIENT-CAUSE MODEL AND POTENTIAL-OUTCOME MODEL. *E Suzuki, E Yamamoto, and T Tsuda (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Okayama, Japan)

The sufficient-cause model and the potential-outcome (= counterfactual) model have now become cornerstones for causal thinking in epidemiology. The link between these 2 models has been discussed, but the correspondence has not been fully enumerated. The present study gives a link between these 2 models under 2 binary causes and a binary outcome, showing a complete enumeration between 512 risk-status patterns (in the sufficient-component cause framework) and 16 response types (in the potential-outcome framework). Although a particular risk-status type in an individual suffices to fix a response type, the converse is not true. Indeed, potential outcomes are quantities specific to individuals, whereas sufficient-cause model refers to mechanisms. Such consideration gives further insight for the assumption of "positive monotonic effect" in the potential-outcome framework, which should be clearly distinguished from the assumption of "no preventive action" in the sufficient-component cause framework. Our explication would also facilitate understanding of the recent findings on the identifiability of particular sufficient causes and response types. Consideration of the correspondence between the 2 models should allow greater insight to facilitate use of each model in the appropriate contexts, clarifying the strengths of each model. As the duality between the 2 models shows, the different approaches of causality provide complementary perspectives, and can be employed together to improve causal interpretations.

1083

CAUSAL MEDIATION ANALYSIS FOR DICHOTOMOUS AND TIME-TO-EVENT OUTCOMES. *T J VanderWeele (Harvard School of Public Health, Boston, MA)

For dichotomous and time-to-event outcomes, we discuss when the standard approaches to mediation analysis employed in epidemiology and the social sciences are valid. Using ideas from causal inference, we provide alternative mediation analysis techniques when the standard approaches will not work. We extend definitions of controlled direct effects and natural direct and indirect effects from the risk difference scale to the odds ratio scale, hazard ratio, survivor function and expected survival time scales. A simple technique to estimate direct and indirect effects on each scale by combining logistic, accelerated failure time or proportional hazards regression for the outcome and a separate regression for the mediator is described. The logistic and proportional hazards approach requires an assumption of rare outcome. Further discussion is given as to how this mediation analysis technique can be extended to settings in which data come from a case-control study design. For the standard mediation analysis techniques employed in the epidemiologic and social science literatures to be valid, an assumption of no interaction between the effects of the exposure and the mediator on the outcome is needed. The approach presented here, however, applies even when there are interactions between the effects of the exposure and the mediator on the outcome. The results are illustrated by assessing what proportion of the effect of genetic variants on 15q25.1 on lung cancer is mediated by smoking.

1085

MARGINAL STRUCTURAL MODELS FOR CASE-COHORT STUDY DESIGNS TO ESTIMATE THE EFFECT OF ANTIRETROVIRAL THERAPY INITIATION ON INCIDENT AIDS OR DEATH. *S R Cole, M G Hudgens, P C Tien, K Anastos, L Kingsley, J S Chmiel, L P Jacobson. (University of North Carolina, Chapel Hill, NC 27599)

To estimate the effect of antiretroviral therapy initiation on incident AIDS or death in a cost-efficient manner, the authors combined a case-cohort study design with inverse probability weighted estimation of a marginal structural Cox proportional hazards model. 950 HIV-1 positive adults were followed in two US cohort studies between 1995 and 2007. In the full cohort 211 incident AIDS cases or deaths occurred during 4456 person-years of follow up. In an illustrative 20% random subcohort of 190 participants, 41 AIDS cases or deaths occurred during 861 person-years. Accounting for measured confounders and determinants of drop out by inverse probability weighting, the full cohort hazard ratio was 0.41 (95% confidence limits: 0.26, 0.65) and the case-cohort hazard ratio was 0.46 (95% confidence limits: 0.25, 0.84). Standard multivariable-adjusted hazard ratios were closer to the null regardless of study design. The precision lost with the case-cohort design was modest given cost savings. Results from Monte Carlo simulations demonstrated that the proposed approach yields largely unbiased estimates of the hazard ratio with appropriate confidence limit coverage. Marginal structural model analysis of case-cohort study designs provides the epidemiologist with a cost-efficient design coupled with an accurate analytic method for research settings where there is time-varying confounding.

1086

CHOOSING BETWEEN LOGISTIC, LOG-BINOMIAL, AND LOG-POISSON REGRESSION FOR DICHOTOMOUS OUTCOMES. *K Kleinman (Harvard Pilgrim Health Care Institute, Boston MA 02215)

Logistic regression is a key tool for multivariate epidemiologic analysis. However, it results in odds ratios, which can be difficult to understand. Much effort has gone into attempts to avoid odds ratios. These attempts include rules of thumb suggesting that the odds ratio can be interpreted as a risk ratio if the proportions are small, simple formulae to convert the odds ratio to a risk ratio, and log-binomial models (a log link for a Bernoulli outcome in a generalized linear model setting). The latter approach frequently cannot be fit, and in such cases a log-Poisson model (a log link for a Poisson outcome) has been recommended. Regrettably, many papers describing these methods do not adequately discuss the costs of using them alongside the benefits of avoiding the odds ratio. I review the conceptual advantages and disadvantages of modeling the odds ratio, the risk ratio, and of modeling the probability directly. The latter approach corresponds to using the identity link for a Bernoulli outcome. I proceed to describe a novel graphical diagnostic tool which can help researchers choose between the logistic, log-binomial, log-Poisson, and probability models. The idea is to plot the jittered outcome and the predicted probability against the linear predictor resulting from the model, along with a smoothed line. A good fit for the model is reflected by a smoothed line that resembles the predicted probabilities. Software to implement the diagnostic plot has been developed in SAS and in R, and can provide side-by-side comparisons of the models. This will allow researchers to consider how well the model fits as well as how to interpret the results, when choosing a modeling approach.

1088

A DYNAMIC POPULATION MODEL TO ESTIMATE THE POTENTIAL EFFICACY OF TOBACCO HARM REDUCTION APPROACHES. *A Bachand, S Sulsky (Environ, Amherst, MA 01002)

The potential for harm reduction to result from replacing 0 to 100% of smoked cigarettes with smokeless tobacco has received considerable attention. This paper introduces a model that estimates changes in hypothetical population mortality associated with different tobacco exposure scenarios. We created a computer simulation that estimates mortality for a hypothetical population of persons who have never used tobacco and who, as they age, transition into and out of different tobacco exposure states, including current and former smoking or smokeless tobacco use. Markov Chain Monte Carlo techniques estimate the variability of the results. All model inputs, including population exposure and mortality parameters for the base-case; relative hazards for various tobacco products; and age-specific transition probabilities, are user-specified. The model allows for 33 transitions into and out of tobacco exposure states, tracks individual exposure histories, and estimates age- and exposure-history-specific all-cause or cause-specific mortality. For each age group and at the end of follow-up, the model estimates the number of survivors comparing the base-case with hypothetical future exposure distributions, and calculates the difference between the two results. The model was tested against actual life tables, with population-specific exposure transition probabilities derived from the literature, and it produced comparable results. This model's main strengths are its comprehensiveness and flexibility. We expect it to be useful for development of harm reduction policies, because it will help to clarify assumptions underlying the various policies being considered.

1087-S

COMPARING GROWTH CURVE AND LATENT CLASS MODELS OF DEPRESSIVE SYMPTOMS IN MOTHERS OF CHILDREN WITH EPILEPSY. *M A Ferro and K N Speechley (The University of Western Ontario, Department of Epidemiology and Biostatistics, London, ON, Canada N6A 5C1)

Two common approaches for studying trajectories of change are standard growth curve modeling (GCM) and latent class growth modeling (LCM). The objectives were to examine the value and compare the results of GCM and LCM in predicting average and individual trajectories of depressive symptoms in a sample of mothers of children with epilepsy. Data were obtained from the Health-related Quality of Life in Epilepsy Study. A total of 258 mothers were assessed four times over a 24-month period. Depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale. Both GCM and LCM adequately described the average trajectory of maternal depressive symptoms; however, there was considerable variation in capturing individual trajectories in both models. For approximately 20% and 7% of individuals, both models over and underestimated depression scores by 3-5 points, respectively. Findings from the two modeling strategies were quite different: GCM suggested a modest change in depressive symptoms over time with paradoxical findings depending on the model selected. Results from the LCM suggested five distinct trajectories of depressive symptoms: sub-clinical, low stable, borderline, moderate increasing, and high decreasing. The sub-clinical group most closely resembled the trajectory observed from GCM. Although GCM and LCM perform equally well in predicting average and individual trajectories of change, they are used most efficiently under different circumstances. For data where individuals are expected to share a homogeneous trajectory GCM should be used; however, where individuals do not follow a common trajectory, LCM is a more appropriate modeling choice.

1089

IGNORING VARIABILITY IN TIMING OF DRUG ADMINISTRATION ATTENUATES HAZARD RATIOS. *V Stevens, E van Wijngaarden (University of Rochester, Rochester, NY 14642)

Previous studies of antibiotics use as a risk factor for *Clostridium difficile* Infection (CDI) have not accounted for complex changes in patients' exposure over time, and may have reported biased risk estimates. We analyzed data from a cohort of 10,154 hospitalizations occurring at Strong Memorial Hospital in Rochester, New York in 2005. Detailed antibiotic exposure information (including drug, timing, dose, frequency, and duration of administration) was available for all hospitalizations. The development of CDI within 60 days following discharge was determined using microbiological records. Age-adjusted marginal Cox proportional hazards models were constructed for two main exposures of interest: the total cumulative number of antibiotics, and drug classes (i.e. penicillin, cephalosporin, etc.) prescribed. In the time-invariant model, the total number of antibiotics (0, 1-2, 3-4, 5+) and specific antibiotic classes (any versus none) received during hospitalization were used to represent antibiotic exposures. In the time-variant model, these measures were allowed to vary on a daily basis. Relative bias is expressed the difference between the time-variant and time-invariant hazard ratio estimates as a percent of the time-invariant value. Models with time-variant exposures demonstrated improved fit relative to the time-invariant model based on Akaike Information Criterion. Of 15 estimates examined, 12 (80%) demonstrated relative bias ranging from 6.9 to 300%, with consistent attenuation of hazard ratios for time-invariant exposures. Attenuation was more pronounced for exposures with greater variability in timing of administration. Our results underscore the importance of accounting for exposure timing in multivariable survival analysis.

1090

SPLINES FOR TREND ANALYSIS AND CONTINUOUS CONFOUNDER CONTROL IN EPIDEMIOLOGIC RESEARCH. *C J Howe, S R Cole, D J Westreich, S Greenland, S Napravnik, J J Eron (University of North Carolina, Chapel Hill, NC 27599)

Spline regression often represents a more accurate alternative to standard linear, polynomial, or categorical analysis of continuous exposures and confounders. Use of splines remains limited in epidemiologic research. A full text search for the term "spline" in three high impact epidemiology journals between June 1990 and June 2010 yielded 450 papers corresponding to 3% of all PubMed indexed articles published in these three journals in that time. We present straightforward SAS code for fitting restricted quadratic splines (henceforth, splines) and illustrate its use in Cox proportional hazards models for trend analysis of an exposure and for control of a continuous confounder. We use data from the University of North Carolina Center for AIDS Research HIV clinical cohort on predictors of 59 deaths among 557 HIV-infected male participants observed after starting combination antiretroviral therapy between 1999 and 2010. In the first example, use of a spline revealed a non-linear relationship not always apparent using standard analysis. While a standard analysis implied a log-linear increase in the hazard of death with increasing HIV-1 viral load, the spline model indicated that the hazard of death did not substantially increase until higher HIV-1 viral loads. In the second example, use of a spline model to adjust for HIV-1 viral load resulted in the most pronounced attenuation of the crude association between CD4 cell count and death compared to standard analysis. This additional attenuation was likely due to improved confounder control. As such, splines can provide a less biased and more efficient approach to analysis of continuous exposures and confounders and are easy to implement in standard software.

1092

AN ASSESSMENT OF THE USE OF PROPENSITY SCORES TO REDUCE SELECTION BIAS RESULTING FROM THE USE OF A SAMPLING FRAME WITH INCOMPLETE COVERAGE OF THE STUDY BASE TO SELECT CONTROLS. *M C Walsh, A Trentham-Dietz, P A Newcomb, R Gangnon, and M Palta (University of Wisconsin, Madison, WI 53726)

Epidemiologists often comment on the adequacy of the sampling frames used to select cases and controls, but rarely evaluate the use of propensity scores to increase study validity when the sampling frame used to select controls has different coverage of the study base than the cases. Using data from the 2004-2008 Wisconsin Women's Health Study (WWHS), a population-based case-control study of breast cancer risk factors (N = 5385), we investigated the impact of selection bias due to using a master-list of licensed drivers with incomplete coverage (68%) of the study base to select controls by applying several established corrective methods. We compared published breast cancer odds ratio estimates to odds ratio estimates obtained after excluding cases that could not have been approached to serve as controls and after applying two propensity score methods to adjust for selection bias. In addition, we evaluated variations in odds ratio precision when several selection bias corrective methods were applied. We found little evidence of selection bias in the two published papers using WWHS data, but statistical conclusions drawn from one of the papers may have been different had this source of bias been evaluated. In our data, propensity score adjustment using a variable indicating the quintile of coverage produced log odds ratio estimates with the best precision compared to other evaluated correction methods of exclusion and propensity score weighting. All three methods produced log odds ratio estimates with a similar degree of bias correction.

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WITHDRAWN

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SIMULATION STUDY OF MULTIPLE LOGISTIC REGRESSION ESTIMATES FOR MULTIPLE CORRELATED EXPOSURES MEASURED WITH ERRORS. *A Mahboubi, M Abrahamowicz, J Siemiatycki (Research Centre of CHUM, University of Montreal, Montreal, QC, Canada, H2W 1V1)

Multivariate logistic regression has become the standard method of analysis of putative exposure variables in case-control studies of disease etiology. However its performance characteristics are not well-established in conditions characterized by: large numbers of exposure variables, rare exposures, highly correlated exposures and measurement error. The aim of this study was to assess the ability of the logistic regression to recover the true relative risk (RR) structure of the data, through simulations which mimic such real life data conditions. In the simulated data we assessed the performance of logistic regression by comparing point estimates, confidence intervals and p-values, based on 1000 samples. In general, the results of the logistic regression analyses reflected the true relative risk structure, but extreme conditions led to unreliable logistic regression estimates. We confirmed the well-known property that failure to account for true risk factors can lead to biased estimates in non-risk factors. More interestingly, we found that even when a true risk factor is included in the model, the RR estimates for other covariates can be biased, particularly when the prevalence of exposure of the true risk factor is low, its RR is high, and there is measurement error. Each of these conditions contributes to the distortions in RR, and not always in the same direction.

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WITHDRAWN

1096

BUILDING A DATABASE OF VALIDATED PEDIATRIC OUTCOMES. D Adams, L Simvakumar, H Nasser, S Surette, L Hartling, and *S Vohra (University of Alberta, Edmonton, AB, Canada)

Pediatric populations have increasingly been included in clinical research, which relies on the availability and use of appropriate outcome measurement tools. The objective of this study was to develop an inventory of valid and reliable pediatric outcome measurement tools. The top 6 general medicine journals and top 4 pediatric journals were searched for pediatric RCTs published since 2000. Searches identified 2229 unique references. Preliminary extraction of 61 RCTS has been completed; full results will be presented in June. Most (70%) were identified from pediatric journals, with ages ranging from 33 weeks gestation to 21 years. The most common condition studied was psychological disorders (12). A single intervention was tested in 57% trials and more than one intervention was tested in 22 trials (36%). Half (48%) reported one primary outcome, while 31% did not identify a primary outcome, and 13% identified more than one. We identified 79 different scale or questionnaire-type measurement tools, from 31 studies, that measured outcomes in 21 different conditions. For 41% of these 79 tools, authors provided information on psychometric properties and included relevant citations in 28% for these properties. The most commonly reported properties were reliability (59%) and validity (41%). A wide variety of pediatric outcome measurement tools are in use by researchers. Psychometric properties of measurement tools are inconsistently reported in pediatric RCTs, thus it is unclear to readers if the tools are of high quality. Developing a comprehensive database of validated pediatric outcome measures may facilitate use of high quality pediatric research.

1095

ESTIMATING GENERALIZED LINEAR MIXED MODELS VIA DIFFERENT METHODS: ARE MATCHING RESULTS LESS BIASED? *A Benedetti and J Atherton (McGill University, Montreal, QC, Canada)

Increasingly, data are collected in which the standard assumption of independence between observations is not met. Generalized linear mixed models (GLMMs) extend the linear mixed model to non-continuous outcomes and account for correlation in the data. The most commonly used methods to estimate the parameters in a GLMM, are penalized quasi-likelihood (PQL) and numerical integration via quadrature (QUAD). It remains somewhat unclear under what conditions good properties can be expected. In particular, when the number of clusters is small and variance across clusters is large, neither PQL nor QUAD are guaranteed to give good results. A common suggestion in this case is to compare the results from PQL and QUAD, with matching results suggesting that bias is minimal. The objective of this work was to evaluate this suggestion systematically via simulation study. A simulation study was conducted in which correlated data was generated while varying the number of clusters and number of subjects per cluster, inter-cluster variability, effect size, etc. The outcome was binary and the prevalence was also varied. Data were analyzed using GLMMs estimated via PQL or QUAD. Matching criteria based on estimated regression coefficients, odds ratios or variance components from PQL or QUAD were proposed and evaluated. Overall, absolute relative bias in estimated regression coefficients and variance components increased as the discrepancy between regression coefficients or variance components estimated via PQL or QUAD increased. However, it was difficult to find a rule that identified problematic estimates. The best results were obtained by classifying results as matching or non-matching based on estimated inter-cluster variability.

1097

STUDY OF NATURAL HEALTH PRODUCT ADVERSE REACTIONS (SONAR): PILOTING AN ACTIVE SURVEILLANCE MODEL IN COMMUNITY PHARMACIES. *S Vohra, K Cvijovic, H Boon, B Foster, W Jaeger, D LeGatt, G Cembrowski, M Murty, D Vu, R Leitch, R Tsuyuki, J Barnes, T Charrois, J Arnason, M Ware, R Rosychuk (University of Alberta, Edmonton, AB, Canada)

Many consumers use natural health products (NHPs) concurrently with prescription medications. As NHP-related harms are under-reported through passive surveillance, the safety of concurrent NHP-drug use remains unknown. The objective of this study was to assess the feasibility of active surveillance in participating community pharmacies to identify adverse events related to concurrent NHP-prescription drug use. Participating pharmacists asked individuals picking up prescription medications about (i) concurrent NHP/drug use in the previous three months and (ii) the presence of potential adverse events. If a potential adverse event was identified and the patient agreed, a research pharmacist conducted a guided telephone interview to gather additional information. Over a total of 112 pharmacy weeks, 2615 patients were screened, of which 1037 (39.7%; 95% CI: 37.8% to 41.5%) reported concurrent NHP and prescription medication use. A total of 77 patients reported a possible AE (2.94%; 95% CI: 2.4% to 3.7%), which represents 7.4% of those using NHPs and prescription medications concurrently (95%CI: 6.0% to 9.2%). Compared to passive surveillance, this study found active surveillance to markedly improve NHP adverse event reporting rates. Active surveillance is feasible and offers improved quantity and quality of adverse event data, allowing for meaningful adjudication to assess potential harms.

1098-S

INVERSE PROBABILITY WEIGHTING FOR MISSING COVARIATE DATA IN A MATCHED CASE-CONTROL STUDY. *M L Bertoia, A Baylin, J W Hogan (Brown University, Providence, RI 02912)

Background: This paper implements a new method, inverse probability weighting (IPW), to handle the problem of missing covariate data in a matched case-control study. IPW assumes missing at random given the weight model covariates. We compare results using IPW to those using complete case analysis and the indicator method, the most common methods used by epidemiologists. Methods: We calculated the weight for each matched pair as the inverse of the joint probability of missingness for both the case and the control. Therefore, pairs with a higher probability of missingness were weighted more heavily. We demonstrate our approach using an example of a matched case-control study of fish intake and risk of myocardial infarction (MI), where income is the covariate with missing information. Pairs with missing information were deleted for the complete case analysis. Pairs with missing information were not deleted and a missing indicator variable was included in the model for the indicator analysis. Results and Conclusions: Estimates of effect were quite different using the three methods: $\beta = -0.064$ (SE 0.048) using the indicator method, -0.076 (SE 0.002) using complete case analysis, and -0.092 (SE 0.014) using IPW. This may mean that more bias is introduced by methods like complete case analysis and the indicator method compared to inverse probability weighting. Bootstrap standard errors were smaller for IPW estimates compared to the indicator method meaning that IPW is more efficient. Although bootstrap standard errors were smallest for the complete case analysis, this method assumes income is missing completely at random which is unlikely.

1100-S

RESIDUAL CONFOUNDING IN FLEXIBLE MULTIVARIABLE SURVIVAL MODELS IN EPIDEMIOLOGIC STUDIES. *W Wynant, M Abrahamowicz (McGill University, Montreal, QC, Canada, H3A 1A2)

The accuracy of the conclusions on the association between risk factors and health outcomes depends critically on the validity of the statistical methods and the consistency of their assumptions with the data. Usually, epidemiologic studies using survival analyses are based on the conventional Cox's proportional hazards (PH) model. However, this model relies strongly on 2 restrictive parametric assumptions: (i) the PH assumption that implies that the effect of a factor remains constant during the follow-up, and (ii) the log-linearity assumption that implies that the logarithm of the hazard is a linear function of a continuous covariate. Abrahamowicz et al (Statistics in Medicine 2007;26:392-408) developed a flexible extension of the Cox model that allows the simultaneous estimation of potential non-linear and time-dependent effects of several inter-correlated risk factors. We aim to assess, in simulations, the performance of the extended Cox model in the presence of residual confounding due to the misspecification of non-linear and/or time-dependent effects of several continuous confounders and the exposure. Simulated data are generated under a variety of assumptions and sample sizes. The results will be compared with respect to their ability to recover the 'true' model used to generate the event times, and accuracy of the estimated effect of the exposure. Preliminary results suggest that residual confounding affects inference about the exposure and its non-parametric effects in two ways: (1) by failing to account for the other non-parametric effect of the exposure ("self-confounding") and (2) by failing to adjust for the non-parametric effects of other continuous confounders ("standard-confounding")

1099-S

ADVANTAGES AND LIMITATIONS OF THE COMPREHENSIVE SMOKING INDEX IN CANCER STUDIES. *W Wynant, J Siemiatycki, and K Leffondré (CRCHUM, Montreal, QC, Canada H2W 1T8)

Smoking is a confirmed risk factor for many cancer sites. It is also a potential confounder in many relations and a potential effect modifier of exposures. However, its modelling is not simple as it may be represented by several components as duration, intensity and time since cessation (TSC). A comprehensive smoking index (CSI) has been recently proposed to account for these three aspects of smoking history into a single covariate. It has already been shown to fit well case-control data on lung cancer. However, the advantages or limitations of the CSI for adjusting for smoking or for investigating interaction with smoking have never been systematically investigated in cancer. This study compares the CSI with other standard approaches to adjust for smoking or to investigate interaction with smoking in cancer. We focus on the following possible exposure-cancer site associations: aromatic amines-bladder cancer, arsenic-colon cancer, polycyclic aromatic hydrocarbons-prostate cancer, insecticides-stomach cancer, and pesticides-lymphoma. The data came from a case-control study carried out in Montreal in 1979-1985 in males aged 35-70 years. It included from 215 to 746 cases depending on the cancer site, and 533 population controls. Smoking was represented using the CSI, the indicator of ever smoking only, or three separate smoking variables (indicator of ever smoking, cigarette-years, and TSC). We investigate the interaction between each exposure and each of these smoking metrics, and in case of null interaction, we compare the estimated effect of each exposure adjusted for each of the smoking metrics. Overall, the CSI provides more significant interaction tests, and a better adjustment for smoking for cancer sites strongly associated with smoking.

1101-S

EFFICIENCY OF THE CASE-TIME-CONTROL DESIGN: EMPIRICAL EVIDENCE FROM A CASE-CONTROL STUDY OF METHICILLIN RESISTANT *S. AUREUS* (MRSA) AND ANTIBACTERIALS IN CHILDREN. *V Schneider-Lindner, C Quach, J Hanley, S Suissa (McGill University, Montreal, QC, Canada)

Background: Infections with methicillin resistant *S. aureus* in the community (C-MRSA) are associated with antibacterials in children, but uncertainty from residual confounding remains. Within-subject designs can control time-constant unmeasured confounding but their efficiencies are generally lower, particularly for the case-time-control design. Objectives: (1) To re-investigate the association between antibacterials and C-MRSA from a case-control study using within-subject designs. (2) To evaluate the standard error (SE) of the odds ratio (OR) from case-time control analyses for varying control-to-case ratios and a small uniform time trend. Methods: We reanalyzed C-MRSA cases and matching controls from the UK General Practice Research Database, 1994-2007. We assessed exposure to antibacterial drugs 180-30 days (risk period) and 363-213 days (control period) before index date. ORs and SEs were estimated using conditional logistic regression in case-crossover and case-time-control analyses, the latter with increasing number of controls per case, weighted and unweighted for the control-to-case ratio. Results: 297 children had C-MRSA, 60 and 28 received antibacterials only during risk and control period respectively, leading to a case-crossover OR of 2.14, 95% confidence interval 1.37-3.36, SE 0.229. The case-time control OR was 2.01, its unweighted SE decreased from 0.326 with one control per case to 0.234 with all 9357 controls. Conclusions: Antibacterials and C-MRSA remain associated in within-subject analyses. While lower than the case-crossover's, the case-time-control design's efficiency based on SE can be close if the control-to-case ratio is large.

1102-S

PROPORTIONAL HAZARDS MODELS FOR ESTIMATING THE EFFECT OF OCCUPATIONAL EXPOSURES IN CASE-CONTROL STUDIES. *H Gauvin, K Leffondré and A Lacourt (Research Centre of the University of Montreal Hospital Centre, Montreal, QC, Canada)

In case-control studies (CCS) on cancer, occupational exposures to potential carcinogens typically vary over lifetime for each individual. Such exposures over lifetime are often assessed using job-exposure matrix. Usually, the effect of each specific exposure is estimated using a cumulative index of exposure at the index age in logistic regression (LR). Such a model does not account for the variation in exposure intensity over lifetime. Yet, for many carcinogens agents and cancer sites, it is plausible that the risk of cancer depends on the longitudinal patterns of exposure intensity. As an alternative to LR, a weighted Cox model (WCM) with time-dependent covariates can be used to better account for this variation of intensity over time. This study illustrates the advantage of the WCM to estimate the effect of occupational exposures in CCS. New versions of the WCM are first proposed; a simulation study is then conducted to investigate the performance of these versions compared to previous ones and standard LR; and the different models are finally applied to a French CCS on occupational asbestos exposure and pleural mesothelioma. Simulation results suggest that a new WCM systematically performs at least as well as standard LR, and better for some exposure distributions. The effects of different aspects of asbestos exposure (age at first exposure, intensity, duration, and time since last exposure) are estimated using all models. Results show some differences between the estimates of the different models that are discussed in the light of simulation results.

1104-S

TIME-VARYING PROPENSITY SCORES AND HAZARD RATIO ESTIMATION. *C Mack, R Glynn, T Stürmer (University of North Carolina, Chapel Hill, NC 27599)

Drugs that have recently arrived to market or have had publicized safety issues are likely to be channeled differently toward certain patient groups as information is disseminated. Propensity scores (PS) are usually estimated as one summary score over multiple calendar years. PS that allow for changes in channeling over time may be more appropriate to control for confounding. We evaluated changes in the ability of individual covariates to predict receiving new versus established treatment in a retrospective cohort study using linked Surveillance, Epidemiology and End Results (SEER)-Medicare data. The study included elderly patients with stage III colon cancer diagnosed between 2003-05. Patients receiving oxaliplatin ($n = 442$), known to be effective in 2003 and approved in 2004, were compared with those on a non-oxaliplatin regimen ($n = 1238$). We constructed overall and calendar year-specific PSs using multivariable logistic models, with race, age, sex, tumor grade, substage, income, and comorbidities as key components of the score. We compared hazard ratios (HR) and 95% confidence intervals (CI) adjusted for both PSs using Cox Models. Over a mean follow-up of 2.8 years, 563 patients died. Oxaliplatin treatment increased over time, 3% ($n = 17$) in 2003 vs. 56% ($n = 269$) in 2005. Men and patients with comorbidities became less likely to receive oxaliplatin over time, while the effect of age remained constant. The HR (95% CI) for mortality was 0.90 (0.63, 1.27) using an overall PS and 0.88 (0.62, 1.27) using calendar year-specific PSs. The propensity for treatment receipt due to key covariates changes as a product diffuses through the healthcare marketplace. These changes may affect confounding control with PSs, although in this specific setting, the treatment effect estimate seems unaffected.

1103-S

EXTENDING RECURRENCE-TIME MODELS OF PERIODIC SCREENING TO ACCOMMODATE TIME-VARYING INCIDENCE AND SENSITIVITY. *S Cristina Oancea and Timothy R Church (Division of Environmental Health Sciences, University of Minnesota School of Public Health, Minneapolis, MN)

An important aspect of mass-screening for chronic diseases like cancer and coronary artery disease is the amount of time by which diagnosis is advanced, viz., the lead time, by a program of testing at regular intervals. Prorok and others have developed models of periodic screening that couple a progressive disease model with a preclinical sojourn time distribution, $q(t)$, and simplifying assumptions of a constant probability, w , of initiating a preclinical disease phase and a constant sensitivity, β , over the course of the preclinical phase. Such recurrence-time models can be used to produce maximum likelihood estimates of the parameters of the lead-time distribution gained by screening a population. However, for many applications the assumptions that these are constants are unrealistic. For example, in many cancers, the incidence increases with age at an exponential rate and for many screening tests the sensitivity increases as the size or stage of the tumor increases, such as in lung cancer screening by radiography or colorectal cancer screening by occult blood tests. We undertook modification of the recurrence-time model of Prorok to incorporate an age-dependent preclinical incidence, $w(x)$, and a generation and screen dependent sensitivity function, β_{ij} . This provides a more realistic model of screening and allows more flexibly modelling the screening process for a wider array of screening situations. We validate the parameters by using maximum likelihood estimator and apply the estimators to data sets from the intervention arm of randomized trials. We illustrate the use of the method on data from a cancer screening trial.

1105

PROPENSITY SCORES AND GENERALIZED CONDITIONAL EXPOSURE MEAN MODELS FOR JOINT TOTAL EFFECTS, INTERACTION, AND MEDIATION ANALYSIS. *O A Arah (Department of Epidemiology, University of California, Los Angeles, CA 90095)

Propensity scores have become commonplace in epidemiologic research where they are often used to estimate single total effects. In this paper, I develop more formally the conditions under which propensity scores or more generally conditional expectation of the exposure (or conditional exposure mean models) can be used to estimate multiple, joint total effects. The paper also shows how propensity scores can be used for both interaction and mediation analysis in traditional regression models with covariate adjustment. Intuitive augmented directed acyclic graphs are introduced for guiding the choice of covariates, and graphically testing for covariate balance aimed at bias reduction. Some surprising results are obtained especially with respect to covariate selection for mediation analysis. Important differences in covariate selection between the exposure models used in marginal structural modeling and that used in propensity score covariate adjustment within traditional regression models are elaborated on. Simulations are used to illustrate the properties of the proposed estimators.

1106-S

THE INFLUENCE OF NEIGHBORHOOD FOOD STORES ON CHANGE IN YOUNG GIRLS' BODY MASS INDEX. *C W Leung, B A Laraia, M Kelly, D Nickleach, N E Adler, L H Kushi, I H Yen (University of California, San Francisco, CA 94118)

As childhood obesity rates have risen in past decades, attention has been given to how the neighborhood food environment affects children's health outcomes. This study examined how the presence of food stores within a girl's neighborhood affects three-year risk of overweight or obesity and change in body mass index (BMI). METHODS: A longitudinal analysis of 353 participants in the Cohort Study of Young Girls' Nutrition, Environment and Transitions was conducted using 2005-2008 data; girls were age 6-7 y at baseline. Food stores were identified from a commercial database, classified using 2006 industry codes, and standardized to counts per 1,000 persons. Generalized linear and logistic models were used to examine how availability of food stores within 0.25-mile and 1.0-mile network buffers of a girl's residence were associated with BMI z-score change and risk of overweight or obesity, adjusting for individual and household-level characteristics. RESULTS: Availability of convenience stores within a 0.25-mile buffer of a girl's residence was associated with greater risk of overweight or obesity (odds ratio (OR) 3.38, 95% confidence interval (CI) 1.07-10.68) and an increase in BMI z-score ($\beta = 0.13$, 95% CI 0.00-0.25). Availability of produce vendors/ farmer's markets within a 1.0-mile buffer of a girl's residence was marginally associated with overweight or obesity (OR 0.22, 95% CI 0.05-1.06). A significant trend was also observed between produce vendors/ farmer's markets and lower risk of overweight or obesity after three years of follow-up. CONCLUSIONS: Policies that improve the neighborhood food environment may have beneficial effects on children's risk of obesity and consequent health outcomes.

1108

ALTERNATIVE OBESITY INDICES FOR ESTIMATING CARDIOMETABOLIC RISK AND RISK CHANGE IN YOUTH. *H S Kahn, L El ghormli, T Baranowski, G D Foster, R G McMurray, J B Buse, D D Stadler, R P Treviño for the HEALTHY Study Group (Centers for Disease Control and Prevention, Atlanta, GA 30341)

Health risk in youth is commonly estimated by a z-score obtained from the reference-based body mass index (BMIz). We explored associations with risk using instead the waist circumference-to-height ratio (WHtR) or height-corrected lipid accumulation product (HLAP; calculated as $[\text{WHtR}-0.30] \times \text{triglycerides}$), neither of which requires reference criteria specific to age and sex. We compared these indices among multiethnic, fasting middle-schoolers in the HEALTHY Study conducted in 42 US schools from 2006 to 2009. In grade 6 ($n = 5742$) the assignment to BMIz quartile differed from WHtR quartile in 29% of the sample and from HLAP quartile in 48%. We used mixed-regression models to relate each index to 3 risk outcomes: total cholesterol/HDL cholesterol, insulin resistance (HOMA) or diastolic BP. We found increments in explained variation (R^2 [%] adjusted for sex and race) for WHtR (vs BMIz) that were respectively +4%, +1% and +2%. For HLAP (vs BMIz) the increments were +26%, 0% and 0%. Among 4143 students measured longitudinally in grades 6 and 8 the assignment to change in (Δ) BMIz quartile differed from Δ WHtR quartile in 52% of the sample and from Δ HLAP quartile in 64%. For longitudinal associations with the same 3 risk outcomes the adjusted increments in R^2 for Δ WHtR (vs Δ BMIz) were +2%, +1%, and 0%. Increments for Δ HLAP (vs Δ BMIz) were +17%, +2% and -1%. For risk outcomes glucose, A1c, and systolic BP each index explained < 5% of R^2 . Estimates of risk status among middle-school youth are influenced by the choice of an obesity index. The reference-dependent BMIz offers little advantage over alternatives not requiring reference criteria.

1107

MATERNAL SMOKING (MS), BREASTFEEDING (BF) AND THEIR IMPACT ON GROWTH OF BODY MASS AMONG CHILDREN IN A LONGITUDINAL COHORT. *J Liu, J Hay, B E Faight, J Cairney (Brock University, St. Catharines, ON Canada L2S 3A1)

To assess the association over time between MS, BF and body mass during childhood we conducted individual growth model analyses. About 2200 children aged 7-9 in Grade 4 in South Ontario were recruited and their anthropometric measures were assessed in 7 waves. When in Grade 7, a questionnaire was sent to parents to collect information of these children's early life experience including MS and BF status. After excluding cases with only one measurement of BMI and missing information of MS and BF status, 963 children remained in this analysis. MS was defined as cigarette smoking either before knowing of a pregnancy, during pregnancy, or during the first year of the child's life. BS was defined as any kind of BS reported during infancy. Children were categorized into 4 groups by MS and BF status: 1) No & Yes; 2) No & No; 3) Yes & Yes; and 4) Yes & No. The percentages in the four groups are 56.2, 12.3, 20.9 and 10.6, respectively. To describe BMI and waist girth (WG) up to Grade 8, two separate linear mixed models were performed using the SAS PROC MIXED procedure. The other person-level covariates included in the models were sex, birth-weight, mother's age at birth, and total physical activity score from Grade 5. The initial status of BMI and WG in Grade 5 was 18.8(kg/m²) and 67.2(cm), respectively. For every one yr increase in age, an average increase of 1.1kg/m² in BMI and 3.0cm in WG ($p < .0001$) was noted. Compared to those in group 4 all other groups had a lower initial status of BMI and WG though only group 1 and 3 reached or near reached significance ($p < .08$). The growth rates of BMI and WG in all other groups were lower than that of group 4, but only rates of BMI reached significance. This suggests that MS and BS status may affect the growth of children's BMI and WG differently.

1109

PASSIVE AND ACTIVE SCREEN TIME AMONG U.S. YOUTH AGED 9-18 YEARS, 2009. *H Wethington, B Sherry, S Park, and H Blanck (Centers for Disease Control and Prevention, Atlanta, GA)

Objective: Because research is emerging on potential benefits of active screen time (AST) (i.e. video games requiring players be physically active) as a low-intensity activity, we decided to examine a) time spent on passive screen time (PST) (i.e. sedentary screen time) and AST; (b) correlations between PST and AST; and c) factors associated with PST and AST on a typical week and weekend day. Methods: We analyzed 2009 Styles Survey data ($n = 1310$), a mailed population-based survey. We examined correlations between PST and AST, and used multivariable logistic regression to identify factors associated with PST and AST. Results: Most youth, 68% and 81%, engaged in ≥ 2 hours PST on a typical week and weekend day, respectively; and 31% and 42% engaged in ≥ 1 hour AST on a typical week and weekend day, respectively. Week PST was positively correlated with weekend PST ($p < 0.01$) and week AST was positively correlated with weekend AST ($p < 0.01$). Factors significantly associated with ≥ 2 hours week PST were: being in high-school vs. 4th-5th grade (Odds Ratio (OR) = 1.8, 95% Confidence Interval (CI) = 1.3-2.6); parental rules on TV content vs. time and content (OR = 1.8, CI = 1.3-2.5); and being physically active 0-2 times weekly vs. 5-7 times (OR = 1.7, CI = 1.2-2.4). Similar results were found for weekend PST. Factors associated with ≥ 1 hour week AST included: being Hispanic vs. non-Hispanic white (OR = 1.6, CI = 1.1-2.4) and living in the West vs. Northeast (OR = 0.6, CI = 0.4-0.9). Similar results were found for weekend AST. Conclusion: Our data provide insights into the relationship of PST and AST and who is taking part in these behaviors which may benefit public health efforts to reduce sedentary screen time and promote AST as a low-intensity activity.

1110

SOCIO-DEMOGRAPHIC CHARACTERISTICS AND NUTRITIONAL STATUS OF SECONDARY SCHOOL ADOLESCENTS IN JOINVILLE/SC. S S B S Mastroeni, *M F Mastroeni, R Bernal, N N Silva, M G Carvalho, P H C Rondó. (University of Joinville Region, Univille, Joinville SC, Brazil, 89.219-710)

This study aimed to describe the socio-demographics characteristics and to evaluate the nutritional status in a representative sample of secondary school adolescents in Joinville, SC. The sample was obtained by systematic and aleatory multi-stage sampling under size proportional share criterion in a single stage whose draw unit was the classroom. One hundred and twelve classrooms were drawn and all of the students aged between 15 and 17 years old were interviewed. One thousand one hundred and four adolescents were investigated, 60% of them girls and 76.6% white. Most of the adolescents' mothers (43.8%) hadn't concluded primary school. Of those who reported use of medication, 90.6% were girls, with contraception being the most frequent medication used (76.7%). Tobacco use and alcohol consumption were greater among the boys, with a prevalence of 61.1% and 54.6%, respectively. For physical activity, 60.2% of all respondents were classified as active and 12.3% were considered overweight. There was no difference in stature and Body Mass Index between the genders. In terms of family history of cardiovascular disease, 16.9% of the adolescents reported that a family member had suffered an acute myocardial infarction, and 31.4% of them reported a family member having had a stroke. The nutritional profile of the studied group revealed a high prevalence of excess weight, a frequent characteristic in studies involving adolescents. This characteristic demonstrates the need for programs that motivate the practice of a healthy lifestyle, avoiding the emergence of chronic non-transmissible diseases later in adulthood.

1112-S

MULTILEVEL DETERMINANTS OF CHILD AND ADOLESCENT FRUIT AND VEGETABLE INTAKE. *A M Branum, L E Caulfield. (CDC/NCHS, Hyattsville, MD 20782)

Studies of dietary intake in children usually focus on one or two realms of determinants, such as individual characteristics or parental factors, and multiple domains of influence are generally not examined simultaneously. Our objective was to examine determinants of and the amount of variance in child and adolescent fruit and vegetable intake at the individual, household, and Census tract levels. We used a confidential National Health and Nutrition Examination Survey data set (2003-2006) that included family members sampled from the same household and Census tract identification. A 3-level hierarchical linear model was used to identify important predictors of fruit and vegetable intake and to determine the amount of variance at the individual, family, and Census tract level. Only 3% of variation in intake occurred at the Census tract level, whereas 24% and 73% occurred at the household and individual level, respectively. After controlling for other factors, very young child age (ages 2-5 years) ($\beta = 0.14$, $p = 0.02$) and adult fruit and vegetable intake ($\beta = 0.16$, $p < 0.001$) were the only factors positively associated with child intake. Adult smoking ($\beta = -0.15$, $p = 0.001$) was significantly associated with decreased child fruit and vegetable intake. Census tract socioeconomic status was not significantly associated with intake. These results show a moderate amount of variance in fruit and vegetable intake is attributable to household level factors and highlight the importance of the family behavior, relative to neighborhood context, on child and adolescent intake.

1111

ADOLESCENT DIET AND METABOLIC SYNDROME COMPONENTS IN YOUNG WOMEN: RESULTS OF THE DIETARY INTERVENTION STUDY IN CHILDREN (DISC) FOLLOW-UP STUDY. *J F Dorgan for the DISC Follow-Up Study Investigators (Fox Chase Cancer Center, Philadelphia, PA 19111)

Adolescent diet is hypothesized to influence development of chronic disease in adulthood. The DISC Follow-Up Study evaluated the long-term effects of a dietary intervention aimed at reducing total fat, saturated fat, and cholesterol and increasing dietary fiber intake during late childhood and adolescence on components of the metabolic syndrome in young adult women. DISC was a randomized controlled trial in which healthy, prepubertal 8-10 year olds with elevated low-density lipoprotein cholesterol were randomly assigned to a behavioral intervention or to a usual care control group. Follow-up visits for female participants ($N = 230$) took place 9 years after termination of DISC when participants were 25-29 years old. Lower systolic blood pressure and fasting plasma glucose levels were found in the intervention compared to the control group at these visits. After adjustment for non-dietary variables, their mean systolic blood pressures were 107.7 mmHg (95% confidence interval (CI) = 106.0-109.5 mmHg) and 110.0 mmHg (95% CI = 108.2-111.8 mmHg), respectively ($P = .03$), whereas their mean fasting plasma glucose levels were 87.0 mg/dl (95% CI = 85.4-88.7 mg/dl) and 89.1 mg/dl (95% CI = 87.4-90.8 mg/dl), respectively ($P = .01$). Further adjustment for current diet did not materially alter these results. Waist circumference, diastolic blood pressure, high-density lipoprotein cholesterol and triglyceride concentrations did not differ by treatment group. Results suggest that adherence to a diet lower in total fat, saturated fat and cholesterol and higher in dietary fiber during childhood and adolescence may benefit glycemic control and blood pressure long-term.

1113-S

CROSS-CORRELATIONS OF ADIPOSITY MEASURES AT AGES 3 AND 7 YEARS. *C E Boeke, K P Kleinman, E Oken, S L Rifas-Shiman, E M Taveras, and M W Gillman (Obesity Prevention Program, Department of Population Medicine, Harvard Pilgrim Health Care Institute/Harvard Medical School, Boston, MA 02215)

In epidemiologic studies of children without dual x-ray absorptiometry (DXA) available, the optimal surrogate method to measure adiposity is controversial. We sought to determine the extent to which adiposity measures are correlated with each other in children at ages 3 and 7 years. We studied 1359 children in Project Viva, a cohort study in Massachusetts. We calculated Spearman correlations among body mass index (BMI), circumferences, and skinfold thicknesses at ages 3 and 7, and bioimpedance and DXA at age 7 only. 48.6% of the children were female and 65.8% percent were white. Mean (SD) BMI was 16.5 (1.5) kg/m² at age 3 and 17.1 (3.0) at age 7; total fat mass by DXA at age 7 was 7.3 (3.7) kg. Correlations of BMI with other adiposity indices were higher at age 7 than at age 3, e.g., with middle upper arm circumference (MUAC) ($r = 0.76$ at age 3, $r = 0.90$ at age 7), waist circumference ($r = 0.69$, $r = 0.85$), and sum of subscapular plus triceps skinfolds ($r = 0.50$, $r = 0.78$). At 7 years, DXA total body fat was highly correlated with bioimpedance total fat ($r = 0.87$), BMI ($r = 0.82$), MUAC ($r = 0.86$), waist circumference ($r = 0.79$), and sum of skinfolds ($r = 0.90$). Bioimpedance underestimated absolute DXA fat mass (mean difference -1.46 kg, 95% confidence interval (CI): -1.55, -1.37) and overestimated fat-free mass (mean difference 1.07 kg, 95% CI: 0.95, 1.19). In early to mid-childhood, BMI and other measures of adiposity were strongly correlated with one another and with DXA fat mass, indicating that these measures may be used in large epidemiology studies to rank children's fat mass levels when DXA is not available.

1114

DOES THE BODY MASS INDEX (BMI) REBOUND OCCUR IN MACROSOMIC BABIES? *J C Khoury, P R Khoury, L Dolan, S Daniels, and J G Woo (Cincinnati Children's Hospital Medical Center, Cincinnati, OH 45229)

The presence or absence of BMI rebound in early childhood may play an important role in the development of childhood obesity. However, the pattern of BMI growth in children born with a higher birthweight has not been documented. Our objective was to examine the growth trajectory of neonates who are macrosomic (M, > 4 kg at birth) versus those that are not. A cohort of children age 3 years at intake were followed for 4 years, with visits every 3 months. At each visit height and weight was measured, and BMI calculated. Children with at least two visits, no maternal diabetes, 37 to 42 weeks gestation at birth and a recorded birth weight were included in this analysis (n = 332 of 372; 266 had measurements at all 12 time points). A generalized mixed model was used to account for repeated measures and examine the interaction of M with BMI growth. The cohort is 51% female, and 19% African American. Mean birth weight (\pm SD) was 3.4 ± 0.6 kg, age at first visit was 3.3 ± 0.4 years with BMI 16.2 ± 1.3 kg/m²; 50 (15%) of the children were M at birth. M and non-M infants did not differ on child and maternal demographic characteristics, except for child BMI at first visit (16.8 ± 1.2 versus 16.2 ± 1.2 respectively, $p = 0.001$). The best growth model included a quadratic effect indicating potential BMI rebound but there was no evidence of different growth trajectories in M and non-M children. However, BMI was higher at all visits for M compared to non-M. In conclusion, infants > 4 kg at birth continue to have a larger body size during childhood, however the growth trajectory does not appear to be different from infants < 4 kg at birth. The large body phenotype created during gestation seems to have a lasting effect.

1116

THE EFFECT OF BIRTHWEIGHT ON CHILDHOOD BMI IN THE 1958 BRITISH BIRTH COHORT. *T B Gage, E K O'Neill, F Fang, X Tan, A G DiRienzo (University at Albany, Albany, NY 12222)

Conventional analyses indicate that BMI, a risk factor for heart disease, increases with birthweight. This is not consistent with other aspects of the fetal programming hypothesis which find an inverse association of birthweight and heart disease. Previous analyses of birthweight show the Covariate Density Defined mixture of linear regressions (CDDmlr) method, using weighted estimation techniques, accounts for unmeasured heterogeneity in infant mortality by identifying two latent subpopulations ("normal" and "compromised" fetal development) within a birth cohort. Here, an analysis of the 1958 British birth cohort using CDDmlr is consistent with previous birthweight results and demonstrates that the same latent categories provide a consistent interpretation of the birthweight/BMI paradox and also explains unmeasured heterogeneity in BMI. Analyses of birthweight by sex (females, males) indicate that 87% and 88% of births occur in the "normal" subpopulation with means of 3279 g and 3420 g. In the "compromised" subpopulation, the mean birthweights are 2855 g and 2922 g. The parsimonious regression model predicting age seven BMI increases linearly with birthweight ($b \sim 5 \times 10^{-4}$) among "normal" births, and is a quadratic function of birthweight among "compromised" births. Despite being smaller at birth, "compromised" births have a higher mean BMI at age seven (17.5 and 18.2 vs. 15.5 and 15.7 for "normal" births) and account for 95.5% and 89.4% obese individuals at seven by sex (female and male births, respectively). Thus, CDDmlr identifies births with faster postnatal growth rates as "compromised" based on birthweight alone and resolves the birthweight/BMI paradox. Supported by NIH grant R01 HD037405 and R24 HD044943.

1115

RISK FACTORS OF OBESITY IN PRESCHOOL CHILDREN IN AN URBAN AREA IN CHINA. *L Zhou, G He, J Zhang, R Xie, M Walker, S Wu Wen (Central South University, Changsha, China 410013)

To assess risk factors of childhood obesity, we carried out a case-control study in 10 kindergartens in Changsha, the capital city in the Chinese province of Hunan July 1 and December 31, 2007. Height and weight measurements were obtained from annual physical examination for the preschool children attending the kindergartens. We defined obesity according to the International Obesity Task Force cut-offs for body mass index (BMI). For each obese child, one child with normal BMI, matched by kindergarten class (same), sex (same), age (within 3 months), and height (within 3 cm) was chosen as the control. The parents of the study subjects were asked to complete a questionnaire about their children, including perinatal factors, infant feeding, and current life-style factors. Univariate analysis was performed first to compare the distribution of risk factors between cases and controls. Conditional logistic regression analysis was used to assess independent risk factors of childhood obesity. A total of 162 subjects (81 pairs of cases and controls) were included in the final analysis. The results showed that the adjusted odds ratios and 95% confidence intervals for childhood obesity were 8.88 (2.41, 32.70), 5.23 (1.24, 22.04), 10.96 (2.08, 21.64), and 6.72 (1.55, 29.12), respectively, for macrosomia, cesarean delivery, early solid foods initiation (< 4 months), and fetal musical education. We conclude that macrosomia, cesarean delivery, early initiation of solid foods, and fetal musical education are associated with increased risk of obesity in preschool children in urban China.

1117

NATIONAL SCHOOL LUNCH AND BREAKFAST PROGRAM AND CHILD WEIGHT STATUS. *L D Howie, S L Lukacs, A M Branum (CDC/NCHS, Hyattsville, MD 20782)

Millions of children receive lunch and/or breakfast through the National School Lunch Program (NSLP) or National School Breakfast Program (NSBP) each year. In recent years, there has been concern about the nutritional value in the food served through NSLP and NSBP and whether the foods served are contributing to the obesity epidemic in children. This analysis examines the potential differences in weight status in a nationally-representative sample of children 6-17 years of age, comparing those who receive NSLP and/or NSBP meals to those who do not participate in school meal programs. Estimates are based on 5,345 children from the 2003-2008 National Health and Nutrition Examination Survey (NHANES). Participation in school meal programs was categorized as not receiving a school meal during the week or receiving one or more meals during the week. Weight status was categorized as being overweight or obese based on BMI for age. Logistic regression was used to examine differences in weight by program participation. From 2003-2008, an estimated 73% of US children received one or more school meals per week. Seventeen percent of children in the sample were overweight and nearly 20% were obese. Adjustment for age, sex, race/ethnicity, poverty, food security, and dietary intake (fiber, sugar, fat, total energy) did not appreciably change the findings. School meal participation was not associated with an increased risk of overweight (adjusted odds ratio (AOR) = 0.95; 95% confidence interval (CI) 0.72-1.27) but children receiving meals were more likely to be obese (AOR = 1.60; 95% CI 1.15-2.23) compared to non-participants. Longitudinal studies of children participating in school meal programs are needed to evaluate their potential impact on childhood obesity.

1118

IDEFICS STUDY – OBESITY PREVALENCE AND RISK FACTORS IN EUROPEAN CHILDREN. *W Ahrens, I Pigeot, on behalf of the IDEFICS Consortium (BIPS, University Bremen, 28359 Bremen, Germany)

Introduction: The prospective study identifies risk profiles for overweight/obesity (OW) and related disorders and evaluates primary prevention strategies in children. The baseline survey was conducted in 8 European countries in 2007/08. Methods: 16,223 children (2-9 years) and their parents participated in an extensive protocol where parents reported socio-demographic, behavioral, medical and nutritional data. Examinations included anthropometry, blood pressure, physical activity (PA, accelerometry), DNA and physiological markers. Parental education was categorized in 5 levels. Age-, sex-, country-adjusted odds ratios (OR; 95% confidence intervals) were estimated by multivariate logistic regression. Results: Obesity prevalence ranges from 6-19% (South) and 2-4% (North). Children's OW is inversely associated with parental education (OR 0.81; 0.76-0.86), percent of daily accelerometer time spent in moderate to vigorous PA (OR 0.66; 0.59-0.73) and hours of sleep/night (OR 0.83; 0.74-0.93). Positive associations were observed for maternal body mass index (BMI) (OR 1.11; 1.09-1.12), hours of screen-time per week (OR 1.02; 1.01-1.03), one-parent as opposed to two-parent families (OR 1.22; 1.04-1.42) and migrant children (OR 1.42; 1.10-1.83). Consumption of fresh fruits and sugary soft drinks did not show strong associations. Conclusion: The analysis across socio-demographic characteristics helps to identify target groups for intervention. However, trends across categories sometimes differ by country. Sleep, PA, parental BMI and social position require further exploration together with diet and behavioral variables that were non-significant in this multivariate analysis. Funding: EC FP 6, Contract No. 016181 (FOOD)

1120-S

EFFECTS OF DIETARY PATTERNS AND FOOD SUPPLY ENVIRONMENT AROUND THE SCHOOL ON BLOOD LIPIDS AMONG ADOLESCENTS IN TAIWAN. *C L Chang, H C Tu, W T Lin, C Y Lee, C H Lee (Kaohsiung Medical University, Kaohsiung City, Taiwan)

Blood lipids consisting of triglyceride (TG), high- (HDL-C), low-density (LDL-C) and total cholesterol (TC) are vital constituents of metabolic syndrome. Fast-food restaurants and correlates are staking out locations within easy walking distance of schools, exposing students to poor-quality foods. Factors that affect the level of blood lipids may be linked to individual dietary, family socioeconomic status (SES) and food supply environment around the school. We conducted a large-scale study with multistage sampling to clarify such concerns for adolescents in Taiwan. A total of 3784 junior-high school students from 36 different urbanization-level of schools participated in this study and offered blood samples (response rate, 72.4%). Individual factors comprising dietary habits and anthropometry examinations were collected. Food-related providers/shops and sport facilities around the schools within 300 and 600m were videotaped and counted. Blood lipids levels are the primary outcomes. Data was analyzed using survey-data modules adjusted for the complex survey design. The TG, HDL-C, LDL-C and TC levels were significantly associated with higher quantities of sweetened beverage intake and higher levels of family SES. Such relationship was clearly evident among adolescents living in areas with high urbanization. The density of sugary drink provider around the school was a key contributor to the difference in blood lipids. 66.7% and 86.7% of schools in such areas had 1 or more sugary drink providers within 300m and 600m of the schools, respectively. In addition to individual dietary, our findings stress the effect of food supply environment around the school on blood lipids of adolescents.

1119-S

THE EFFECT OF LIFESTYLE AND DISTRIBUTION OF METABOLIC RISK FACTORS IN OVER WEIGHT WITH OBESITY CHILDREN IN KOREA. H A Lee*, W K Lee, K A Kong, E H Ha, Y S Hong, H Park (Department of Preventive Medicine, School of Medicine, Ewha Womans University, Seoul, Korea.)

Overweight and obesity are central to the metabolic syndrome and are the dominant risk factors for chronic diseases. Obesity is a complex problem resulting from a combination of genetic, behavioral, environmental, and socioeconomic effects. Although behavioral factors including eating habits and sedentary lifestyle are considered determinants of obesity, specific lifestyle factors in childhood have not been clearly defined. The subjects comprised 261 children aged 7-9 years who were recruited from an elementary school. Information was obtained from their parents using a questionnaire for eating behavior and life style, and data were also collected via anthropometric measurement, and biochemical examinations including blood. The effect of lifestyles on overweight has been estimated using multiple logistic regressions. The 34(70.8%) of overweight children have at least another one component of metabolic syndrome. Regarding the risk of lifestyle factors on overweight and obesity, eating behaviors was found as significant risk factors. Those who have overeating behavior more than 2 times/week had 3 times risk (95% CI 1.50-7.22) and have fast speed of eating behavior also had 3 times risk (95% CI 1.63-6.02). Those who had less than 3 family meals per month were likely to have 10 times risk than those who had one family meal per day. Overweight and obesity increase the risk of metabolic syndrome in children. Therefore, our results suggest the necessity of controlling of weight and acquiring correct eating behavior earlier in life to reduce metabolic risk. This work was supported by a grant from the Korea Research Foundation (KRF-2005-204-E00030)

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PHYSICAL ACTIVITY GROWTH CURVES AND ADIPOSITY IN ADOLESCENTS. *T Barnett, K Maximova, C Sabiston, A Van Hulst, Jr Brunet, A Castonguay, M Bélanger, J O'Loughlin (Université de Montréal, Montreal, QC Canada)

We describe change in physical activity through secondary school and examine its effect on adiposity. Participants were followed from age 12-13 to 17-18 years; physical activity was measured in self-report questionnaires in a total of 19 survey-cycles over a 5-year period, from 1999-2005. Height, weight, triceps and subscapular skinfold thickness were measured in survey-cycles 1, 12 and 19. Two separate study periods were defined, with complete data on 840 adolescents followed from cycles 1 through 12 (early adolescence), and 760 adolescents followed from cycles 12 through 19 (later adolescence). First order growth curves modeling both moderate-to-vigorous physical activities (MVPA), and vigorous physical activities (VPA) only, were estimated for each study period. Indicators of adiposity included body fat (BF) %, using Slaughter's equations, and BMI z-score, based on CDC growth curves. Estimates of initial level and rate of decline in each of MVPA and VPA bouts/week were used as predictors of adiposity in sex-specific linear regression models. In early adolescence, physical activity was associated with BF % in girls only: a yearly decline of 1 MVPA bout/week was associated with an increase of 0.19 (95% CI: 0.02-0.36) units of BF %, and a yearly decline of 1 VPA bout/week was associated with an increase of 0.47 (95% CI: 0.015-0.92) units of BF %. In later adolescence, only MVPA was associated with BF %, and only among boys: a yearly decline of 1 MVPA bout/week was associated with an increase of 0.38 (95% CI: 0.05-0.70) units of BF %. These associations were not observed when using BMI z-score, likely because BMI does not distinguish muscle from fat mass, increasing the risk of classifying muscular individuals as overweight. Results suggest that efforts to prevent or reduce obesity in youth should promote physical activity in early adolescence among girls, and in later adolescence among boys.

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PREDICTORS OF CHILDHOOD PHYSICAL ACTIVITY: THE GATESHEAD MILLENNIUM STUDY. *M S Pearce, L Basterfield, K D Mann, A J Adamson, K N Parkinson, C M Wright, J J Reilly (Newcastle University, Newcastle upon Tyne, UK)

Conflicting evidence exists for associations between birth weight and childhood physical activity (PA) levels. Further, it is important to know what other, potentially modifiable, factors may influence PA in children given its' association with childhood and later adiposity. The aim of this analysis was to identify predictors of childhood PA levels in the Gateshead Millennium Study (GMS), a population based cohort of 1029 infants born in 1999-2000 in Gateshead in Northern England. Throughout infancy and early childhood, detailed information was collected. Assessments at age 9 yrs included body composition, objective measures of habitual PA (using accelerometers during waking hours). Mean total volumes of PA (accelerometer count per minute, cpm) and moderate-vigorous intensity PA (MVPA), and the percentage of time spent in sedentary behavior (%SB) were quantified and direct and mediating associations analysed within path models. Significant differences were seen in all 3 outcome variables between males and females ($p < 0.001$). No direct significant associations were seen with birth weight. Increased paternal age was associated with significant increases in %SB and decreases in cpm and MVPA ($p < 0.033$). Significant associations with BMI at 9 yrs were in the expected directions. Increased time spent in sports clubs was significantly associated with decreased %SB ($p = 0.02$) and increased MVPA ($p = 0.01$), but not cpm ($p = 0.13$). Although we found no evidence for an effect of birth weight on PA, path models suggest indirect effects mediated through BMI. Having an older father appeared to have a negative impact on the child's PA levels, while participation in sports clubs increases time spent in MVPA, but not cpm.

1124

SEDENTARY BEHAVIORS AND ADIPOSITY IN CHILDREN. *R Pabayo, T Barnett, K Maximova, M-E Mathieu, J O'Loughlin, A Tremblay, M Lambert (University of Alberta, Edmonton, AB Canada)

Sedentary behavior (SB) is a plausible cause of obesity. TV viewing is a risk factor for excess body fat but few studies investigate a wide range of SBs. We examine the association between central adiposity and time spent in screen (TV viewing, computer use) and non-screen (talking on the phone, reading, doing homework) behaviors, using baseline data (2005-2008) from the Quebec Adiposity and Lifestyle Investigation in Youth (QUALITY) study, a longitudinal investigation of children aged 8-10 years with at least one obese parent. Central fat mass (CFM) % (i.e. CFM/total fat mass) was measured in children using dual X-ray energy absorptiometry. For each of a typical week and weekend day, children reported number of hours spent in each behavior. Adiposity was regressed on total, screen, and non-screen SB time, adjusting for child's age, Tanner stage, physical activity, parental education, household income, mother's age, and mother's weight status. Complete data were available for 323 boys and 278 girls. Mean (sd) CFM% was 41.7 (5.6) in girls and 39.8 (5.3) in boys. Median hours/day of total SB time on weekdays Vs weekends were 3.5 Vs 4.6 in boys, and 3.1 Vs 3.8 in girls, respectively. In girls, CFM% was associated with total SB time on weekdays ($\beta = 0.44$, 95% CI = 0.14, 0.74) and weekends ($\beta = 0.20$, 95% CI = 0.0, 0.40). CFM% was also associated with screen SB time on weekdays ($\beta = 0.41$, 95% CI = 0.07, 0.75) and weekends ($\beta = 0.26$, 95% CI = 0.03, 0.48); CFM% was associated with non-screen SB time on weekdays only ($\beta = 0.74$, 95% CI = -0.02, -1.49). Among boys, CFM% was negatively associated with non-screen SB time ($\beta = -0.51$, 95% CI = -1.01, -0.02) on weekends only. No other significant associations were found among boys. The relationship between SB and central adiposity appears to vary by sex in children; findings suggest that efforts to prevent or reduce obesity should consider both the nature and timing of children's SBs.

1123

STRONGER EFFECTS OF MATERNAL THAN PATERNAL OBESITY ON INFANT BMI GROWTH CURVES. *A Linabery, R W Nahhas, A Choh, A Odegaard, W Johnson, B Towne, E Demerath (University of Minnesota, Minneapolis, MN 55455)

To investigate parent-to-child transmission of obesity risk, we compared associations between maternal and paternal body mass index (BMI) category (normal: $\leq 25 \text{ kg/m}^2$, overweight: $25 < 30$, obese: ≥ 30) and infant and early childhood weight, length, and BMI in a well-characterized cohort. An average of 8 serial weight and length measures from birth to 3.5 years were obtained from 912 European American subjects in the Fels Longitudinal Study born in 1928-2008. Multivariable linear mixed effects regression was performed to evaluate associations of interest, accounting for repeated measures and including fourth-degree polynomial functions of age, maternal and paternal stature, smoking status, and age, and infant sex, gestational age, and birth year as covariates, as well as significant interactions. Children of obese mothers had greater mean BMIs compared to those of over- and normal weight mothers and there was a significant interaction between maternal BMI category and child's age ($p_{\text{interaction}} < 0.0001$), such that the effect of maternal obesity increased with age. For example, the average BMI difference between infants of obese and normal weight mothers was 0.4 kg/m^2 at 3 months of age and 1.0 kg/m^2 at 3.5 years. There was no significant influence of paternal BMI on child's BMI ($p = 0.25$). This is among the first studies to fully examine these associations longitudinally over the entire infancy period, and the findings suggest that interventions focused on reducing maternal pre-pregnancy BMI may be important in preventing excess BMI in young children. Supported by NIH Grants R01 HD53685, R01 HD12252, and T32 CA99936.

1125-S

DOES SIZE FOR GESTATIONAL AGE MODIFY THE RELATIONSHIP OF SOCIOECONOMIC STATUS AND CHILDHOOD OBESITY? *A Brzozowski, C Drews-Botsch, and J Gazmararian (Emory University, Atlanta, GA 30322)

To assess possible effect modification of size for gestational age on the relationship between socioeconomic status (SES) and childhood obesity, data from the Follow-Up Development and Growth Experiences Study were used. Data were collected from 1997-99 on 706 children aged 4.5 years born in Atlanta, GA. Height, weight, triceps skinfold thickness (TST), and subscapular skinfold thickness (SST) were measured. Hospital of birth (a proxy for SES) and small-for-gestational-age (SGA) status were obtained from previously-collected data. Mantel-Haenszel statistics and Breslow-Day tests were used and p-values ($p < 0.05$) were considered statistically significant. Overweight/obese body mass index (BMI), TST, and SST, as well as SES were associated with SGA status. Only the associations with BMI ($p < 0.001$) and TST ($p = 0.035$) were statistically significant. Among both SGA and appropriate-for-gestational-age (AGA) children, those of higher SES were more likely to be overweight/obese as classified by TST (SGA: 8.1% vs. 4.9%, AGA: 13.9% vs. 10.3%) and SST (SGA: 10.1% vs. 6.9%, AGA: 20.5% vs. 6.0%, $p = 0.012$). In contrast, among SGA children, those of lower SES were more likely to have overweight/obese BMIs (11.9% vs. 8.7%), while no difference was seen among AGA children (26.9%). Although all Breslow-Day tests were non-significant, results suggest potential effect modification by SGA status on the SES/BMI relationship. Attention should be paid to the possible modifying effect of SGA status on the relationship between childhood obesity and SES. Additionally, presence of effect modification may differ due to variation between obesity measurement techniques.

1126-S

DETERMINANTS OF ACTIVE COMMUTING TO SCHOOL AMONG PRIMARY SCHOOL CHILDREN. M Majidi, *S A Motevalian, A Joneidi (Tehran University of Medical Sciences, Tehran, Iran)

Background: Physical activity is an important element of healthy life style. Active transportation to and from school, such as walking, is one potential opportunity for children to be physically active. The objective of this study was to determine the prevalence of active commuting to school and its determinants in primary school children. Methods: A cross-sectional study was carried out on 695 children in grade 4-5 of 17 elementary schools in Shahriar (a 1.2 million population city in close proximity to Tehran). Data collection included interviews with students, their parents and school authorities. Logistic regression analysis was done to identify the determinants of active commuting to school (walking or biking). Results: The prevalence of active travel to school was 69.5% (69.4% walked and 0.1% biked to school). Multiple logistic regression revealed that type of school [Odds Ratio (OR) for private vs. public school = 7.3 (95% CI: 4.3-12.6)] and distance of home to school [(OR for > 1.75 km, 1.01-1.75 km, 0.51-1.00 km vs. 0.5 km or less: 5.8 (95% CI: 3.4-10.0), 5.8 (95% CI: 3.5-9.8), and 4.7 (95% CI: 2.7-8.1) respectively] were significantly associated with active commuting to school while other variables including student's sex, mother's employment, father's age, mother's age, number of siblings and school grade were not associated. Conclusion: This study showed that children of families with higher socioeconomic status are less likely to actively transport to and from the school. With rapid motorization of the country and socioeconomic development this issue is a warning signal for policymakers to put interventions for increasing active commuting to schools.

1128

YOUTH PERCEIVE ILLICIT DRUG IMAGERY IN AN UNBRANDED NIKE ADVERTISEMENT. *N Auger, M Daniel, B Knäuper, M-F Raynault, and B Pless (Institut national de santé publique du Québec, Montréal, QC, Canada H2P 1E2)

A recent study investigated how youth perceived the imagery of ads used by the sports company Nike in 2003-2004 to promote sales of hockey equipment to Canadian youth. The study, a cluster-randomised controlled trial of 20 grade 7-11 school classes, involved administration of a survey to 397 students to test the hypothesis that components of an ad may have contained smoking-related content. We performed a post hoc analysis to determine whether students perceived illicit drug-related imagery in the ad. The exposure ad contained the slogan LIGHT IT UP. The slogan was replaced in the control ad by GO FOR IT. Potential tobacco-related imagery in the control ad was reduced, and the Nike brand name was removed from both ads. Outcomes included self-reported illicit drug imagery in the appearance and text of the ad, and the product being promoted. Relative risks (RR) and 95% confidence intervals (CI) were computed, accounting for classroom clustering using generalised estimating equations. In the original study, 37.6% of students reported smoking-related messages in the exposure ad compared with 0.5% in the control (RR 4.9, 95% CI 2.9-8.3). Post hoc, it was discovered that 22.9% of students reported the exposure contained illicit drug messages compared with 1.0% of controls (RR 22.0, 95% CI 6.5-74.9, $p < 0.001$). Students shown the exposure ad were more likely to report that the slogan referred to illicit drugs (RR 5.3, 95% CI 1.8-15.9, $p = 0.005$) and the ad promoted illicit drugs (RR 2.3, 95% CI 1.1-5.1, $p = 0.04$) compared with the control. This study aimed at determining whether youth perceived smoking-related imagery in an unbranded Nike ad incidentally found that students perceived illicit drug messages.

1127-S

PREVALENCE OF METABOLIC SYNDROME RISK FACTORS IN YOUTH. *J Chotalia, K Theall (Louisiana State University School of Public Health, New Orleans, LA 70112)

Metabolic syndrome (MS) has been associated with increased insulin resistance, type 2 diabetes, and coronary disease. Objective: To examine the prevalence of MS risk factors in youth (12-20 years). Design: The National Health and Nutrition Examination Survey (NHANES) is an ongoing complex, stratified, multistage surveillance by Center for Disease Control. Methods: Data from 8486 youth participants in NHANES from 1999-2006 surveys were analyzed using SAS 9.2. MS was defined as presence of 3 or more risk factors among following: waist circumference, high serum triglyceride, low serum High Density Lipoprotein (HDL), high blood pressure, high fasting glucose levels. Due to lack of a universally accepted definition of MS in youths, we considered subjects at risk with levels greater than the 90th percentile for all MS risk factors except for HDL where less than 10th percentile was considered at risk for their age and gender groups. Results: Overall, we found the prevalence of MS was 4.47%. The prevalence was significantly higher among whites (4.76%) and Hispanics (5.83%), compared to blacks (1.81%). It was also significantly higher among females (4.54%) than males (4.40%). Among females, waist circumference was the most prevalent risk factor (23.88%), while high fasting glucose level was the most prevalence risk factor (17.23%) in males. Almost 40% study participants had at least one and 13% had at least two risk factors for MS. The prevalence of insulin resistance was 13.55%. Conclusion: Though the prevalence of MS was 4.47% among youths, a substantial number of participants had at least one or two risk factors present. Due to MS' grave health consequences and financial burden on system, it is important to expand interventions that address MS in youth.

1129-S

HOUSEHOLD SECONDHAND SMOKE EXPOSURE FOR CHILDREN: BEFORE AND AFTER TAIWAN'S NEW TOBACCO HAZARDS PREVENTION ACT. *C C Chen, C H Lee, and H L Huang (Kaohsiung Medical University, Kaohsiung, Taiwan 807)

The Tobacco Hazards Prevention Act first enacted in Taiwan in 1997 aims to prevent tobacco hazards. Until January of 2009, the amendments to the Act stipulated that tobacco use is strictly prohibited in all indoor public spaces and workplaces. While this Act protects non-smokers from second-hand smoke (SHS) exposure in public spaces, it fails to provide protection for children that are vulnerable to potential SHS exposure at home. The aim was to analyze household SHS exposure for children and factors related to their self-efficacy to avoid SHS before and after new Act. Two waves of surveys were conducted on 3rd to 6th graders in 26 respective elementary schools in 2008 and 2009. 4,450 questionnaires were obtained, with a response rate of 92.85%. Regression models analyzed the factors in regard to children's self-efficacy to avoid household SHS. After the new law, high percentages of schoolchildren were still exposed to household SHS. 63% of these children were found to have lived with a family member who smoked in front of them, while 35% of them were exposed to household SHS more than 4 days a week. Having a positive attitude toward smoking ($\beta = -0.05$ to -0.06) and high household SHS exposure ($\beta = -0.34$ to -0.47) were found to be significantly associated with a lower self-efficacy. Compared to females, male had lower scores with respect to their knowledge of tobacco hazards; this was significantly related to their self-efficacy ($\beta = 0.13$ to 0.14). The findings suggest that an intervention program should enhance a positive anti-smoking attitude and self-efficacy, and more importantly, provide tobacco hazard knowledge to male students in order to reduce exposure to household SHS.

1130

WITHDRAWN

1132

MODELING THE POTENTIAL IMPACT OF SHIFTING PRENATAL ANTI-EPILEPTIC MEDICATION PRESCRIBING PRACTICES ON THE PREVALENCE OF SELECTED BIRTH DEFECTS. SM Gilboa, *C S Broussard, O Devine, K N Duwe, A L Flak, S L Boulet, C A Moore, M M Werler, MA Honein (Centers for Disease Control and Prevention, Atlanta, GA, 30333)

Epilepsy affects over 1 million US reproductive aged women and 0.5% of pregnancies. Decisions regarding anti-epileptic drug (AED) treatment must balance the risk versus benefit to both mother and fetus. Previous literature reported associations between certain AEDs and neural tube defects, orofacial clefts, heart defects, and hypospadias. To model how influencing clinical practice towards the use of lower risk AEDs would impact the prevalence of these birth defects, we conducted focused searches of the English-language literature to derive point estimates and uncertainty intervals for data elements used in our simulation. These elements included prevalence of epilepsy among pregnant and reproductive aged women, prevalence of selected AED use in these populations, and reported associations between selected AEDs and the birth defects of interest; 41 papers ultimately informed one or more of our simulation elements. We also analyzed the 1999-2006 National Health and Nutrition Examination Surveys and the 2005-2008 Thomson Reuters MarketScan® Commercial Databases to further inform our simulation inputs. Consistent with current clinical management guidelines, valproate use during pregnancy has been rarely reported in recent years. For the more commonly reported AEDs in pregnancy, our simulation models estimate the number of birth defects potentially preventable through different prescribing scenarios. This modeling approach could be extended to other medications used to treat maternal conditions before and during pregnancy to estimate the collective impact of translating pharmacoepidemiologic data to evidence-based prenatal care practice.

1131-S

KNOWLEDGE AND ATTITUDES TOWARDS THE HUMAN PAPILLOMAVIRUS VACCINE AMONG COLLEGE STUDENTS. Owen Simwale; *N Daneshvar, L Scott, T Sylk (Franklin & Marshall College, Lancaster, PA)

Human papillomavirus (HPV) is the most common sexually transmitted infection (STI) and is a leading cause of cervical cancer in the United States; most cases occur in individuals between the ages of 15 and 24, yet few studies have examined factors associated with HPV vaccine acceptance among this age group. Responses to a 15-question web-based survey were used to determine predictors and deterrents of HPV vaccine acceptance among college students. Multinomial logistic regression was used to analyze data at a confidence interval of 95%. Students who believed they were at risk for contracting HPV were over four times more likely to be willing to receive the vaccine than students who did not believe they were at risk [Odds Ratio: 4.2; CI: 2.113, 8.359; $p = 0.000$]. Students who had previously been diagnosed with an STI were almost seven times more likely perceive they were at risk for contracting HPV [OR: 6.86; CI: 1.85, 25.52; $p = 0.009$]. Male students were less willing to receive the preventative HPV immunization than their female counterparts [OR: 0.355; CI: 0.155, 0.812; $p = 0.007$]. Students who were aware of the relationship between HPV and cervical cancer were nearly two times more likely to report willingness to receive the vaccine [OR: 1.93; CI: 0.987, 3.754; $p = 0.044$]. HPV vaccination uptake may be increased if future programs emphasize students' susceptibility to HPV infection. Vaccination campaigns should also highlight the relationship between HPV and cervical cancer, as well as vaccine safety and effectiveness.

1133

COMMUNITY KNOWLEDGE, RISK PERCEPTION AND PREPAREDNESS FOR THE 2009 INFLUENZA A/H1N1 PANDEMIC. *M Jehn, Y Kim, B Bradley, T Lant (Arizona State University, Tempe, AZ 85287)

To examine public knowledge, perceptions and preparedness for the 2009 Influenza A/H1N1 pandemic, we conducted a telephone survey of selected households in Arizona during the month of October 2009. Among the 727 households interviewed, one-third (34%) were not aware that the terms swine flu and H1N1 refer to the same virus. Many believed that it is more difficult to contract 2009 H1N1 (27%) than seasonal influenza (14%). About three quarters of respondents perceived the H1N1 situation as urgent (76%), but only about a third of those surveyed believed a family member would get sick with H1N1 within a year (35%). Approximately half (53%) of those surveyed intended to get the H1N1 influenza vaccine. Family doctors, television news and local public health officials were the most trusted sources for H1N1 information. The survey highlighted a number of important misconceptions about H1N1 knowledge, treatment options and transmissibility. Increased efforts should be made to understand how messages are transmitted and received in the community during a pandemic, in order to improve risk communication plans moving forward.

1134

IMPROVING PUBLIC HEALTH PREPAREDNESS THROUGH ENHANCED DECISION-MAKING ENVIRONMENTS. *M Jehn, T Lant (Arizona State University, Tempe, AZ 85287)

Tabletop exercises allow participants to role-play during a health emergency in an experiential practice environment and evaluate performance using existing benchmarks. Although tabletop exercises are routinely used in public health to identify gaps in emergency planning, quantitative measures of the impact of participating in an exercise are less common. Research on the interaction of decision making and emergency preparedness that focuses on the best-practices in real-time decision-making settings is a critical, unmet need in the field. To this end, Arizona State University has developed a novel epidemiology-driven simulation and tabletop exercise that facilitates decision-maker interactions around emergency-response scenarios. Participants respond to a hypothetical pandemic influenza scenario and make iterative policy decisions in a group setting. The simulation gives policy makers the ability to see the real-time impact of decisions related to social distancing policies (e.g., percentage of the population infected with influenza, duration of outbreak, costs of school closures). We conducted a series of exercises across the state in the fall of 2009 to address the impact of this simulation-based exercise on participants' perceived competence in several public health functional capabilities. All participants (N = 109) were given a pre- and post-evaluation survey to assess improvements in self-reported knowledge and competence in several public health functional capabilities. The exercises provided a valuable forum reviewing and assessing emergency plans for schools to prepare for, respond to, and recover from an influenza pandemic. After the exercise, participants reported a significantly increased level of confidence in performing core public health functional capabilities.

1136

CAMBODIAN AMERICAN ADULTS' AWARENESS OF CALIFORNIA'S "SMOKE-FREE CARS WITH MINORS" LAW. *R Friis, C Garrido-Ortega, A Safer, C Wankie, J Pallasigui, M Forouzesh, K Trefflich, K Kuoch (California State University, Long Beach, CA)

On January 1, 2008, California enacted the "smoke-free cars with minors" law that bans smoking in automobiles when minors are present. We used an epidemiologic approach to investigate Cambodian American adults' awareness of this law. Cambodian Americans (especially men) have a high prevalence of smoking. A stratified, random sample of respondents (n = 1,414; females = 60.1%; mean age = 50.5 years) was obtained from census tracts with high concentrations of Cambodian Americans who reside in Long Beach, California. A cross-sectional survey collected information on demographic characteristics and awareness of this law. A total of 72.0% of respondents were aware of the law. A logistic regression analysis found that significant demographic predictors of awareness were age, marital status, employment status, and educational status. Persons aged 30 to 64 years were 1.5 times (95% CI = 1.0 – 2.1) more likely than those aged 65 years and older to report awareness of the law. Married persons were 2.0 times (95% CI = 1.5 – 2.7) more likely than unmarried persons to report awareness of the law. Unemployed persons were 1.7 times (95% CI = 1.2 – 2.3) more likely than employed persons to report awareness of the law. Persons who had a grade 10th to 12th education level were 1.7 times (95% CI = 1.1 – 2.7) more likely than those with a college education to report awareness of the law. Consequently, those most aware of the law tended to be 30 to 64 years of age, married, unemployed, and have a grade 10th to 12th education.

1135

DRIVING IN REVERSE: USING ADMINISTRATIVE HEALTH SYSTEM RECORDS TO RECRUIT A COMMUNITY-REPRESENTATIVE COHORT. *J M Oakes, M Khandker, B L Harlow (University of Minnesota, Minneapolis, MN 55454)

Increasing prevalence of cell phones undermines the use of random digit dialing (RDD) telephone methods to recruit subjects representative of their home communities. The benefits of conventional household-sampling methods have also been in decline. Thus, it is currently unclear how best to recruit a community-representative sample. It has long been assumed that subjects recruited from clinical (eg, ambulatory care and/or hospital) records, even when selected randomly, yield samples unrepresentative of host communities, and the selection bias associated with clinical visits is thought to yield unrepresentative samples. Pursuant to enrolling a community-representative sample for a women's health study, we accessed administrative records of all outpatient visits within the past 2 years to a major ambulatory care and hospital system in the Twin Cities metropolitan area of Minnesota, and geocoded women 18-40 years of age using their most recent home address. We then randomly sampled age-eligible women in target neighborhoods and asked them to complete a self-administered screener questionnaire about their current health status. From ~4000 completed screener questionnaires, we examined socio-demographic characteristics (race, educational attainment, age category) to determine how well participating subjects represent their census-based target neighborhood communities. Additional comparative analyses between these findings and an earlier study that relied on census-based sampling methods were also assessed regarding geographic and demographic comparability. Our "reverse" sampling methodology may hold great promise for identifying community-based samples representative of their demographic and geographic constituencies.

1137

COMPARING HEALTH RISKS OF SWEDISH SNUS WITH SMOKING. *C Ward and G Mariano (ENVIRON International, Arlington, VA 22203)

The US Family Smoking Prevention and Tobacco Control Act has fueled interest in the potential role of smokeless tobacco products in reducing harm from cigarettes. Health risks among users of Swedish snus, a smokeless tobacco product, have been compared to those of smokers in roughly 60 epidemiology studies. We extracted the relative risk estimates for snus and smoking from individual studies where compared in a single study population. We plotted the overall risk estimates, and those from subanalyses such as age- or dose-groups, to compare pictorially the health risks for tobacco-related disease (defined by the US Surgeon General) and other health outcomes examined in the snus studies. Several limitations were identified. Even within the same study, snus users and smokers were not always compared to a common reference group, and exposure groups differed in some studies, eg, ever smokers and current snus users, making comparisons within a single study difficult. In other studies, covariate-adjusted risk estimates were reported for one tobacco user group, but not the other, and thus only univariate risk estimates were available to compare. Limitations in inter-study comparability included differences in exposure groups, in health outcome definitions, variations in the quality and control of important potential confounding factors, and in measurement and reporting of dose-response analyses. In addition to using risk estimates from individual studies, we also compared summary risk estimates published in meta-analyses or for large cohorts to further present the overall picture of risks from snus use compared to smoking. Despite these limitations, portraying risks in a summary plot provides a reasonable way to compare and present the risk differences for different tobacco products.

1138

USING CAUSE-OF-DEATH TEXTS ON DEATH CERTIFICATES TO IDENTIFY DEATHS FROM SPECIFIC RARE DISEASES. *M Adams and D Mandel (Centers for Disease Control and Prevention, Atlanta, GA 30333)

Rare diseases with similar pathologies but distinct symptoms sometimes share a single ICD diagnosis code. For example, Duchenne muscular dystrophy (DMD)—a rare childhood onset neuromuscular condition with mortality in late teen or early adult years—shares a diagnosis code (G71.0, ICD-10) with other muscular dystrophy types. All types of muscular dystrophy have muscular dysfunction, but the type of dysfunction results in distinct mortality patterns: death in infancy; late adolescence thru early adulthood; or usual adult survival. Searching the text written on death certificates for specific causes of death may be an effective way to identify distinct rare diseases from mortality records. To find DMD deaths, we screened > 6 million death certificates filed in the United States during 2003-7. We searched for the G71.0 diagnosis code as well as the text for DMD. Of the 1,485 males with the G71.0 diagnosis code who died between age 10 and 35, 633 (43%) had cause of death text or DMD. Moreover, comparing records with text for DMD ($n = 777$) to records with text that did not state the type of muscular dystrophy ($n = 2,756$) revealed distinct age at death distributions (17-26 years vs. 28-64 years; 25th-75th percentiles). We conclude that using the cause of death text will ascertain some, but not all DMD deaths. Therefore, this method may be a practical way to identify deaths from rare diseases that could not be identified from ICD diagnosis codes.

1140-S

STARTING FROM SCRATCH: DEVELOPING A DATA MANAGEMENT INFRASTRUCTURE ON A BUDGET. *E L Priest (Baylor Health Care System, Dallas, TX 75246)

Epidemiology is based on measurement. The initial measured value of a variable may be modified before the final analysis by the data management processes of handling, monitoring, and controlling. Thus, data management processes can impact data quality and the validity and precision of estimates of effect. Developing a high quality data management infrastructure is critical to epidemiologic research. We developed a data management infrastructure that would allow one person to manage data across multiple studies. This complex project was successful even with the limited resources of people and money. We documented the requirements for research, investigated and implemented software solutions, and researched and created data management processes for our organization. We developed a database for tracking critical documentation on data management processes, implemented an open source electronic data capture system, and created standard operating procedures. Many epidemiologists are faced with the problem of developing data management infrastructure for studies with a limited budget and few personnel. Our experience provides an outline of the information needed and decision points required during the development of a data management infrastructure for a small data management group.

1139-S

THE IMPACT OF A \$.25 PER DRINK TAX INCREASE: WHO REALLY PAYS THE TAB? *M Stahre, J Daley, T Naimi (University of Minnesota, Minneapolis, MN)

Excessive alcohol use is the third leading preventable cause of death in the United States annually. Raising the price of alcohol through excise taxes is an effective, evidence-based means of reducing excessive alcohol use and related harms. However, this method faces strong political opposition. One argument against a tax increase is that 'moderate' or low risk drinkers will be unfairly burdened. To investigate the impact of a \$.25 tax increase on low- versus high-risk drinkers, data from the 2008 Behavioral Risk Factor Surveillance System was used. High-risk drinkers were those who reported any of the following in the past 30 days: binge drinking, heavy average consumption, daily drinking exceeding 2005 US Dietary Guidelines, or impaired driving. The impact of a \$.25 tax increase was estimated by multiplying the average number of drinks consumed by an individual per month by the tax increase. These results were extrapolated to one year and aggregated to the population level by selected demographics. Overall, about half of all past 30 day drinkers were high-risk. A hypothetical tax increase of \$.25 would result in a per capita annual tax of about \$131 for high-risk drinkers versus \$28 for low-risk drinkers. The aggregate annual tax for all drinkers was \$9.1 billion; 83% accrued by high-risk drinkers. The demographic groups that would pay the most of the hypothetical tax increase included those aged 21-30 years, males, those of white race, college graduates, and those employed making \$50,000 or more. Although a tax increase would likely affect the amount of alcohol consumed by various groups, the results of this study demonstrate that a tax increase would be borne disproportionately by high-risk drinkers, both as individuals and in aggregate.

1141-S

THE IMPACT OF SOCIO-ECONOMIC STATUS AND PRICE MINIMIZING BEHAVIORS ON SMOKING CESSATION: FINDINGS FROM THE INTERNATIONAL TOBACCO CONTROL (ITC) FOUR COUNTRY SURVEY. *A Licht, A Hyland, R O'Connor, F Chaloupka, R Borland, G T Fong, N Nargis, K M Cummings (University at Buffalo, Buffalo N Y 14214)

This study examines the relationship between using price minimizing behaviors (PMB) and cessation indicators using data from the International Tobacco Control (ITC) Four Country Survey, and includes 7,038 adult smokers from Canada, the United States, the United Kingdom and Australia of which 4,961 were re-interviewed one year later. PMB included: low/untaxed sources, discount cigarettes/roll-your-own (RYO) tobacco, carton purchases, and using simultaneous behaviors at last purchase. Odds ratios were calculated from multivariate logistic regression models examining predictors of using PMB, and if use of PMB predicted cessation at 1-year follow-up (cessation, making a quit attempt, successful quit attempt). Statistical tests for interaction examined the joint effects of socio-economic status (SES) and each PMB on cessation outcomes. 63% of all respondents used any PMB. Low SES smokers were less likely to use low/untaxed sources or cartons but were more likely to use discount brands/RYO. Low SES smokers were more likely to use any PMB compared to high SES smokers. Smokers who used any PMB at last purchase were 28% less likely to quit at follow-up, those using two or more PMB simultaneously were 40% less likely to quit. SES did not modify this relationship. Lower priced cigarettes may attenuate public health efforts to reduce the smoking prevalence via price/tax increases among all SES strata. Minimum price policies and specific tobacco excise taxes may effectively increase tobacco prices across all products and jurisdictions, reducing the availability of cheaper products.

1142

THE MEDICAL DEVICE EPIDEMIOLOGY NETWORK (MDEPINET)—IMPACTING THE FUTURE OF REGULATORY SCIENCE PRACTICE. D Marinac-Dabic, *M E Ritchey, E Pinnow, H L Wong (Food and Drug Administration Center for Devices and Radiological Health, Silver Spring, MD)

MDEpiNet was launched this year as collaboration between FDA experts and academic centers with epidemiologic, statistical, and clinically relevant expertise to establish a partnership to determine the evidence gaps and questions, datasets and approaches for conducting robust analytic studies and improve understanding of the performance of medical devices. The creation of MDEpiNet was motivated by the need to leverage resources and expertise from multiple stakeholders toward the development of innovative methods to address methodological gaps in studying medical devices. While FDA has considerable expertise and analytic tools to evaluate device safety and effectiveness, collaboration with methodological and clinical subject matter experts will result in a more comprehensive understanding of device performance. MDEpiNet will collect, evaluate and share information, facilitate advancement of device development, and promote and protect the health of the public. This effort will enable better decision-making by FDA, the medical device industry, and by medical professionals and the American public. Specific projects implemented under the auspices of MDEpiNet will incorporate innovative methods for studying medical devices and facilitate knowledge management toward ultimate goals of advancing regulatory science. As FDA and our academic partners begin this venture, we want to share aspects of this innovative partnership, including infrastructure, MDEpiNet objectives, successful pilot initiatives, and opportunities for future collaboration.

1144

EPIDEMIOLOGY AND THE HUMANITIES: POEMS ON COMMON METAPHORS. *D L Weed (DLW Consulting SvcsLLC, El Prado, NM 87529-1632)

The role of the humanities in epidemiology is well-established. Ethics, history, and the philosophy of science have played key roles in the development of epidemiological concepts and methods. The practice of epidemiology has been improved as a result of the scholarly attention paid to our humanitarian roots. Professional ethics guidelines are an excellent example as are counterfactual statistical methods. The relevance of other humanistic disciplines—literature and art—are not so apparent, although commentators have made the case that these disciplines are important. This paper explores the role poetry plays in epidemiology as applied to metaphors used in epidemiological practice. A few (serious) poems have appeared in the epidemiological literature: see, for example, “The Sea of Person Time” in (Int J Epidemiol 1996) and “Rethinking Epidemiology” in (Int J Epidemiol 2006) Here, three poems are offered: “The Web of Causation,” “Ivory Tower,” and “The River of Uncertainty.” The “Web of Causation” has been used as a way to describe the need for multilevel hypotheses and analyses, including but not limited to social causes. The “Ivory Tower” is a popular way to describe the distance that can be maintained between academia and the “real” world including epidemiologists in private sector employment. Finally, the “River of Uncertainty” is a useful metaphor to begin an exploration into the overwhelming impact that chance and under-determination have on epidemiological thinking and practice. It has been said that poetry brings us closer together because it reveals our emotions and blends our ideas in ways that traditional modes of scientific (and ethical) expression cannot. Poetry can also bring us closer to the public whom we serve.

1143-S

CHALLENGES CREATED BY DATA DISSEMINATION AND ACCESS RESTRICTIONS WHEN ATTEMPTING TO ADDRESS COMMUNITY CONCERNS: INDIVIDUAL PRIVACY VERSUS PUBLIC WELLBEING. *A Colquhoun, L Aplin, K J Goodman, and J Hatcher (University of Alberta, Edmonton, AB, Canada T6G2E1)

Population health data are vital for the identification of public health problems and the development of public health strategies. Challenges arise when attempts are made to disseminate or access anonymised data that are deemed to be potentially identifiable. In these situations, there is debate about whether the protection of an individual’s privacy outweighs potentially beneficial public health initiatives developed using confidential information. While these issues have an impact at planning and policy levels, they pose a particular dilemma when attempting to examine and address community concerns about a specific health problem. Barriers are faced by public health professionals and researchers when endeavouring to address these concerns; specifically, provincial cancer surveillance departments and community-driven participatory research groups face challenges related to data release or access that inhibit their ability to effectively address community enquiries. The resulting consequences include a limited ability to address misinformation or to alleviate concerns when dealing with health problems in small communities. Research currently underway in northern Canadian communities on the frequency of *Helicobacter pylori* and associated diseases, such as stomach cancer, will be used to illustrate the challenges that data controls create on the ability of researchers and health officials to address community concerns. The consequences of these data dissemination and access restrictions will be outlined and potential solutions will be offered.

1145

THE CASE FOR TOBACCO HARM REDUCTION. *C V Phillips, K K Heavner, C M Nissen, P L Bergen (Populi Health Institute, Wayne, PA 19087)

Tobacco harm reduction (THR), substitution of low-risk nicotine products for cigarette smoking, is increasingly recognized as the only proven method for substantially reducing smoking prevalence much below current levels in Western countries. While the epidemiology always showed that widely-used smokeless nicotine sources (smokeless tobacco and pharmaceutical nicotine) caused much lower risk than smoking, the last decade has solidified that evidence. It is widely agreed that these and new products (dissolvable oral products, electronic cigarettes) cause about 1/100th the risk of smoking. Many would-be smokers have switched or only used low-risk alternatives, with the expected result: health outcomes indistinguishable from non-users of nicotine. Further research shows a pent-up demand among smokers to switch to low-risk products that they do not know exist or cannot get. With the epidemiology clear, assessing the promise of THR now must focus on why we do not use our knowledge to improve public health, which requires an analysis of political economy. Similarly, making the case for THR must move beyond the epidemiology to address the ethical case for demanding an end to disinformation about that epidemiology. To address all of these points systematically, we are completing a book-length analysis that reviews the epidemiology and puts it in the context of scholarly analysis of the relevant economics, political science, and ethics. In addition to making a case for one of the greatest untapped public health interventions, this analysis will be a useful case study for epidemiologic researchers interested in how their results fit into a policy-making context, and stands as a *J'accuse* toward political actors who have misrepresented epidemiology to the detriment of public health.

1146

EVALUATION OF SYNDROMIC SURVEILLANCE SYSTEMS USED IN ONTARIO DURING THE H1N1 PANDEMIC. *R Savage, L Rosella, M Policarpio, R Walton, A Chu, and I Johnson (Ontario Agency for Health Protection and Promotion, Toronto, On, Canada M5G 1V2)

To evaluate the role of syndromic surveillance in informing public health action, we examined the experiences of Ontario, Canada's 36 public health units, the Ontario Ministry of Health and Long-Term Care and Public Health Agency of Canada during the 2009 H1N1 pandemic. A web survey was completed by all invitees (100% response rate) to identify syndromic surveillance systems used, and to describe system attributes and utility in monitoring pandemic activity and informing decision making locally. Overall, 53% (20/38) of organizations reported having access to local syndromic surveillance systems. During the pandemic, several health units also created temporary systems to collect syndromic data. Of all syndromic sources, school absenteeism and emergency department screening data were the most frequently used and reported to be the most essential in local monitoring and decision-making during the pandemic; however neither were considered as useful as laboratory testing data. Laboratory testing data was rated as having a very acceptable level of reliability, timeliness and accuracy by 92%, 51% and 89% of respondents. In contrast, the highest rated syndromic data sources were ED visit data at 48% for reliability, hospital/clinic screening data at 43% for timeliness and ED visit data at 48% for accuracy. Interviews are being conducted to further understand how syndromic data supported specific actions taken by public health during the pandemic. Understanding the utility of syndromic data will inform further investments in public health surveillance capacity for both emergency preparedness and routine disease surveillance.

1148

DIFFERENTIAL EFFECTIVENESS OF PSYCHOLOGICAL AND PHARMACOTHERAPY INTERVENTIONS FOR PTSD: A META-ANALYTIC REVIEW. *S C Messer (Center for Psychological Studies, Nova Southeastern University, Fort Lauderdale, FL 33314)

Posttraumatic stress disorder (PTSD) is estimated to affect 9% of individuals in the population at some point in their lives and is associated with high rates of comorbidity. PTSD constitutes a major public mental health morbidity and mortality burden, highlighting the importance of prevention and early intervention efforts. Comparative effectiveness research is critical in the identification of the most robust interventions. Treatment guidelines for PTSD include empirical reviews of the literature and meta-analyses; however, their recommendations have some significant disagreement. For example, though there is agreement that trauma-focused cognitive behavioral therapies show efficacy, a recent Institute of Medicine review found insufficient evidence for the efficacy of selective serotonin and norepinephrine inhibitor (SSRI, SNRI) medications, causing controversy. The current study is a meta-analytic review of the effectiveness of both psychological and pharmacological therapies and most importantly, their differential efficacy. The study follows the PRISMA recommendations for the conduct of a high quality meta-analysis. Moreover, subgroup and meta-regression analyses will examine group difference and relations such as baseline severity of PTSD symptoms, gender, comorbidity, depression diagnosis, and attrition associated with psychological and pharmacologic treatments of PTSD. Empirical evidence highlighting the benefits of both classes of interventions, separately and differentially, will assist clinicians and policy makers making mental health care decisions, as well as providing focus for research gaps, for this significant public health problem.

1147

STRESSFUL LIFE EVENTS AND RELATIONSHIPS ARE ASSOCIATED WITH MENTAL HEALTH SYMPTOMS AND SUBSTANCE USE IN YOUNG ADOLESCENTS. *N C Low, E Dugas, D Rodriguez, G Contreras, E O'Loughlin, M Chaiton, J O'Loughlin (McGill University, Montreal, QC, Canada)

Objective: To describe the association between common stressors and indicators of mental health problems and substance use in a population-based sample of adolescents. Sample and Methods: Data on romantic, interpersonal, personal and family stress, symptoms of depression and conduct disorder, and substance use (smoking, binge drinking, marijuana use, illicit drug use) were collected in self-report questionnaires completed by 834 grade 7 students (mean age 12.8 years; 47% male). The association between each stressor and each mental health and substance use indicator was modeled in multivariable logistic regression analysis controlling for covariates. Results: Relatively high proportions of boys and girls reported that life events and relationships caused them stress/worry, ranging from 3% for sex to 22% for schoolwork. A higher proportion of girls than boys reported worry/stress for most stressors. Romantic stress was statistically significantly associated with all the mental health and substance use indicators. Interpersonal stress was associated with mental health symptoms, and was borderline statistically significantly associated with smoking and illicit drug use. Family stress was associated with marijuana use only. Personal stress was related to depression symptoms and was borderline statistically significantly associated with conduct disorder. Conclusions: Reports of stressful life events and relationships are common in adolescents. Interventions may be needed to help adolescents learn positive coping skills for common sources of stress and in particular, to develop skills to cope with stress related to romantic relationships. Parents, teachers and clinicians should be vigilant in monitoring stress and its effects in young people.

1149-S

THE EFFECT OF TRAUMA CARE IN THE TEMPORAL DISTRIBUTION OF HOMICIDE AND SUICIDE MORTALITY *R Griffin and G McGwin, Jr., (University of Alabama, Birmingham, AL 35294)

The distribution of time from acute traumatic injury to death has three peaks: immediate (≤ 1 hour), early (6 to 24 hours) and late (days to weeks). It has been suggested that coordinated trauma care dampens the early peak; however, this research is based largely upon deaths due to unintentional injuries, which are generally less severe than intentional injuries. Thus, this decrease in early deaths may be more reflective of unintentional than intentional deaths. This study examines whether a coordinated trauma care system alters the temporal distribution for deaths due to intentional injury. Data were obtained from deaths examined by the Jefferson County Coroner/Medical Examiner Office from 1984-2008. Deaths were determined to be a homicide or suicide by a trained medical examiner. A death occurring from 1997-2008 was defined as occurring in the presence of a trauma system (the trauma system including Jefferson County was implemented in late 1996). Time from injury to death was categorized as ≤ 1 hour, $> 1-6$ hours, $> 6-24$ hours, > 24 hours-3 days, 3-7 days, and > 7 days. A total of 2923 homicides and 1835 suicides occurred from 1984-2008. The presence of a trauma system was associated with a change in the temporal distribution of homicide mortality, with an increase in deaths within an hour and a decrease in deaths 24 hours or later ($p = 0.0008$). There was no association between presence of a trauma system and the temporal distribution of suicide mortality ($p = 0.3035$). These results suggest that a trauma system is effective in preventing early and late homicide deaths; however, other means of preventing death (such as violence prevention programs) are needed to decrease the burden of suicides and immediate homicide deaths.

1150

RECIPROCAL ASSOCIATIONS BETWEEN BMI AND PSYCHOSOCIAL ADJUSTMENT DURING ADOLESCENCE. *B Xie, El J Susman. (School of Community and Global Health, Claremont Graduate University, San Dimas, CA 91773)

Limited efforts have been made to examine the dynamic reciprocal associations between body mass index (BMI) and multiple co-occurring psychosocial adjustment problems during adolescence utilizing statistically sound analytic approaches. We conducted a secondary analysis with data from the multisite Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development (SECCYD). Longitudinal data consisted of repeated measures of weight, height, and broad-band behavior problems (i.e. internalizing and externalizing problems) in 1,364 youths during the period from age nine to age fifteen. State of the art analytic approach of cross-lagged modeling with latent difference scores was applied to explore the reciprocal associations between age-gender specific BMI z scores and both internalizing and externalizing behavioral problems. In girls, significant causal paths were observed from internalizing problem at 5th and 6th grade to BMI z scores, and from BMI z scores at 6th grade to externalizing problems. In boys, externalizing problems at 5th grade significantly predicted BMI z scores, and BMI z scores at 6th grade significantly predicted internalizing problems. Findings from our analysis may have the great potential to advance knowledge on the dynamic reciprocal associations between BMI and psychosocial adjustment during adolescence, which can be translated into appropriate interventions to address the epidemic of overweight among adolescents.

1152

CHILDHOOD ADVERSITY AND ADULT MOOD DISORDERS. *J Jacobs and G Bovasso (Southern Connecticut State, New Haven, CT)

Inconsistencies in the research about whether parentally bereaved adults are more likely to have increase risk for adult psychopathology than adults from intact families might be accounted by the prevalence of small samples and groups which have limited external validity such as twins, college students or institutionalized subjects. Subjects: The 1118 subjects were gathered thru Baltimore Epidemiologic Catchment Area (ECA) as part of a follow-up survey and two cohorts were created. One cohort consisted of 116 subjects who had one or both parents die before the age of 18. The comparison cohort consisted of 972 subjects whose parents were both still alive. Subjects whose parents died in adulthood were excluded from the analysis. The Diagnostic Interview Survey was used to assess symptoms of depression, anxiety, panic, alcohol and drug abuse symptoms. Results : A multiple analysis of covariance was conducted and subjects whose parents died in childhood reported more depression $F(1, 976) = 674.3, p < .01$, phobia $F(1, 976) = 17.93, p < .01$, and panic $F(1, 976) = 72.12, p < .01$. However, less drug $F(1, 976) = 96.55, p < .01$ and alcohol symptoms $F(1, 976) = 335.28, p < .01$. No interaction effects were detected. Discussion: The severity of the grief, the decrease availability of the surviving parent, and financial complications surrounding a loss of a parent might contribute to the consequences of a traumatic loss persisting in adult life. Difficulty adapting to childhood and adolescent stress might leave them with a heightened vulnerability to anxiety, panic and depression. Parental loss subjects might also be more cautious in general and this might account for lower substance abuse, which is an unnecessary, and risky behavior associated with aversive legal and health consequences.

1151

A LATENT CLUSTER ANALYSIS APPROACH TO INVESTIGATE TRAJECTORIES OF POSTTRAUMATIC STRESS SYMPTOMS AND DYSFUNCTION. *M Cerdá, F Norris, E Goldmann, M Tracy and S Galea (Columbia University, New York, NY 10032)

While post-trauma research has focused on psychiatric disorders, mainly posttraumatic stress disorder, traumatic events may have broader mental health effects that result in dysfunction at home, work and social settings. We know little about dysfunction trajectories, or the relation between post-traumatic stress symptoms (PTSS) and dysfunction. We selected a random sample of adults in Galveston and Chambers Counties, Texas, 2-6 months after Hurricane Ike and interviewed them 3 times in 2 years. PTSS and dysfunction items were subject to repeated measures latent class analysis to estimate common pathways. Respondents exhibited the following patterns over the 2 years: (1) no dysfunction/PTSS class members (58.2% - 78.8% of sample at Times 1-3) were unlikely to experience role impairment, interference with social activities/daily behaviors, difficulties handling stressors, or to report PTSS including re-experiencing, avoidance and hyperarousal; (2) low dysfunction/moderate PTSS class members (29.4-14.6%) were unlikely to report dysfunction symptoms but moderately likely to report PTSS; and (3) high dysfunction/PTSS class members (12.4-6.6%) were highly likely to exhibit both dysfunction and PTSS. Relative to the no dysfunction/PTSS class, membership in the low dysfunction/moderate PTSS class was predicted by exposure to Ike-related and post-Ike stressors. Membership in the high dysfunction/PTSS class was predicted by Ike-related and post-Ike traumatic events and stressors. These results illustrate distinct and co-occurring post-trauma PTSS and dysfunction trajectories. Alleviating ongoing post-trauma adverse circumstances may play a central role in mitigating the consequences of traumatic events.

1153

A LONGITUDINAL REGISTRY OF POST-TRAUMATIC STRESS DISORDER IN OEF/OIF VETERANS: THE EARLY RECRUITMENT EXPERIENCE. *M A Gates, D W Holowka, P Rodriguez, T M Keane, B P Marx, R C Rosen (New England Research Institutes, Watertown, MA 02472)

Posttraumatic stress disorder (PTSD) is a common and potentially disabling psychiatric disorder that affects a large number of active duty military personnel and veterans. However, the natural history of PTSD and predictors of remission and progression are not well understood. In 2010, we began recruitment for Project VALOR, an observational patient registry of 1,600 male and female veterans with ($n = 1,200$) or without ($n = 400$) a history of PTSD who were deployed to combat and utilized the Department of Veterans Affairs (VA) health care system. Data on medical history, including prior PTSD diagnoses, were abstracted from the VA electronic medical records at baseline. Participants completed an online self-administered questionnaire and a semi-structured diagnostic telephone interview administered by a blinded, doctoral-level clinician with specialized training in PTSD assessment using the Structured Clinical Interview for DSM (SCID) Module for PTSD. We enrolled 27 participants (13 men and 14 women) during the pilot phase of the study. On average, participants were 42 years of age (range: 28 to 58 years), and 74% of participants had a diagnosis of PTSD based on the VA medical records. Concordance between the PTSD diagnosis from the medical records and the SCID was 82%; 18 participants (67%) had a positive diagnosis on both the medical records and the SCID, 3 (11%) were positive on the SCID but not the medical records, 2 (7%) were positive based on the medical records but not the SCID, and 4 (15%) were negative for both. Study recruitment is ongoing. These results suggest that confirmation of medical record-based diagnoses is needed in studies of PTSD. Funded by the U.S. Department of Defense (award numbers W81XWH-08-2-0100, W81XWH-08-2-0102)

1154

DESCRIPTIVE EPIDEMIOLOGY AND UNDERLYING PSYCHIATRIC CONDITIONS AMONG SUICIDE ATTEMPTERS IN THE NATIONAL HOSPITAL DISCHARGE SURVEY (NHDS). *N S Weber, J A Fisher, D N Cowan, T T Postolache, W F Page, and D W Niebuhr (Walter Reed Army Institute of Research, Silver Spring, MD 20910)

Suicide is the 2nd leading cause of death in the US among persons 13-40 years old. We examined demographic characteristics, time and seasonal trends, and underlying psychiatric conditions in hospital discharges with suicide attempts (ICD-9 code E95), using the CDC-maintained NHDS, which contains > 6 million records from 1979-2006. SAS 9.1 survey procedures were used for statistical analyses of weighted data. We calculated proportional morbidity of suicide attempts per year and explored changes over several time periods. Demographic and seasonal variations were examined. Logistic regression was used to compare demographic characteristics and psychiatric morbidity between violent and non-violent methods of suicide attempts. While proportions of suicidal attempts using violent means were stable over the study period, attempts using non-violent means increased significantly ($p < 0.001$) from 1980-1988, with a second peak in 2000-2001. We found significant changes in the monthly distribution of the suicide attempts in discharges from the northeast ($p < 0.001$) and south ($p = 0.01$). 79% of hospitalizations with non violent attempts and 83% with violent attempts had at least one underlying psychiatric condition ($p < 0.001$). Significantly ($p < 0.001$) more females (87%) than males (79%) who used violent means had an underlying psychiatric condition. The presence of psychotic and personality disorders was associated with violent suicide attempts, with odds ratios of 1.6 (95% CI 1.4, 2.0) and 1.4 (95% CI 1.1, 1.9), respectively. NHDS data provide insight into suicide attempts not available elsewhere.

1156-S

A PROSPECTIVE POPULATION-BASED STUDY OF SUICIDAL BEHAVIOR BY BURNS IN TWO PROVINCES IN IRAN. *R Alaghebandan, A Rastegar Lari, M-T Joghataei, A Motavalian (Memorial University of Newfoundland, St. John's NL Canada)

The aim of the study was to examine epidemiologic characteristics differences of suicidal behavior by burns requiring hospitalization between urban and rural settings in the provinces of Khorasan and Ilam in Iran. A prospective population-based study of all suicidal behaviors by burns requiring hospitalization was conducted in the provinces of Khorasan and Ilam, Iran, from March 21, 2005 to March 20, 2006. Data were obtained from patients, family members, and/or significant others through interviews during the course of hospitalization. A total of 181 patients with suicidal behavior by burns requiring hospitalization were identified during the study period, representing an overall incidence rate of 8.0 per 100,000 person-year (P-Y). The rate of suicidal behavior by burns among the rural population was slightly higher than the urban population (8.1 vs. 7.9 per 100,000 P-Y) ($P > 0.05$). Females in both urban and rural settings had a higher rate of suicidal behavior by burns than males (5.9 vs. 2.7 for urban areas, 18.2 vs. 6.4 for rural areas per 100,000 P-Y) ($P < 0.001$). The age-specific rate of suicidal behavior by burns peaked at age group 20-29 years for both urban and rural areas (19.6 and 18.9 per 100,000 P-Y, respectively). In urban areas, the rate of suicidal behavior by burns was higher among married persons than single persons, while an opposite pattern was observed in rural areas. The most frequent precipitating factor for suicidal behavior was marital conflicts in both urban and rural areas. The high rate of suicidal behavior by burns among young, married women in both urban and rural areas is an alarming social tragedy. Despite substantial efforts toward improving health and human rights, persistent conditions allow violence against women in Iran and that these women continue to turn to the desperate remedy of self-burning.

1155-S

THE ASSOCIATION BETWEEN DIET QUALITY AND INTERNALIZING DISORDERS IN CHILDREN. *S McMartin, S Kuhle, S Kirk, P Veugelers, and I Colman (School of Public Health, University of Alberta, CA)

To investigate the association between overall diet quality and the development of an internalizing disorder we used data from the Children's Lifestyle and School Performance study (CLASS). CLASS involved the participation of 5,200 Grade 5 students from Nova Scotia, Canada and included the completion of the Harvard Food Frequency Questionnaire. Students were linked with their administrative health data through health insurance card numbers to provide a physician diagnosis of an internalizing disorder within 3 years of follow up. Negative binomial regression models were used to examine the association between overall diet quality and internalizing disorder while adjusting for gender, socioeconomic characteristics of parents, geographic area, parental marital status, BMI and physical activity level. Moderate overall diet quality score was not associated with the development of an internalizing disorder (Incidence Rate Ratio (IRR) = 0.994; 95%CI: 0.658, 1.440). Greater variety in diet was significantly associated with lower risk of internalizing disorder (IRR = 0.449; 95%CI: 0.245, 0.821). Lower scores for Diet Quality Index-International components Variety and Adequacy rather than Balance and Moderation demonstrated a stronger gradient for the development of an internalizing disorder. Students with an increased fish intake were significantly less likely to develop an internalizing disorder (IRR = 0.594; 95%CI: 0.407, 0.866). These findings suggest the importance of overall variety and variety within protein sources in the diet, particularly fish, with respect to mental health. The potential for dietary interventions at the individual and population level should be considered to combat mental illness.

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NUMBER OF DEPLOYMENTS AND TOTAL MONTHS OF DEPLOYMENT AS PREDICTORS OF POST-TRAUMATIC STRESS DISORDER IN ACTIVE DUTY SOLDIERS. *R K Herrell, P B Bliese, and C W Hoge (Walter Reed Army Institute of Research, Silver Spring, MD 20910)

Repeated deployments to Iraq and Afghanistan increase risk for post-traumatic stress disorder in US Soldiers. We examined the effect number of deployments and total months deployed on prevalence of PTSD (measured with the PCL) in a sample of 3380 Soldiers, 77% of whom had at least 1 deployment. The Soldiers were surveyed approximately 6 months after redeployment. Both number of deployments and total months of deployment predict greater odds of PTSD. Four or more deployments more than triple the odds of PTSD compared to Soldiers with no deployments (odds ratio [OR] = 3.7, 95% confidence interval [CI] = 2.3-6.0; test for trend $p > \chi^2 = 0.000$). In Soldiers with the greatest total number of months of deployment (top quintile > 25 months) compared to those with no deployments, the odds of PTSD was more than doubled (OR = 2.5, CI = 1.8,3.6; test for trend $p > \chi^2 = 0.000$). The significant, independent effect remained when both effects were entered in logistic regression models as ordinal variables. However, when the sample was limited to at least 1 deployment and intensity of combat experiences was added to the model (type and extent of 30 experiences categorized as tertiles of the sum of the variables), number of deployments, but not months of deployment remained significant (OR = 1.2, CI = 1.1-1.3 over 1 to 4 or more deployments; p -trend > 0.025). Those with the highest combat intensity had a 5-fold increase in the odds of PTSD (OR = 4.9, CI = 3.5-6.8). While both number of deployments and total months of deployment add to the psychological demands on Soldiers, these results suggest that the process of returning to the theater itself increases the risk of PTSD.

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BEHAVIORAL HEALTH FIELD INVESTIGATIONS OF VIOLENT CRIME: METHODOLOGY & RESULTS IN A MILITARY POPULATION. *M Galloway, A Millikan, M Bell, R Perales, D Bibio, D Fink, C Lagana-Riordan (US Army Public Health Command, Gunpowder, MD 21010)

Modeled after a classic outbreak investigation, a mixed-methods approach was developed to conduct comprehensive field investigations of mental health and psychosocial outcomes, e.g. suicide, violent crimes. The rapid process often includes ascertainment & analysis of existing data and primary collection of data via focus groups and population surveys. Examples of unique methods & results from a population suspected of having an increased prevalence of violent crimes perpetrated by Soldiers will be presented. Multiple underlying measures were examined to define contributing factors of the rarer outcome, violent crimes. Given the increased negative behavioral history among violent crime perpetrators, a novel approach was undertaken to define individual behavioral health risk profiles, whereby we showed the prevalence of high risk profiles was nearly two and a half times more common among Soldiers present in the at-risk population a longer period of time (6.7% vs. 2.8%). Given the affect of combat deployments on behavioral health, and the difference in combat experiences often reported, we created a more granular definition of deployment and combat intensity based on self-reported combat experiences. A linear association was identified between increasing combat intensity and negative behavioral health outcomes (e.g. aggression, alcohol misuse, criminal behavior). Whereas Soldiers who experienced low/moderate levels of combat intensity were associated with moderately increased associations, Soldiers who reported high levels of combat intensity were associated with much greater significant associations (Odds Ratio Range: 2.3-4.0) compared with Soldiers never deployed.

1160

POST-TRAUMATIC STRESS DISORDER IS ASSOCIATED WITH IMMUNOSENESCENT T CELL PHENOTYPES IN THE DETROIT NEIGHBORHOOD HEALTH STUDY. *M Uddin, K Hekman, G Pawelec, E Derhovanessian, C Cheng, K C Koenen, D E Wildman, S Galea, A E Aiello (University of Michigan, Ann Arbor, MI 48104)

Post-traumatic stress disorder (PTSD) has previously been linked to alterations in T cell phenotypes. The extent to which this occurs in T cell subsets indicative of the age-related decline of the immune system, however, is currently unknown. We therefore sought to assess whether PTSD is associated with alterations in T cell subsets indicative of immunosenescence in a sample of community-dwelling adults in Detroit. A subsample of 85 participants from wave 1 of the Detroit Neighborhood Health Study with available venipuncture specimens was selected for analyses. All participants had been exposed to one or more potentially traumatic events and 19 met DSM-IV criteria for lifetime PTSD. Markers of T cell differentiation were assessed in isolated peripheral blood mononuclear cells via flow cytometry. Linear regression models were used to assess the relationship between lifetime PTSD and CD8+ and CD4+ T-cell subsets indicative of immunosenescence, controlling for age, medication, education, smoking, and seropositivity to cytomegalovirus. Lifetime PTSD predicted: significantly lower CD8+CD27+, CD8+CD28+ and naive CD8+ T cell percentages; and significantly lower CD4+CD28+ T cell percentages. Lifetime PTSD also predicted higher CD8+ and CD4+ T cell subsets with markers of very late stage differentiation, although these relationships did not reach statistical significance. Together, these results demonstrate that PTSD is associated with T cell phenotypes that are indicative of immunosenescence. Studies are ongoing to assess whether immunosenescent T cell profiles represent a vulnerability to PTSD, or are a consequence of this disorder.

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INCOME INEQUALITY AND SUICIDE IN SÃO PAULO, BRAZIL (1996 TO 2009). D H Bando, T G Fernandes, A C Goulart, I M Bensenor, and *P A Lotufo (Hospital Universitario-USP, S.Paulo, Brazil 05508)

To describe the characteristics of suicide in the city of São Paulo according to socioeconomic status. The city is organized into 96 districts that were classified into three areas according to family income. From 1996 to 2009, a total of 6,123 suicides (for area: wealthiest, 1,193; middle-income, 1,996; poorest area, 2,934) were adjudicated. In the poorest area the age-adjusted rates were 6.1 (men) and 1.6 (women); in the middle, 6.7 (men) and 1.5 (women), and the wealthiest 8.0 (men), and 2.8 (women). In the city, the suicide rates declined for men (from 8.3 to 6.9) and for women (from 2.2 to 1.8). No differences of temporal trends according to these three areas were observed. The most common method among men was hanging (51.4%) followed by firearm (21.9%) and poisoning (11.5%). Among women, the method were poisoning (35.5%) followed by hanging (27.3%) and jumping (21.1%). For comparison, the poorest area rates were reference. For men, the odds ratio (OR) and 95% Confidence Interval (95%CI) were for the middle and the wealthiest area, respectively: for hanging, 0.88 (0.78 to 1.00), and 1.09 (0.98 to 1.20); for firearms, 1.26 (1.07 to 1.49) and 1.95 (1.65 to 2.30); for poisoning, 0.87 (0.70 to 1.07), and 0.52 (0.39 to 0.71). For women, OR (95% CI) were, for the middle and the wealthiest area, respectively: poisoning, 0.81 (0.64 to 1.02), and 0.49 (0.36 to 0.67); for hanging, 1.03 (0.78 to 1.37), and 1.35 (1.01 to 1.79); for jumping, 2.09 (1.32 to 3.29) and 9.55 (6.54 to 13.94). Concluding, suicide rates were higher in the wealthiest area compared to the poorest one, and the method of self-inflicted death varied according to socioeconomic status.

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RISKY DRIVING BEHAVIOR AMONG OHIO ARMY NATIONAL GUARD SOLDIERS. *K J Hoggatt, E Goldmann, M Prescott, J Calabrese, M J Tamburrino, I Liberzon, S Galea (University of California Los Angeles, Los Angeles, CA 90095)

Risky driving among veterans is associated with deployment-related stressors, including posttraumatic stress disorder (PTSD), and alcohol abuse or dependence. Less is known about these behaviors in National Guard soldiers. We recruited 2616 Ohio Army National Guard soldiers, 1294 of whom had been deployed and experienced at least one traumatic event during the most recent deployment. Overall, 12% reported drinking and driving within the past 30 days, 26% reported passing cars on the right often within the past year, and 25% reported ignoring speed limits during the night or early morning often within the past year. Mental health (PTSD, generalized anxiety disorder, major depression) and alcohol abuse or dependence were associated with increased risky driving. In men, alcohol abuse or dependence predicted risky driving even after controlling for mental health history, deployment, and demographic characteristics (drinking and driving: odds ratio (OR) and 95% confidence interval (CI) = 7.5 (5.0, 11.4); passing on the right: 2.5 (2.0, 3.1); ignoring speed limits: 2.2 (1.8, 2.7). Results for women were similar (passing on the right: 1.8 (1.0, 3.1); ignoring speed limits: 1.7 (1.0, 2.9); due to sample size limitations we could not estimate drinking and driving for women). Deployment was associated with risky driving for men (OR (95% CI) for men: 1.6 (1.1, 2.3) for drinking and driving, 1.6 (1.2, 2.1) for passing on the right, and 1.2 (0.9, 1.6) for ignoring speed limits); among recently deployed men, risky driving increased with the number of traumatic events experienced. Efforts to decrease risky driving in veterans should include the National Guard, particularly those returning from deployment or with a history of mental health or alcohol use issues.

1162

PRENATAL VITAMINS, FUNCTIONAL ONE-CARBON METABOLISM GENE VARIANTS, AND RISK FOR AUTISM IN THE CHARGE STUDY. *R J Schmidt, R L Hansen, J Hartiala, H Allayee, L C Schmidt, D J Tancredi, F Tassone, I Hertz-Picciotto (University of California Davis, Davis, CA 95616)

Background: Causes of autism are unknown. Associations with maternal nutritional factors and their interactions with gene variants have not been reported. Methods: Northern California families were enrolled from 2003-2009 in the population-based case-control CHARGE (Childhood Autism Risks from Genetics and the Environment) Study. Children aged 24-60 months were evaluated and confirmed to have autism (n = 288), autism spectrum disorder (n = 141), or typical development (n = 278) at the M.I.N.D. Institute using standardized clinical assessments. Adjusted odds ratios (OR) were estimated for associations between autism and retrospectively collected maternal vitamin intake before and during pregnancy and combined effects with maternal and child MTHFR, COMT, MTRR, BHMT, FOLR2, CBS, and TCN2 genotypes. Results: Mothers of children with autism were less likely than those of typically developing children to report taking prenatal vitamins during the three months before and the first month of pregnancy (OR = 0.62, 95% confidence interval [CI]: 0.42-0.93). Significant interactions were found for maternal MTHFR 677, CBS, and child COMT 472 genotypes, with greater risk for autism when mothers did not take prenatal vitamins periconceptionally (OR [CI] = 4.5 [1.4-14.6]; 2.6 [1.2-5.4]; and 7.2 [2.3-22.4], respectively). Greater risk was also observed for other maternal genotypes when combined with no prenatal vitamin intake. Conclusions: Periconceptional use of prenatal vitamins may reduce the risk of having children with autism especially for genetically susceptible mothers and children. Replication and mechanistic investigations are warranted.

1164

MONITORING EMERGENCY DEPARTMENT (ED) VISITS FOR SUICIDE IDEATION AND ATTEMPTS DURING THE US ECONOMIC RECESSION USING BIOSENSE, 2008-2009. *R Gladden, K Vagi, N Patel, N Lipskiy, S Benoit, R English, A Dey, A Crosby (Centers for Disease Control and Prevention, Atlanta, GA)

Suicide is the eleventh leading cause of death for Americans. While national surveillance data are available, there is a 1 to 3 year delay in their release. During 2008-2009, America's unemployment rate increased from 5.8% to 9.3% and states struggled with budget deficits. Documented links between societal factors such as unemployment and suicidal behavior highlight the need for timely monitoring of suicide-related events during times of economic change to ensure adequate services are available. Near real-time ED chief complaint data collected by BioSense from a convenience sample of 419 hospitals across 20 states was used to compare 2008 to 2009 trends in ED visits related to suicide ideation and attempts. Analyses by gender, quarter-year (e.g., fall 2008 versus fall 2009), and age were conducted using chi-square tests for trend. The overall number of ED visits for suicide ideation among 14 to 64 year olds increased from 52,124 to 56,763 from 2008 to 2009. The proportion of ED visits for suicide ideation per 1000 ED visits increased significantly; 8.4% relative increase for males and 4.9% for females. The largest relative increases in proportions occurred in the last two quarters, ranging from 6.8% to 14.6%. The proportion of visits for suicide attempts did not change significantly. Increases in suicide ideation ED visits underscores the need to maintain services for people struggling with suicidal thoughts during the current recession. Results highlight the utility of BioSense as a sentinel system for monitoring suicide ideation and attempts. Patients' economic status was not available. The relationship between observed increases and economic changes needs further investigation.

1163-S

POTENTIAL IMPACT FRACTIONS OF RISK FACTORS FOR EARTHQUAKE RELATED PTSD IN A POPULATION-BASED SAMPLE OF HAITIANS: A COUNTERFACTUAL EXERCISE. *M Paczkowski, M Desvarieux, M Cerdá, C Péan, K Nemethy, S Galea (Columbia University, New York, NY 10032)

Low-income countries face an increased likelihood of severe disasters compared to high income countries. Despite this, few population-based studies regarding the psychological consequences of mass disasters have been conducted in low-income contexts, and none of which we are aware have calculated the attributable burden of risk factors for post-traumatic stress disorder (PTSD). Using population-based data collected 2-4 months after the January 12th, 2010 earthquake in Haiti, we investigated the relation between pre- and post-disaster risk factors and PTSD. We also created counterfactual distributions of risk factors to quantify potential reduction in the proportion of PTSD cases using the potential impact fraction as an analogue of the attributable burden. Results from multivariate logistic regression models indicated that those with prior history of violent trauma, post-earthquake injuries, job loss, and low social support were more likely to have PTSD (Odds Ratio (OR) = 1.56, 95% Confidence Interval (CI): 1.17, 2.07; OR = 1.51, 95% CI: 1.05, 2.17; OR = 1.41, 95% CI: 1.01, 1.96; OR = 1.54, 95% CI 1.16, 2.06, respectively). Under counterfactual scenarios, decreasing post earthquake injuries, job loss, and lifetime violent trauma by 10% reduced PTSD cases by 3.97, 3.24, 3.99%, respectively. Increasing social support by 10% reduced PTSD cases by 3.92%. Increasing social support and decreasing injuries, job loss, or lifetime violent trauma was equivalent in reducing PTSD cases. Post-disaster interventions aimed at connecting affected individuals with appropriate community social support systems may have the same impact as minimizing injuries on reducing PTSD cases.

1165-S

NIGHTTIME SLEEP DURATION AND EXTERNALIZING BEHAVIORS IN PRESCHOOL CHILDREN. *R Scharf, R Demmer, E Silver, R Stein, (Columbia University, New York, NY)

BACKGROUND: The number of hours preschool children in the US currently sleep is not well described. Shorter sleep may be associated with externalizing behaviors. PURPOSE: To examine how many hours US preschool children sleep at night and test the hypothesis that children with shorter sleep duration are more likely to exhibit externalizing behaviors. METHODS: This study examines the 3rd wave of the Early Childhood Longitudinal Study, Birth Cohort, a nationally representative sample of children born in 2001 (n = ~10,650). Parents of 4-year-olds reported their child's typical weekday bed and wake times from which nighttime sleep duration was calculated. Short sleep duration (SSD) was defined as sleeping < 1 standard deviation below the mean duration. Parents rated their child on the Preschool and Kindergarten Behavior Scale - 2nd Ed., in regard to six different externalizing behaviors on a scale from 1-5 (never, rarely, sometimes, often, very often). Items were dichotomized as scores of 1-3 vs. 4-5. Logistic regression analyses were used to examine the association and adjust for socioeconomic status, guardians in the home, race, gender, and television viewing. RESULTS: Weighted to ~3,895,100 children born in 2001, mean sleep duration was 10.47 hours. Mean bedtime was 8:39 pm and wake time was 7:13 am. The odds ratios and 95%CI for children with SSDs (< 9.44 hours) compared with children sleeping ≥ 9.44 hours for six different externalizing behavior outcomes were as follows: over-activity = 1.27(1.03-1.57); anger = 1.33(1.10-1.60); aggression = 1.65(1.24-2.19); impulsivity = 1.38(1.10-1.73); tantrums = 1.47(1.18-1.84); and annoyance = 1.39(1.01-1.93). CONCLUSION: Children with shorter sleep duration more frequently exhibited externalizing behaviors.

1166

LOW SOCIAL SUPPORT AS A PREDICTOR FOR DISABILITY IN PEOPLE WITH DIABETES. *N Schmitz, G Gariepy, A Malla, J Wang, R Boyer, L Messier, A Lesage, I Strychar (Douglas Mental Health University Institute, McGill University, Montreal, QC, Canada)

The purpose of the study was to estimate the association between social support and disability in a prospective community sample of people with diabetes. Random digit dialing was used to select a sample of adults with diabetes in Quebec (2008; n = 2003). Disability was assessed by the World Health Organization Disability Assessment Schedule II. Social Support was assessed by abbreviated Rand Medical Outcomes Study Social Support Survey scale. Subjects were re-assessed after one and two years. Logistic regression and structural regression modeling were conducted. Social support was strongly associated with the onset of disability. Participants with low levels of social support were more likely to develop disability even after controlling for diabetes specific complications, diabetes duration, diabetes treatment, depressive symptoms, lifestyle related behavior, age, sex and socioeconomic factors (OR = 1.21, 95% CI 1.07 to 1.34). Structural equation modeling suggested an important association between social support and depression: high levels of social support were found to buffer the effects of depression on the risk of disability. The model fit was good (GFI = 0.95, AGFI = 0.93, and RMR = 0.04). Lack of social support is an important risk factor for disability in people with diabetes. Social support might be helpful to cope with this chronic condition and might help people to function well in the community.

1168-S

ANEMIA DURING PREGNANCY: IMPACT ON BIRTH OUTCOME AND ON INFANTS' HEMOGLOBIN LEVEL DURING THE 18 FIRST MONTHS OF LIFE. * G K Koura, A Le Port, S Ouedraogo, L Watier, J Guerra, I Choudat, A Rachas, J Bouscailloux, A Massougboji, M Cot and A Garcia. (Institut de Recherche pour le Développement, UMR 216 : Mère et enfant face aux infections tropicales. Paris, France)

To determine the effect of maternal anemia on pregnancy outcome and to describe its impact on infants' hemoglobin level until 18 months, a prospective study was carried out among 618 pregnant women and their children born at three maternity hospitals in a district in Benin. Prevalence of anemia was 39.48% in mothers and 61.07% in newborn at birth. Maternal anemia was neither associated with low birth weight (OR = 1.16 [0.63-2.16]) nor with prematurity (OR = 1.27 [0.67-2.40]). Nevertheless, children born from anemic mother presented a significantly higher risk to be anemic at birth (OR = 1.77 [1.24-2.53]). The occurrence of malaria symptomatic infection during early childhood was significantly associated with decreased infants' hemoglobin level until 18 months, whereas the association with the newborns' hemoglobin level at birth and *P. falciparum* placental infection were borderline significant. There was no association with maternal anemia.

1167-S

TOBACCO AND ALCOHOL ABUSE CORRELATES OF POSTTRAUMATIC STRESS DISORDER IN ACTIVE DUTY AND RESERVE COMPONENT MILITARY PERSONNEL. *C M Reyes Guzman, J Williams, R M Bray, J L Spira, L H Hourani (RTI International, Washington, DC)

The relationship between posttraumatic stress disorder (PTSD) and substance abuse has been studied in the general civilian population and in war veterans. However, little research has been conducted using large population-based samples of either active duty or reserve component military personnel. This study examined the association of smoking and heavy alcohol use and the risk of PTSD in both military components. Data from two population-based surveys of military personnel (1 active duty, N = 16,146; 1 reserve component, N = 18,342) were used to assess these associations. Findings showed a statistically significant interaction between smoking and heavy drinking when modeling the risk for PTSD in active duty personnel but not for reservists. In particular, results demonstrate an increased risk for PTSD among current smokers compared to never smokers regardless of heavy drinking status for both active duty and reserve component personnel, although differences were observed between personnel types in heavy drinking status group contrasts. Our findings build on other research conducted among war veterans and emphasize the importance of interventions to address the role of tobacco and alcohol abuse on symptoms specific to PTSD.

1169

SENSITIVITY ASSESSMENT OF THE IMPACT OF TIME TO MATERNAL INTERVIEW ON INTERVIEW QUALITY IN THE NATIONAL BIRTH DEFECTS PREVENTION STUDY. *S Tinker, C Gibbs, O Devine, A H Herring, M Honein, K Crider, M Werler, M Anderka, J Reefhuis (Centers for Disease Control and Prevention, Atlanta, GA 30333)

Reproductive epidemiologic research often uses retrospective maternal interviews to gather data on prenatal exposures. The time interval from exposure to interview may influence accuracy of these data. The National Birth Defects Prevention Study is a population-based case-control study of birth defects in 10 US states. Mothers complete a computer-assisted telephone interview between 2 and 24 months after their estimated date of delivery. We assessed the association between time-to-interview (TTI) and interview quality using several metrics, including whether the start month of reported medication use or illnesses was specified or unspecified. We assessed interaction by several factors, including case-control status. There were 24,826 interviews for births between 1997 and 2005. The mean TTI was 10.8 months (standard deviation = 5.2). The mean TTI did not differ by maternal age, education, income, or parity; variation was observed among study sites. Cases were interviewed later than controls (11.1, 10.1 months, respectively; $p < 0.001$). TTI over 6 months was associated with lower odds of reporting a start month for acetaminophen use (odds ratio [OR]:0.7), pseudoephedrine use, (OR:0.6) and upper respiratory infection (OR:0.6). We observed interaction by case status; controls had a greater reduction in interview quality with increased TTI. Future analyses will consider other interview quality metrics. This information will be used in Bayesian sensitivity analyses to estimate the potential impact of exposure misclassification due to prolonged interview interval on a previous analysis of antibiotics and birth defects.

1170-S

EARLY MENARCHE PREDICTS INCIDENCE OF ASTHMA IN EARLY ADULTHOOD. *Ban Al-Sahab, Mazen J Hamadeh, Chris I Ardern, and Hala Tamim (York University, Toronto, ON, Canada M3J 1P3)

The present study explores the effect of age at menarche on the incidence of asthma during early adulthood. The analysis was based on Canadian girls followed up from 8–11 to 18–21 years of age during the first 6 cycles (1994–2005) of the National Longitudinal Survey of Children and Youth. Early menarche was defined as 1 standard deviation less than the average age at menarche. Asthma occurrence after menarche was measured as asthma that was diagnosed by a health care professional. The authors used logistic regression to investigate the association between early menarche and incidence of asthma, adjusting for possible confounders. A total of 1,176 girls weighted to represent 352,345 Canadian girls were analyzed. The incidence of asthma after menarche was 11.2% (95% confidence interval: 8.3, 14.0). The onset of early menarche (< 11.56 years of age) predicted postmenarcheal incidence of asthma; girls who matured early had more than twice the risk of developing asthma during early adulthood than did girls who matured at an average age (odds ratio, 2.34, 95% confidence interval: 1.19, 4.59). The present study provides partial insight into the worldwide rapid increase in asthma rates that coincides with the declining trends in menarcheal timing. Further studies within different contexts are warranted to assess the generalizability of these Canadian findings.

1172-S

PREPREGNANCY OBESITY TRENDS AMONG LOW-INCOME US WOMEN. *S Hinkle, A Sharma, S Kim, S Park, K Dalenius, T Brindley, L Grummer-Strawn (Centers for Disease Control and Prevention, Atlanta, GA 30341)

Obesity (body mass index [BMI] ≥ 30 kg/m²) increases the risk for complications throughout pregnancy. We examined prepregnancy obesity trends among a low-income, high risk population enrolled in the Women, Infants, and Children (WIC) program during the prenatal period. Using data from the Pregnancy Nutrition Surveillance System (PNSS) from 24 states and Indian Tribal Organizations who continuously reported to PNSS from 1999 to 2008, we analyzed 5,768,639 maternal records. Measured height and self-reported prepregnancy weight were obtained at the first WIC prenatal visit. We used direct standardization to account for changes in maternal race-ethnic and age distributions over time using 1999 as the standard population. Obesity prevalence increased from 23.3% in 1999 to 26.8% in 2008. In 2008, the prevalence of class I (BMI 30.0–34.9), II (BMI 35.0–39.9) and III (BMI ≥ 40.0) was 14.0%, 7.1% and 5.6%, respectively. From 1999 to 2004, the unadjusted prevalence of obesity increased among all race-ethnic groups except Asians/Pacific Islanders. However beginning in 2004, the obesity prevalence among non-Hispanic Blacks and American Indian/Alaskan Natives plateaued with an increase of ≤ 0.10 percentage points annually. In contrast, from 2004 the prevalence increased by 0.36 percentage points annually among both non-Hispanic Whites and Asians/Pacific Islanders, and by 0.70 percentage points annually among Hispanics. In 2008 the prevalence was highest among American Indian/Alaskan Natives (34.4%) and lowest among Asians/Pacific Islanders (12.7%). Obesity remains a public health problem among low-income women entering pregnancy. Effective preconception public health strategies are needed to treat and prevent obesity.

1171-S

IMPACT OF BREASTFEEDING DURATION ON AGE AT MENARCHE. *B Al-Sahab, L Adair, M J Hamadeh, C I Ardern, H Tamim (York University, Toronto, ON, Canada M3J 1P3)

The study aims to assess the relationship between breastfeeding duration and age at menarche. Analysis was based on a cohort of 994 Filipino girls born in 1983–84 and followed up from infancy to adulthood by the “Cebu Longitudinal Health and Nutrition Survey”. The main outcome was self-reported age at menarche. Cox regression was used to investigate the relationship between duration of exclusive and any breastfeeding with age at menarche while adjusting sequentially for specific sets of known socioeconomic, maternal, genetic and prenatal confounders. The estimated median of age at menarche was 13.08 years. After adjusting for potential confounders of the association of breastfeeding with age at menarche, exclusive breastfeeding duration retained an independent and significant association with age at menarche. An increase in one month of exclusive breastfeeding decreases the hazard of attaining earlier menarche by 6% (hazard ratio: 0.94; 95% confidence interval: 0.90, 0.98). Any breastfeeding duration was not associated with age at menarche. Although this is the first longitudinal study that reveals a negative association between exclusive breastfeeding and early menarche, the relationship is still elusive. Further longitudinal studies within different contexts are warranted to assess the generalizability of these findings.

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INTAKE OF FRUITS, VEGETABLES, AND CAROTENOIDS IN RELATION TO RISK OF UTERINE LEIOMYOMATA. *L A Wise, R G Radin, J R Palmer, D A Boggs, S K Kumanyika, L Rosenberg (Slone Epidemiology Center, Boston, MA 02215)

Black women have higher rates of uterine leiomyomata (UL) than white women and have lower intakes of fruits and vegetables. Greater intake of fruits and vegetables was inversely associated with UL in a case-control study. Dietary supplementation with lycopene, a major carotenoid in tomatoes, was associated with reduced leiomyoma incidence in an animal model; but human studies show no such association. We prospectively assessed the relation of dietary intake of fruits, vegetables, carotenoids, folate, fiber, and vitamins A, C, and E to UL risk among 22,583 premenopausal women from the Black Women’s Health Study. Dietary intake was estimated using food-frequency questionnaires in 1995 and 2001. From 1997–2009, there were 6,627 incident cases of UL diagnosed by ultrasound (n = 4,346) or surgery (n = 2,281). We used Cox regression to derive incidence rate ratios (IRR) and 95% confidence intervals (CI). Total intake of fruits and vegetables was inversely associated with UL (≥ 4 vs. < 1 servings/day: IRR = 0.90, CI: 0.82, 0.98; P-trend: 0.03). The association was stronger for fruits (≥ 2 servings/day vs. < 2 servings/week: IRR = 0.89, CI: 0.81, 0.98; P-trend: 0.07) than for vegetables (≥ 2 servings/day vs. < 4 servings/week: IRR = 0.97, CI: 0.89, 1.05; P-trend: 0.51), and was most evident for citrus fruit (≥ 3 servings/week vs. < 1 serving/month: IRR = 0.92, CI: 0.86, 0.99; P-trend: 0.01). The IRR comparing highest vs. lowest quintiles of dietary vitamin A was 0.92 (CI: 0.85, 1.00, P-trend: 0.07). UL was not associated with any of the carotenoids, including lycopene, or with vitamins C, E, folate, or fiber. These data suggest a protective role for intake of fruits, specifically citrus fruit, and dietary vitamin A on UL risk.

1174

A PROSPECTIVE COHORT STUDY OF PHYSICAL ACTIVITY AND TIME-TO-PREGNANCY. *L A Wise, E M Mikkelsen, K J Rothman, H T Sorensen, A Riis, E E Hatch (Boston University, Boston, MA 02215)

Background: The health benefits of regular physical activity (PA) are well-known, but the relation between PA and fertility is unclear. High levels of vigorous PA have been associated with menstrual disturbances, amenorrhea, and oligomenorrhea. Epidemiologic studies of PA and infertility have been mixed, with some showing reduced risk among vigorous exercisers and others showing increased risk at the highest levels of frequency or intensity. Methods: We investigated the association of leisure-time PA with time-to-pregnancy (TTP) among 3,441 Danish women participating in a prospective cohort study (2006-2009). Vigorous and moderate PA were reported at baseline. We computed total metabolic equivalents (METs) by assigning 7 METs to each hour of vigorous PA and 3.5 METs to each hour of moderate PA. Fecundability ratios (FR) and 95% confidence intervals (CI) were derived from discrete-time Cox models, adjusting for potential confounders. Results: Relative to 20-29 MET-hrs/wk, FRs for < 10, 10-19, 30-39, 40-49, 50-59 and ≥ 60 MET-hrs/wk were 0.95 (CI: 0.82, 1.11), 0.97 (CI: 0.85, 1.10), 0.96 (CI: 0.82, 1.11), 0.82 (CI: 0.68, 0.99), 0.89 (CI: 0.71, 1.13), and 0.74 (CI: 0.56, 0.98), respectively. Inverse associations for high intensity PA were still evident after the exclusion of underweight women, but were weaker among overweight and obese women. In addition, low PA levels were associated with delayed TTP among overweight and obese women (< 10 vs. 20-29 MET-hrs/wk: FR = 0.76, CI: 0.58, 0.98). Conclusions: Among lean women, PA in moderation was not appreciably associated with TTP, but high intensity PA was associated with reduced fecundability. Among overweight and obese women, only low levels of PA were associated with reduced fecundability.

1176-S

THE PREGNANCY AND INFANT DEVELOPMENT (PRIDE) STUDY: COHORT PROFILE. *M van Gelder, R Bretveld, G Zielhuis, N Roeleveld (Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands)

Little is known about the etiology of complications and disorders in both mother and child that originate in pregnancy, such as gestational hypertension, spontaneous abortions, birth defects, and childhood cancer. Therefore, we established the PRIDE Study (PRIDE: PRenancy and Infant DEvelopment). The PRIDE Study is a large prospective cohort study that aims at including 150,000-200,000 pregnant women in early pregnancy to study a broad range of research questions pertaining to maternal and child health, preconception, prenatal, and perinatal care, and adverse developmental effects in offspring. At the first prenatal care visit, women will be asked to fill out web-based questionnaires during gestational weeks 8-10, 17, and 35, approximately six months after delivery, and during childhood. In addition, a food frequency questionnaire and a paternal questionnaire will be administered around gestational weeks 8-10 and pharmacy and medical records will be consulted. Multiple validation studies will be conducted and paper-and-pencil questionnaires will be available for women who cannot or do not want to participate through the Internet. For subgroups of participants, blood samples for genetic and biochemical analyses will be collected as well. The start of the PRIDE Study is foreseen for the spring of 2011 in the region of Nijmegen and will spread out over the Netherlands soon thereafter. We expect that this study, which will be the largest pregnancy cohort in the world, will provide new insights in the etiology of disorders and diseases that originate in pregnancy.

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EFFECTS OF MATERNAL SMOKING CESSATION BEFORE AND DURING EARLY PREGNANCY ON CHILDHOOD GROWTH. *K Suzuki, M Sato, T Tanaka, N Kondo and Z Yamagata (University of Yamanashi, Chuo, Japan)

Maternal smoking during pregnancy has been recently considered a major risk factor for childhood overweight. However, few studies have examined the effects of smoking cessation before and during early pregnancy on childhood overweight. Therefore, this study aimed to examine the effects of smoking cessation before, and during pregnancy on overweight in children by using data of a prospective cohort study. This study included 2137 women with their children born between April 1, 1991 and March 31, 2003. Anthropometric data were collected for 1834 of the 2137 (85.8%) children when they were 3 years old. Multiple linear and logistic regression models were used to analyze the data. The number of women in each group of smoking status during early pregnancy, i.e., nonsmokers, ex-smokers who quit before pregnancy, ex-smokers who quit during early pregnancy, and current smokers, was 1336 (76.0%), 95 (5.4%), 224 (12.7%), and 104 (5.9%), respectively. After adjustments for maternal age and body mass index (BMI), it was found that BMI (difference in adjusted mean: 0.47 kg/m², $p = 0.03$) and risk of overweight (adjusted odds ratio: 2.9; 95% confidence interval, 1.2-7.1) were more likely to increase in boys born to current smokers than in those born to nonsmokers. In the case of the ex-smokers, there was no evidence of the effect of smoking status on growth in boys. Furthermore, smoking status and childhood overweight did not significantly differ among girls. In conclusion, the effect of smoking exposure on childhood overweight was not observed in children born to mothers who quit smoking before and during early pregnancy.

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MODELING THE PUBLIC HEALTH IMPACT OF PRE-PREGNANCY OBESITY ON SELECTED INFANT OUTCOMES. *M Honein, O Devine, A Sharma, S Park, S Rasmussen, J Kucik, J Sniezek, C Boyle (Centers for Disease Control and Prevention, Atlanta, GA 30333)

Approximately one-third of U.S. reproductive-aged women are obese, and pre-pregnancy obesity is a strong risk factor for numerous adverse infant outcomes including some major birth defects. We estimated the annual number of selected adverse infant outcomes potentially preventable in the U.S. if the risk associated with pre-pregnancy obesity was eliminated. Based on meta-analyses, pre-pregnancy obesity is associated with numerous adverse infant outcomes including congenital heart defects (odds ratio [OR] = 1.3), spina bifida (OR = 2.2), and fetal deaths (OR = 2.1). After accounting for biased reporting of maternal obesity and strength of the association with each outcome, the estimated prevalence of pre-pregnancy obesity among mothers of infants with congenital heart defects, spina bifida, and fetal deaths was 31%, 43%, and 42%, respectively. A Monte Carlo uncertainty propagation approach was used to model the attributable fraction and the preventable number of infant outcomes, accounting for uncertainty in the estimates for: 1) obesity prevalence, 2) strength of the association with obesity, and 3) prevalence of the outcome. Preliminary results indicate that elimination of pre-pregnancy obesity could prevent 352 cases of spina bifida (uncertainty interval [UI] 263-443), 2,393 cases of congenital heart defects (UI 867-4,254), and 5,942 fetal deaths (UI 3,422-8,769) each year in the United States. This simulation suggests that effective policy-level strategies to reduce pre-pregnancy obesity or the risk associated with obesity could have a measurable impact on infant health.

1178

PREGNANCY IN ADOLESCENCE: ALWAYS UNWANTED? *C Meneses, C Lopes, V Magalhães (Universidade do Estado do Rio de Janeiro, NESAs, Rio de Janeiro, Brazil)

Introduction: Studies conducted all over the world show that the rates of pregnancy in adolescence are increasing especially in the early adolescence (10 to 14 years of age). Although the majority of pregnancies in this period are not desired some studies suggest that an expressive number of them could be even wanted. Aims: 1) Assess the prevalence of pregnancy willingness and possible associations with socioeconomic and demographic factors and social support network in a population of pregnant adolescents 2) Verify if age should be an effect modifier in these associations. Methods: Cross sectional study conducted with pregnant adolescents regularly attending two public maternity. A sample of 232 pregnant adolescents between 13 and 20 years of age (mean: 17.3) completed a self-reported questionnaire to access socioeconomic and demographic data. Results: Prevalence of pregnancy willingness was 46.2%. Final adjusted model showed that being married (PR = 1.80; CI 95% 1.27-2.56) and do not have friends (PR = 1.48; CI 95% 1.15 -1.90) showed association with desire of being pregnant. Girls studying in the elementary grade and with 12 to 16 years of age showed less desire of being pregnant (PR = 0.57; IC 95% 0.38-0.88). Conclusion: Pregnancy may not always be unwanted. Some factors, as being married and do not have friends may have influence in these cases. Professionals dealing with adolescents should be aware of these issues to identify risk situations that could be successfully managed.

1180-S

THE RELATIONSHIP BETWEEN PRECONCEPTIONAL AND PRENATAL ADVICE ON GESTATIONAL WEIGHT GAIN. *A Metcalfe, K Forbes, S Gracie, S Tough (University of Calgary, Calgary, AB, Canada T2N 4Z6)

Obesity in pregnancy is associated with adverse outcomes for women and infants, but these risks may be mitigated by regular exercise and adherence to weight gain recommendations. This study assessed the relationship between receipt of advice on healthy weight gain, nutrition and exercise in pregnancy from a prenatal care provider (PCP) and gestational weight gain by body mass index (BMI) categories. Data for this study comes from the All Our Babies Observational Cohort, a community-based study of women's experiences during pregnancy and post-partum. Gestational weight gain was categorized based on the 2009 Institute of Medicine guidelines. Chi-square tests were used to assess the association between gestational weight gain and PCP advice by BMI category. Self-reported data was obtained on 1032 women. Pre-pregnancy 4.9% were underweight, 62.7% were normal weight, 22.6% were overweight and 9.8% were obese. A significant association was found between BMI category and overall gestational weight gain ($p < 0.001$) with 55.4% of overweight and 45.5% of obese women reporting excessive weight gain compared to 9.8% of underweight and 22.7% of normal weight women. Preconceptional advice on nutrition was associated with increased rates of adequate gestational weight gain for normal weight women ($p = 0.009$) only. Prenatal advice on weight gain ($p = 0.21$), nutrition ($p = 0.48$) and exercise ($p = 0.19$) was not associated with gestational weight gain. Prenatal advice on healthy weight gain in pregnancy may come too late to ensure adequate gestational weight gain. Referral to services that encourage pregnant women to engage in physical activity may be a more effective strategy to promote adequate gestational weight gain.

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EFFECT OF SMOKING ON HUMAN SPERM PARAMETERS IS MODIFIED BY GLUTATHIONE-S-TRANSFERASE (GST) T1 GENOTYPE. *R S Mijal, J J Wirth, B Messaros, M P Diamond, K Friderici, K A Jernigan, D Daly, E Puscheck, N Paneth, and Q Lu (Michigan State University, E. Lansing, MI 48823)

Epidemiologic studies describing associations between smoking and human sperm parameters have yielded mixed results. Polymorphisms in genes involved in metabolism of tobacco carcinogens and steroid hormones may modify the effect of smoking. Men recruited from 2 infertility clinics provided information on demographics, smoking behavior and health history and semen and blood samples. Semen samples were scored using WHO protocols and outcome defined as: low motility ($< 50\%$), low morphology ($< 4\%$ normal) and low concentration ($< 20 \times 10^6$ sperm/mL). Genotype was determined for GST-M1 (present/null), GST-T1 (present/null) and CYP1A1 (MspI). Analyses included men with complete data ($N = 547$). Men with a low score on a sperm parameter were compared to men who had no low scores. Odds ratios (OR) and 95% confidence intervals (CI) were determined. Interactions were tested by likelihood ratio X^2 (p_{int}). Ever or current smoking and CYP1A1 were not associated with any parameter. Positive ORs were observed for GST-T1 null and low motility and morphology, and GST-M1 null and low morphology (borderline-significant). GST-T1 null ever-smokers had increased odds of low motility (OR = 3.01; CI: 1.26-7.17) while ORs for genotype or smoking were ~ 1 , ($p_{int} = 0.07$). GST-T1 null ever-smokers were more likely to have low morphology (OR = 2.08; CI: 0.88-4.91), whereas GST-T1 present ever-smokers were less likely (OR = 0.64; CI: 0.41-1.00); genotype only had little effect ($p_{int} = 0.05$). Adjustment for confounding tended to strengthen morphology results. GST-T1 genotype may modify the effect of smoking on sperm parameters. More studies are needed to characterize and confirm findings.

1181-S

CORRECTION OF VERIFICATION BIAS: DIAGNOSTIC VALIDITY OF TRANSVAGINAL SONOGRAPHY IN DETECTING ENDOMETRIAL POLYPS. *G R Khalili, M R Akhond, M Hafezi, T Madani (Royan Institute for Reproductive Biomedicine, ACECR, Tehran, Iran)

Verification bias is common in diagnostic performance studies. This bias occurs when the results of a gold standard test are more available for patients who have positive results for the test under investigation. In this study the diagnostic accuracy of the Transvaginal Sonography (TVS) in detecting endometrial polyps was assessed with and without correction for verification bias. Patients who underwent TVS evaluation in mid-follicular phase (days 5-8) for endometrial polyp were included in the study. The observed sensitivity and specificity of TVS were calculated only for patients whose diagnosis was verified by hysteroscopy as gold standard. For patients who did not undergo hysteroscopy, the effect of verification bias was estimated with global sensitivity analysis, a technique of graphic representation of whether a particular combination of sensitivity and specificity estimates are compatible with the observed data. Among the 507 patients included in the study, 258 patients (51%) had the TVS findings verified by hysteroscopy. The observed sensitivity and specificity of TVS among patients who underwent hysteroscopy were 78.3% and 65.7% respectively. However after adjustment for verification bias corrected total sensitivity was 69.1% (95% CI: 60.2% to 78%), and total specificity was 75.6% (95% CI: 69.9% to 81.3%). Diagnostic accuracy of TVS in the evaluation of endometrial polyp had greatly been affected by verification bias. Verification bias can lead to an increase in sensitivity and decreases in specificity of the test which needs to be corrected carefully. Keywords: Verification Bias, Global Sensitivity Analysis, Endometrial Polyps, Transvaginal Sonography

1182-S

TIME TRENDS AND CORRELATES OF INFANT BEDSHARING IN THE UNITED STATES, 2000-2008. *K B Kamm, C B Rudra (State University of New York at Buffalo, Buffalo, NY 14214)

In 2005, the American Association of Pediatrics (AAP) recommended against infants sharing a sleeping surface with any person. We analyzed infant bedsharing practices using the Pregnancy Risk Assessment Monitoring System survey (Centers for Disease Control) in eleven states with data before and after 2005 to describe the effect of the AAP recommendation and explore characteristics of mothers and infants who bedshare. Overall, the prevalence of bedsharing was approximately 25% before and after 2005, but varied by state of residence. Infants in the northwest were most likely to bedshare (37%), followed by the south (32%), northeast (21%), and mid-west (19%). In a multivariate regression model, younger mothers (less than 17 years-old) compared to mothers aged 25-29 years-old (Odds Ratio(OR) = 1.4, 95% Confidence Interval(CI) 1.2, 1.7) and those reporting heavy drinking before pregnancy (more than 14 drinks per week) compared to nondrinkers (OR = 1.4, 95% CI 1.1, 1.7), were at significantly increased risk of bedsharing. Nonwhite mothers were more likely to report bedsharing compared to white mothers, and the strength of association differed by race. Bedsharing was also independently associated with increased duration of breastfeeding. Women breastfeeding more than 25 weeks were 2.4-fold more likely to bedshare compared to women who did not breastfeed or fed less than one week (OR = 2.4, 95% CI 1.9, 3.1). These data describe correlations between maternal and infant characteristics and bedsharing and show that AAP recommendations against infant bedsharing did not appear to have a strong effect on the prevalence of bedsharing in these eleven states.

1184

OCCUPATIONAL EXPOSURE TO ANESTHETIC GASES, ANTINEOPLASTIC DRUGS, ANTIVIRAL DRUGS, STERILIZING AGENTS, AND X-RAYS AND RISK OF SPONTANEOUS ABORTION AMONG NURSES. *C C Lawson, C M Rocheleau, E A Whelan, E N Hibert, B Grajewski, D Spiegelman, J W Rich-Edwards (National Institute for Occupational Safety and Health, Cincinnati, OH 45213)

Adverse reproductive outcomes among female health care workers have been reported, but previous studies have been of limited sample size. We evaluated self-reported occupational exposure to antineoplastic drugs, anesthetic gases, antiviral drugs, sterilizing agents, and X-rays and the risk of spontaneous abortion (SA) in U.S. nurses. Retrospective data on pregnancy outcome, occupational exposures, work schedule, and lifestyle factors were collected from 7,482 participants of the Nurses' Health Study II who worked as a nurse during the first trimester of pregnancy. The overall participation rate was 76%. Log binomial regression was used to estimate relative risks (RRs) and 95% confidence intervals (95% CI). Participants reported 6,707 live births and 775 (10%) SAs (< 20 weeks gestation), 74% of occurred before the 12th week of pregnancy. After adjusting for age, parity, shift work, and hours worked per week, reported exposure to antineoplastic drugs was associated with an increased risk of SA (RR = 1.86, 95% CI = 1.27-2.73); particularly with early SA of < 12 weeks gestation (RR = 2.04, 95% CI = 1.33-3.13). Reported exposure to sterilizing agents was associated with a 2-fold increased risk of late SA (12-20 weeks) (95% CI = 1.28-3.93), but not with early SA. There was a suggested increase in risk of early SA with X-ray exposure (1.29; 0.99-1.68). Antiviral drug and anesthetic gas exposures were not associated with SA in our study. This study suggests that occupational exposures to antineoplastic drugs and sterilizing agents are related to an increased risk of SA.

1183

SELECTION BIAS IN A CASE-CONTROL STUDY OF PARENTAL INFERTILITY AND HEPATOBLASTOMA: A REPORT FROM THE CHILDREN'S ONCOLOGY GROUP (COG). *S E Puumala, J A Ross, G E Tomlinson, M K Georgieff, M D Krailo, L G Spector (University of Minnesota, Minneapolis, MN)

Parental infertility has been hypothesized as a risk factor for hepatoblastoma (HB) with one study indicating a 9-fold increase in risk for presumed infertility treatment. In our case-control study of HB we found no evidence of an association with parental infertility. However, factors related to infertility treatment such as maternal age and socioeconomic status likely influenced participation, especially amongst controls, leading to selection bias. Cases were identified through the COG and were assumed to be representative. Controls were identified through birth certificates. We conducted a quantitative sensitivity analysis using post-stratification weights. Data from the National Vital Statistics System were used to calculate weights for controls based on various combinations of maternal age, race, and education. Sensitivity analysis was performed using weighted logistic regression and compared with the unweighted model. Out of 771 cases, 383 mothers completed the interview for a response rate of 50%. 387 control mothers completed interviews out of 1703 selected birth certificates for a response rate of 23%. Our controls differed from the reference population with regard to maternal age, race, and education. The weighted and naive odds ratio estimates were similar for all measures of parental infertility and all 95% confidence intervals contained one. Even though controls were different from the population of interest, sensitivity analysis using post-stratification weights did not result in a different conclusion. Supported by NIH R01 CA111355, and the Children's Cancer Research Fund, Minneapolis, MN.

1185-S

MATERNAL OBESITY, FOLATE INTAKE, AND NEURAL TUBE DEFECTS IN OFFSPRING. *D McMahon, J Liu, H Zhang, M Torres, and R Best (University of South Carolina, Columbia, SC 29208)

PURPOSE: To investigate whether maternal obesity before pregnancy is a risk factor of delivery of an infant with neural tube defect (NTD) and to study relationships between folic acid intake during the periconceptional period and the risk of NTD in overweight and non-overweight women. METHODS: We used data from a state-wide case-control study conducted between 1992 and 1997 in South Carolina. Overall, 179 women with NTD-affected pregnancies (first isolated NTDs, from singleton pregnancies, live born or electively terminated) and 288 women without NTD-affected births were interviewed within 6 months after delivery or pregnancy termination. Average daily intake of supplemental folic acid was estimated based on self-reported brand, dose and frequency of vitamin intake. Folate intake from food was assessed using food frequency questionnaire. RESULTS: After adjustment for confounders including vitamin use in the three months before and after conception, obese women (BMI \geq 30) had almost twice higher odds of having NTD-affected pregnancy (odds ratios = 1.88, 95% confidence interval (CI) = 1.09, 3.81) than normal weight women. Compared to the lowest quartile of average daily folate intake from food, the upper three quartiles had lower odds of NTDs in offspring. The NTD-protective effect was stronger in overweight and obese women [BMI \geq 25] than normal weight women (BMI < 25). Total daily folate intake was not significantly associated with NTD pregnancies. CONCLUSIONS: Maternal obesity is a risk factor of NTDs in offspring. Yet higher level of folate intake is NTD-protective and has a stronger effect among overweight and obese women. Obese women planning pregnancy should be suggested to reduce their weight and increase intake of folate.

1186

DIETARY NITRATES, NITRITES AND NITROSATABLE COMPOUNDS AND NEURAL TUBE DEFECTS, ORAL CLEFTS AND LIMB DEFICIENCIES. *J Huber, Jr, Q Zheng, J Sharkey, J Brender, A Vuong, M Shinde, L Suarez, P Langlois, M Canfield, P Romitti, S Malik, and the National Birth Defects Prevention Study (Texas A&M Health Science Center, College Station, TX 77843)

Dietary intake of nitrates, nitrites and nitrosatable compounds can increase levels of N-nitroso compounds in the stomach. Animal studies suggest that these compounds are teratogenic. We used data from a 58-question food frequency questionnaire, adapted from the short Willett Food Frequency Questionnaire and administered as part of the National Birth Defects Prevention Study, to estimate daily intake of dietary nitrates, nitrites, and nitrosamines in a sample of 6544 mothers of infants with neural tube defects (NTDs), oral clefts (OCs), or limb deficiencies (LDs) and 6807 mothers of unaffected control infants. Total daily intake of these compounds was divided into quartiles based on the control mother distributions. Using logistic regression, models were adjusted for daily caloric intake, maternal race, education, dietary folate intake, high fat diet (> 30% of calories from fat), and state of residence. While there were some unadjusted results for NTDS with 95% confidence intervals [CI] that excluded the null value, none remained after adjustment for covariates and the effect sizes were small (adjusted odds ratios [aOR] < 1.12). Similar results were found for OCs and LDs with the exception of animal nitrites and cleft lip with/without cleft palate (aORs and CIs for quartile 4 compared to quartile 1 = 1.24; CI = 1.05-1.48), nitrosamine and cleft lip (4th quartile aOR = 0.74; CI = 0.58-0.95), and total nitrite and intercalary LD (4th quartile aOR = 4.70; CI = 1.23-17.93). Overall, dietary intake of these compounds did not appear to be a significant risk factor for NTDS, OCs or LDs.

1188

GESTATIONAL AGE DATING: BEING SMALL CAN MAKE A BIG DIFFERENCE. *K K Harland, A F Saftlas, A B Wallis, M B Zimmerman (University of Iowa, Iowa City, IA 52242)

PURPOSE: Early ultrasound (US) dating in women with suspected fetal growth restriction may underestimate gestational age (GA) relative to the date of the last menstrual period (LMP) because the fetuses tend to be small. We tested this hypothesis and developed a statistical approach to adjust for US dating errors in a case-control study of small for gestational age (SGA) and preterm delivery, which used birth records as its sampling frame. **METHODS:** Analysis was restricted to women with 1st trimester prenatal care, a valid LMP, and US at 7-20 weeks (N = 1135). In clinical practice, GA is based on LMP, except when LMP and US dates disagree by > ± 7 days (US at 7-14 wks) or by > ± 10 days (US at 14-20 wks). We used this algorithm to compare GA dating changes from LMP to US and calculated 'mean days difference' as [LMP GA at US - US GA] by initial case-control status. Confounding and interaction between maternal factors and GA dating reassignment to US were assessed. Multivariable linear regression modeling was used to adjust for US dating errors. **RESULTS:** The 'mean days difference' for SGA subjects was 5.5 days versus only 1.1 and -0.2 day in controls and preterm cases, respectively. 156 (31.6%) of 493 SGAs were reclassified to the US GA; of these, most (87%) were reclassified because the LMP GA exceeded the US GA by > 7 days. Multivariable regression modeling indicated the need to adjust US dating by an average of 1.5 weeks. Adjustment of US dating varied by maternal age, 1st trimester vaginal bleeding, and 1st or 2nd trimester smoking. **CONCLUSION:** Ultrasound underestimates the GA of infants selected as SGA. An approach was developed to adjust for biased US dating in infants selected as SGA, which may be applied to other case-control studies of SGA.

1187

EARLY LIFE SOY EXPOSURE AND TIME TO MENARCHE. *M Adgent, J Daniels, W Rogan, L Adair, L Edwards, D Westreich, M Maisonet, M Marcus (NIEHS, Durham, NC)

Modern soy infant formula is considered safe for term infants. Soy products, however, contain plant estrogens, such as genistein, which alter pubertal timing in lab studies. We studied age at menarche by infant feeding method among participants in the Avon Longitudinal Study of Parents and Children. Mothers answered questionnaires about infant feeding methods, and we formed 4 exposure categories: primarily breast, early formula (referent), early soy, and late soy. Age at menarche was assessed via questionnaires repeatedly administered between ages 8 and 14.5. Eligible subjects were term, singleton, white girls. Kaplan Meier (KM) survival curves were used to assess time to menarche. Our analysis included 2920 girls. Two percent of mothers reported that their daughters used soy in early infancy (early soy). The median time to menarche was slightly shorter among early soy fed girls compared to early formula fed girls (149 months (interquartile range (IQR): 140-159) vs. 153 months (IQR: 144 - 163), log-rank p-value: 0.12), and slightly longer among primarily breast fed girls (154 months (IQR: 145 - 165), log-rank p-value: 0.07). Among the early soy fed girls, KM curves suggest the most pronounced decrease in survival occurred in early adolescence, approximately before age 12.5. Soy use was not associated with body mass index. While not statistically significant, our results suggest a slightly shorter time to menarche among early soy fed girls, as compared to those fed cow milk formula in early infancy. Our study is limited by few soy exposed girls. Because soy formula use is common in some populations, this subtle association with timing of menarche warrants further study.

1189-S

FETAL GROWTH IS A SIGNIFICANT PREDICTOR OF SEMEN QUALITY. *N Straka, X Liu, P Cirillo, B Cohn, P Factor-Litvak (Columbia University, New York, NY 10032)

Several studies have suggested that male fertility in Western countries has decreased over the past fifty years; however, this decline has largely remained unexplained. We hypothesized that impaired fetal growth may be associated with decreased sperm quality. Our sample derived from a long term follow up study of 338 male offspring age 39-47 from the Child Health and Development Studies. Of these, 196 donated semen samples to measure sperm count, motility and morphology. Birth weight and length of gestation were available from the archived data files; we calculated birth weight for gestational age based on published gender specific natality statistics for 1999-2000 (Oken et al, BMC Pediatrics 2003 Jul 8;3:6). Linear regression was used to assess the associations between birth weight, birth weight percentile for gestational age and the three outcomes, adjusting for age, race, education, adult body mass index and adult smoking. Birth weight and birth weight percentile for gestational age were significant predictors of sperm concentration, but not of percent motile sperm or percent normal sperm morphology. For every 100 gram increase in birth weight, sperm concentration increased by 2.84×10^6 sperm/mL (95% CI: $0.96-4.72 \times 10^6$ sperm/mL, $p = 0.0051$). For every 1% increase in birth-weight percentile for gestational age, sperm concentration increased by 4.5×10^5 sperm/mL (95% CI: $1.2-7.8 \times 10^5$ sperm/mL, $p = 0.0086$). These findings suggest that suboptimal fetal growth may negatively impact reproductive function in adulthood.

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VALIDATION OF A MIXTURE MODEL TO CORRECT MISCLASSIFICATION OF GESTATIONAL AGE BASED ON MENSTRUAL DATES. *M L Urquia, R Moineddin, J G Ray, J W Frank and R H Glazier (St. Michael's Hospital, Toronto, ON Canada)

Misclassification of gestational age based on the last menstrual period (LMP) creates bias in newborn birthweight and gestational age-related indicators. Current methods to rectify the problem have not been validated. We used the public-use 2007 US natality file from the Centers for Disease Control and Prevention's National Center for Health Statistics, which contains both the LMP and the clinical/obstetric estimate of gestational age, to compare LMP gestational age-specific birthweight percentiles and preterm birth rates among non-malformed singleton infants against a gold standard, before and after correction by a normal mixture model that separates the spurious distribution of birthweight at each gestational age from the deemed true distribution. The gold standard for gestational age measurement included births to women who initiated prenatal care in the first trimester and whose LMP-based gestational age did not differ more than one week from the clinical/obstetric estimate. The normal mixture model identified 5.8% of births as misclassified. Preterm birth rates (< 37 weeks) based on the LMP estimate were 10.8% before and 7.8% after correction, similar to the gold standard (7.8%). Birthweight differences for percentiles 50 and 90 between the LMP estimate and the gold standard at week 28 of gestation were 170 and 1899 grams before correction and 28 and 255 grams after correction, respectively. Birthweight differences were plotted across gestational ages 20 to 45. The normal mixture model behaved better than previous methods (Tukey's outliers, Alexander's cut-offs), particularly before week 37 of gestation. Misclassification was more common among teenagers, single mothers, Hispanics and Blacks, with low education and late entry to prenatal care.

1192-S

EXPRESSION OF LEPTIN RECEPTOR GENE IN THE PLACENTA IS ASSOCIATED WITH FETAL GROWTH. *M Yousefi, W Karmaus, T Sabo-Attwood, S McGee (University of South Carolina, Columbia, SC 29208)

Leptin, a 16 kD hormone encoded by the LEP gene and known to regulate energy intake and expenditure, also affects various peripheral functions such as glucose and lipid metabolism, insulin sensitivity, hematopoiesis, angiogenesis, blood pressure, and progesterone secretion in the ovary. During pregnancy, leptin is produced in the human placenta and is secreted into maternal and fetal circulation. Increased placental LEP mRNA expression has been associated with pre-eclampsia during pregnancy, and high serum leptin levels in pre-eclamptic women have been linked to small-for-date newborns. This suggests that elevated leptin levels may be related to fetal growth restriction, however this claim is not well supported or studied. The leptin receptor protein, encoded by the LEPR gene, is a cell-specific receptor for leptin. We tested whether LEP and LEPR expressions in the placenta were associated with fetal growth. We recruited pregnant women from Columbia and Charleston, SC and obtained placental LEP and LEPR gene expression values from 90 women. We abstracted delivery information, including crown-heel length and birth weight, from medical hospital records. General linear models were used to estimate the effect of LEP and LEPR gene expressions on crown-heel length and birth weight. Controlling for maternal height and child gender, for every one unit increase in LEPR gene expression (Ct), crown-heel length was decreased by 0.61 cm (P-value = 0.05). No association was detected for birth weight. Our results suggest that placental expression of the LEPR gene, independent of placental LEP gene expression, is involved in determining anthropometric values at birth.

1191

ASSOCIATION BETWEEN MATERNAL SERUM LEVELS OF FREE-BETA-HUMAN CHORIONIC GONADOTROPIN IN EARLY PREGNANCY AND HYPOSPADIAS. *N Nassar, S E Jamieson, F Schueuer, V Taveski, J Morris, C L Roberts (Perinatal Research, Kolling Institute of Medical Research, University of Sydney, Australia)

Hypospadias is a urogenital birth defect occurring in infant boys. Free β -human chorionic gonadotropin (free β -hCG), a protein produced by the placenta stimulates the development of Leydig cells that produce testosterone and is crucial in the masculinisation of the urogenital system. The aim of this study was to assess the association between first trimester maternal serum levels of free β -hCG and risk of hypospadias. Data from women with a singleton pregnancy attending first trimester screening in New South Wales, Australia between July 2006 and June 2008 were included. Maternal serum levels of free β -hCG were measured at 10-13 weeks gestation and maternal and infant outcomes were obtained through record linkage to routinely collected population-based birth, hospital and birth defects data. The risk of hypospadias was evaluated in relation to free β -hCG < 5th percentile of the multiples of the median adjusting for potential confounders. Among 10,761 women undergoing first trimester screening and who had a male infant, 55 women had an infant diagnosed with hypospadias. Serum free β -hCG levels in hypospadias pregnancies were lower [0.92 multiples of the normal median (MoM), interquartile range (IQR) 0.57-1.09 MoM] than in unaffected pregnancies (0.97 MoM, IQR 0.64-1.35 MoM). After adjusting for risk factors there was a significant association between free β -hCG < 5th percentile and hypospadias (Odds ratio(OR) 2.58; 95%CI 1.08, 6.62). Findings suggest low levels of free β -hCG in early pregnancy may be indicative of a lapse or disturbance in androgen production that may lead to incomplete urethral development, resulting in hypospadias.

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ANTICIPATED SOCIAL MOBILITY: DEVELOPMENT OF A NEW PSYCHOSOCIAL INDICATOR ASSOCIATED WITH ADOLESCENT RISK BEHAVIORS. *M Ritterman Weintraub, L C Fernald, NE Adler, S L Syme (University of California, Berkeley, CA 94704)

Social class gradients have been explored in adults and children, but not extensively during adolescence. The first objective of this study was to examine the association between adolescent risk behaviors and a new indicator of adolescent relative social position: "anticipated social mobility" (ASM). Second, it investigated demographic, socioeconomic and psychosocial correlates of this indicator. Data were taken from the 2004 urban adolescent module of Oportunidades, a cross-sectional study of Mexican adolescents living in poverty. ASM was calculated for each subject by taking the difference between their rankings on 2 10-rung ladder scales that measured (1) projected and (2) current subjective social status within Mexican society. Adolescents with higher ASM were significantly less likely to report alcohol consumption, drinking with repercussions, compensated sex, police detainment, physical fighting, consumption of junk food or soda, or watching ≥ 4 hours of television during the last viewing. They were significantly more likely to report exercising during the past week and using a condom during last sexual intercourse. These associations remained significant with the inclusion of covariates, including parental education and household expenditures. Multiple logistic regression analyses show higher ASM to be associated with staying in school longer and having higher perceived control. The present study provides evidence for the usefulness of ASM as an indicator for understanding the social gradient in health during adolescence and suggests the possibility of implementing policies and interventions that provide adolescents with real reasons to be hopeful about their trajectories.

1194

MODELLING THE RELATIONSHIP BETWEEN FAMILY CONTEXT, PARENTING AND CHILD OUTCOMES. *C Wade, R Giallo, N Lucas, L Canterford, J Nicholson Murdoch (Parenting Research Centre, Melbourne, Australia)

While socioeconomic disadvantage is associated with poor parenting practices there is evidence that the relationship is not direct but that it is largely mediated by parent mental health and social support. Furthermore, disruptions to effective parenting are associated with poor outcomes for children, and socioeconomic disadvantage is also associated with poorer outcomes for children. However, the precise mechanisms via which the socioeconomic environment, familial factors and parenting practices interact to influence child well-being remains subject to conjecture. The aim of this study was to examine the mechanisms via which socioeconomic disadvantage influenced parenting practices and perceptions in a representative sample of Australian families recruited to participate in the Longitudinal Study of Australian Children. A theoretical model of the pathways via which socioeconomic disadvantage, social support, and parent mental health influence parenting practices and perceptions, and subsequently, child well-being was devised and tested using Structural Equation Modelling.

1196

EDUCATION AND CORONARY HEART DISEASE RISK: A PROPENSITY SCORE MATCHING ANALYSIS. *E B Loucks, S L Buka, M L Rogers, T Liu, I Kawachi, L D Kubzansky, L Martin, S E Gilman (Brown University, Providence, RI 02912)

Education is inversely associated with risk for coronary heart disease (CHD), however whether this is due to causal effects of schooling rather than confounders that existed prior to school entry (e.g. intelligence, childhood economic circumstances, childhood chronic illness, parental mental health) remains unknown. Objectives were to evaluate whether education is associated with lower 10-year CHD risk independent of many early childhood conditions, in participants aged 38-47 years (59.5% female) of the New England Family Study birth cohort. Propensity score matching was performed to evaluate associations of \leq high school vs. college degree with 10-year risk for CHD. Ten-year CHD risk was calculated using the validated Framingham risk algorithm incorporating age, sex, diabetes, smoking, blood pressure, total and HDL cholesterol. Local propensity score matching incorporated 22 directly assessed early life potential confounders including those listed above. Regression analyses demonstrated that college graduation was associated with $\beta = -27.9$ (95% CI: -36.2, -18.6)% lower 10-year CHD risk compared with \leq high school after matching on propensity score that included age, sex and race; further addition of the early life potential confounders to the propensity score resulted in $\beta = -13.1$ (95% CI: -33.4, 13.4)% lower CHD risk. In conclusion, this study found that participants with a college degree had lower CHD risk after accounting for traditional confounders; further addition of early life potential confounders reduced the effect size by about 50%, suggesting potential importance of early life factors in explaining observed associations between education and CHD.

1195

COULD NOT ONLY HEIGHT, BUT LEG LENGTH BE AN INDICATION OF HEALTH INEQUALITY IN LATER LIFE? *H Chun, S I Cho, K Jung-Choi, M Kang (Ewha Womans University, Seoul, Korea)

This study aims to examine associations between height/leg length and chronic diseases in Korean older population. Data was taken from a national survey of the elders aged 60-89, targeting 1,000 samples. The survey's design was based on gender-, age-, and area- stratified random sampling. Trained interviewers performed home-visit interviews and undertook all measuring. A total of 982 samples were analyzed after deleting incomplete cases. By placing subject's head and feet against the wall, height was measured without shoes, and leg length was measured from the uppermost part of the iliac crest to the ipsilateral lateral malleolus of the left leg, using portable measurers. These anthropometric measures were recorded to the nearest mm. Health outcomes included physician diagnosed chronic diseases. To compare the prevalence of chronic diseases according to major independent variables, age adjusted prevalence using direct standardization was used. To assess the independent effect of height and leg length on health, logistic regression was performed by adjusting for age, family economic status throughout the subject's life, and health behaviors (cigarettes smoking and exercise). Life-course socioeconomic status was measured by the MacArthur scale (childhood, adulthood, and old age). Older Koreans with higher familial economic status in childhood were significantly taller and had longer leg length. The effect of shorter height and leg length on chronic diseases was detected only among women. Women with shorter leg length were 1.67 times more likely to report having chronic diseases (95%CI 1.07-2.45), with this risk increasing to OR 1.77(95% CI 1.10-2.84) when both legs and height were significantly shorter. However, adjusting for lifecourse SEP and health behaviors attenuated the associations. This result suggests shorter height and shorter leg lengths are an indicator of the likelihood of a high risk factor of poorer health and draw to attention this plausible biological marker of health inequality in later life.

1197-S

MODERATION AND MEDIATION IN THE COMBINE STUDY FOR TREATMENTS OF ALCOHOLISM. *M Subbaraman (University of California, Berkeley, Berkeley, CA 94720)

COMBINE investigators aimed to determine whether naltrexone, a drug alleged to reduce craving, combined with a behavioral intervention (CBI) alleged to change coping behavior, improves drinking outcomes more than either alone. After 16 weeks only naltrexone alone and CBI + placebo significantly increased percent days abstinent (PDA) in models controlling for baseline PDA and site of treatment administration. Analyses examined theoretically informed mediators and moderators to help explain the combination's lack of improvement over each monotherapy. In the sample overall, both naltrexone and CBI + placebo appeared to reduce cravings, although naltrexone effects on cravings were stronger. No treatment condition appeared to affect stress/coping in the sample overall. Social support for drinking moderated treatment effects. Among those with low support for drinking at baseline, only CBI + placebo significantly predicted PDA; however, CBI + placebo did not appear to affect cravings or stress/coping. Among those with high support for drinking, naltrexone alone and CBI + naltrexone both significantly increased PDA; unexpectedly, while both the naltrexone alone and the CBI + naltrexone conditions did reduce cravings, the CBI + naltrexone condition also appeared to increase stress (reduce coping) among those with high support for drinking. Mediation analyses show that cravings may explain both the naltrexone alone and CBI + placebo effects in the sample overall, and naltrexone effects among those with high support for drinking. No mediators were found for those with low support for drinking. Increases in stress among those receiving CBI + naltrexone may explain the combination's lack of superior effects.

1198-S

ASSOCIATIONS OF SOCIOBEHAVIORAL CLUSTERING WITH CHD RISK FACTORS, NHANES 2001-2004. *N J Everage, C D Linkletter, A Gjelsvik, S T McGarvey, E B Loucks (Brown University, Providence, RI 02912)

Social and behavioral risk markers cluster; however, little is known about whether clustering is independently associated with CHD risk. Objectives were to determine if sociobehavioral risk marker clustering is associated with biological CHD risk factors, and whether the association is independent of the individual clustering components. The study sample was 4,305 men and 4,673 women aged ≥ 20 years from NHANES 2001-2004. Independent variables were: \leq high school degree/GED, < 150 minutes physical activity/week, < 3 fruit and/or vegetable servings/day and smoking, summed into a risk marker index (RMI; range: 0-4). Multiple regression analyses evaluated associations of RMI with biological CHD risk factors. ROC curve analyses assessed independent predictive ability of RMI with biological CHD risk factors. Having healthful sociobehavioral clustering (RMI = 0) conferred benefit, where $\beta = -1.90$ (95% Confidence Interval (CI):-2.99,-0.81) mmHg SBP, 4.61 (3.24,5.98) mg/dL HDL, -2.30 (-3.20,-1.40) cm waist circumference (WC),and odds ratio (OR) = 0.67 (0.54,0.85) for diabetes, after adjusting for age, sex and race for RMI = 0 vs. 1-3. Analyses further adjusted for individual clustering components (i.e. education, physical activity, diet, smoking) demonstrated lower effect sizes, where $\beta = 0.66$ (95% CI:-0.85, 2.17) mmHg SBP, 2.73 (0.85, 4.60) mg/dL HDL, -1.98 (-3.22, -0.74) cm WC, and OR = 0.76 (0.56, 1.03) for diabetes. Addition of RMI to models containing age, race, sex and the individual RMI components did not improve C-statistics. In conclusion, sociobehavioral risk marker clustering is associated with biologic CHD risk factors; however, associations may not be independent of the individual clustering components.

1200

QUANTIFYING THE BIDIRECTIONAL EFFECTS OF INCOME AND BMI IN ADULTS IN THE UNITED STATES, 1986-2008: A MARGINAL STRUCTURAL MODEL APPROACH. *D Rehkopf and M Odden (Stanford University, Stanford, CA 94305)

It is well understood that there is a strong correlation between household income and body mass index (BMI) in the United States, with higher levels of BMI in poorer populations, particularly among women. The social epidemiologic literature contains a large number of studies that describe the impact of income on BMI, whereas the economics literature has generally focused on studies demonstrating an effect of BMI on income. Mechanisms for the prior include the costs of healthy foods, the cost of calorie dense food and the cost of participation in physical activity; mechanisms for the later include hiring practices and marriage. While there is likely to be a causal relationship in both directions, the relative strength of the effects has important implications for what types of policies may reduce income disparities in BMI. In order to quantify the relative effects of income and BMI on each other, we use a marginal structural model approach to account for time-varying confounding. The study population includes 12,480 men and women in the National Longitudinal Survey of Youth 1979. Respondents were followed over 12 waves of surveys from 1986-2008. Potential confounding variables include demographics, parental socioeconomic status, family wealth, cognitive ability, labor market participation, anxiety and locus of control. We use a cross-validated data-adaptive computer learning algorithm to identify the best-fit functional form of the models. We will discuss the implications of our findings for demonstrating the extent to which the direction of causation between income and BMI is bidirectional.

1199

DISENTANGLING NEIGHBORHOOD, BUILT ENVIRONMENT AND IMMIGRANT FACTORS SHAPING PHYSICAL ACTIVITY BEHAVIORS IN CHILDREN. *S E Echeverría, P Ohri-Vachaspati, M Yedidia (University of Medicine and Dentistry of New Jersey, School of Public Health, Piscataway, NJ 08854)

A growing body of research has demonstrated that social contexts such as neighborhood socioeconomic condition and the built environment pattern cardiovascular disease and cardiovascular risk factors, including physical activity behaviors. However, little research exists examining the joint contribution of neighborhood/ built environment features and immigrant status associated with physical activity behaviors among racial/ ethnic minority children. In the present study, we examine socioeconomic and demographic correlates associated with physical activity behaviors in children 3-17 years of age, and determine whether any observed disparities by race/ ethnicity and immigrant status (Latino sample only) are explained by neighborhood and built environment features. The study population includes a random representative sample of African-American (n = 710) and Latino (n = 716) residents living in five cities in the state of New Jersey. We investigate associations across four physical activity behaviors: active transport to school, use of local neighborhood parks, use of neighborhood physical activity resources, and use of sidewalks to walk, run, bike, or play. Both self-reported (e.g., neighborhood aesthetics, crime, traffic, and social cohesion) and objective, geocoded measures (e.g., neighborhood walkability, presence of recreational resources, and proximity to parks) will be examined using linear and logistic regression models fitted with Generalized Estimating Equations (GEE), to account for the potential correlation of study outcomes. The present study will provide new evidence relating neighborhood and immigrant factors shaping physical activity behaviors in a racially and ethnically diverse sample of children. Study findings could point to policy and neighborhood levers that can be targeted to increase physical activity in children.

1201

RACIAL DISCRIMINATION AND HYPERTENSION AMONG AFRICAN AMERICAN MEN: THE ROLE OF IMPLICIT RACIAL BIAS. *D H Chae, A M Nuru-Jeter, N E Adler (Emory University, Atlanta, GA 30309)

African American men are at greater risk for hypertension compared to other racial groups. Stressors associated with racial minority status, including experiences of racial discrimination, may contribute to the development of hypertension. However, findings on discrimination and cardiovascular disease have been particularly inconsistent. In this study we examined whether explicit reports of racial discrimination were associated with current hypertension (diastolic ≥ 140 mmHg or systolic ≥ 90 mmHg) in a sample of African American men between 30-50 years of age (n = 95). In addition, we investigated whether associations between discrimination and hypertension varied between participants with an unconscious pro-Black vs. anti-Black bias, assessed using the Black-White Implicit Association Test. While we did not find a main effect of either racial discrimination (odds ratio [OR]: 0.78, 95% confidence interval [CI]: 0.48, 1.28) or implicit racial bias (OR: 1.15, 95% CI: 0.66, 2.02), we did detect a statistically significant interaction between the two (OR: 1.91, 95% CI: 1.05, 3.51) in predicting hypertension. Among those with an implicit pro-Black bias, there was almost no association between discrimination and hypertension. However, among participants with an implicit anti-Black bias, there was a strong positive association. The combination of experiencing discrimination and internalizing negative racial group attitudes may have particularly detrimental consequences for cardiovascular health. Efforts to address racism at multiple levels may be effective in improving cardiovascular outcomes among African American men.

1202

DEVELOPING A MEASURE OF THE PSYCHOSOCIAL QUALITY OF UNPAID FAMILY WORK: METHODOLOGICAL DESCRIPTION, INITIAL FINDINGS AND CHALLENGES. *B L Janzen, L Hellsten, T Colton (University of Saskatchewan, Saskatoon, SK, Canada, S7N 2E5)

In contrast to the voluminous literature on paid work, relatively little is known about the psychosocial characteristics of unpaid family work (e.g. housework, child rearing) which may influence well-being and contribute to inequalities in health. A major impediment to advances in this field is the lack of valid and reliable instruments available to measure family work quality. Drawing on classical test theory, three interrelated studies are being conducted to construct and gather validity evidence for an instrument designed to assess the psychosocial quality of unpaid family work among 25-50 year old partnered women with children. The intent of this presentation is to provide a methodological overview of the research project and a description of the initial findings. Study one involved the delineation of key constructs and specification of scale content. This was based on multiple strategies, including an extensive review of relevant theories and research, examination of existing scales, focus groups with the target participants, and a quantitative analysis of pilot group data. The purpose of study two was to collect preliminary validity evidence for our draft questionnaire by means of: 1) a formal evaluation by individuals with content and/or measurement expertise, and 2) a quantitative content analysis of the draft questionnaire by graduate students. The results of studies one and two suggest five key dimensions of the psychosocial quality of unpaid family work: equity, decision latitude, demands, rewards, and social support. Sixty items have been developed to reflect these 5 aspects of family work. Study three, which has yet to be conducted, will involve large scale empirical validation of the preliminary scale to further examine the homogeneity and quality of items, the scale structure, and to collect evidence of convergent/divergent validity and test-retest reliability.

1204-S

SOCIOECONOMIC PATTERNING IN HEALTH DYNAMICS IN CANADA: A MIXTURE LATENT MARKOV MODEL. *M Koh, E Renahy, A Quesnel-Vallée (McGill University, Montreal, QC, Canada H3A2T5)

Objective: Examine the association of self-rated health trajectories and time-varying after tax income (adjusted for family size and composition), education, and labour status. Methods: The sample of 24 611 individuals aged 25 to 69 interviewed annually from 2002 to 2008 comes from the Canadian Survey of Labour and Income Dynamics (SLID). This longitudinal, nationally representative household panel survey contains the gold standard in income measurement as about 93% of the income information is derived from Canada Revenue tax files. To address the concern of heterogeneity in self rated health assessment, the measure is validated within the sample using activity limitations and self-reported stress level. The data are analyzed using Mixture Latent Markov models which account for cross sectional and longitudinal measurement error which has been cited as a major concern with repeated categorical data (Langeheine & van de Pol, 2002) and also estimate the probability of transition between respondent's true health state over time. For identification purposes, transition probabilities are held constant. Results: Under the hypothesis of two latent classes for self rated health at each time point and three trajectories based on the mover-stayer model (persistent good health, persistent poor health, and fluctuating health), preliminary analysis show 72.5% in persistent good health, 3.9% in persistent poor health and 23.6% in fluctuation. Langeheine, R., & van de Pol, F. (2002) Latent Markov Chains. In J.A. Hagenaars & A.L. McCutcheon (Eds.), Applied Latent Class Analysis. New York, NY: Cambridge University Press

1203

NEIGHBORHOOD DRUG MARKETS: A RISK ENVIRONMENT FOR BACTERIAL SEXUALLY TRANSMITTED INFECTIONS (STIS) AMONG URBAN YOUTH. *J M Jennings, R A Salhi, R B Taylor, C D M Furr-Holden, J M Ellen (Johns Hopkins University, Baltimore, MD)

Pools of infected sex partners, i.e. core transmitters, are associated with individual level risk for STIs. We hypothesized that neighborhoods with drug markets (as compared to those without) are more likely to have a greater concentration of infected sex partners. In this study, we sought to determine whether neighborhood drug markets were associated with having a high-risk sex partnership and separately, a current bacterial STI (gonorrhea and/or chlamydia) independent of individual demographic and sexual risk factors and neighborhood socioeconomic status (SES) among a household sample of youth in Baltimore City, MD. Data were collected from a household study, systematic social observations, and police arrest, STI surveillance and census data. In multilevel nonlinear probability models, we found that living in a neighborhood with reported existence of drug markets from the household study significantly increased the likelihood of a high-risk sex partnership (Odds Ratio [OR] 2.43, 95% Confidence Interval [CI] 1.13, 5.21, $P = 0.024$) and having a current bacterial STI (OR 10.89, 95% CI 1.87, 63.31, $P = 0.009$) after controlling for individual and neighborhood level factors. These relationships, however, were not significant when measuring drug markets from systematic social observations and publicly available drug arrest data. The results suggest that neighborhood drug markets may play an important role in setting-up risk environments for bacterial STIs. Future studies should explore how drug markets may alter sexual networks structures and whether specific types of drug markets are particularly important in determining STI risk.

1205

EXAMINING VARIATION IN BODY MASS INDEX AMONG HISPANICS: THE ROLES OF RACE AND RESIDENTIAL SEGREGATION. *K N Kershaw, S S Albrecht (Northwestern University, Chicago, IL 60611)

Few studies have examined the relationship between race and body mass index (BMI) among Hispanics. Moreover, few have investigated the association between ethnic residential segregation and health among Hispanics and findings are mixed. Using data from 15,951 Hispanic male and 25,073 Hispanic female 2005-2009 Behavioral Risk Factor Surveillance System participants age 25 and older that self-identified as black, white, and 'other' race, we used multi-level linear regression to examine race differences in BMI and whether the relationship between residential segregation and BMI varies by race. BMI was based on self-reported height and weight. Residential segregation was measured using the Hispanic isolation index based on the 2005-2009 American Community Survey data. After adjusting for age, sex, education, income, and language of questionnaire, there was no difference in mean BMI between black and white Hispanic men, but 'other' race men had higher mean BMI than whites (estimate: 0.29; 95% confidence interval (CI): 0.02, 0.56). Segregation was also significantly associated with higher mean BMI among men (estimate: 0.22; 95% CI: 0.07, 0.37), but there was no variation by race. Black and 'other' race women both had higher mean BMI than white women (estimates: 1.27 (95% CI: 0.53, 2.01) and 0.41 (95% CI: 0.19, 0.63), respectively). Segregation was linked with higher mean BMI among white Hispanic women but appeared protective for blacks (p for interaction = 0.08). These findings highlight the need for a better understanding of the roles of racial categorization and related individual- and area-level factors as contributors to variation in health outcomes among Hispanics.

1206

TRENDS IN ENDOMETRIAL CANCER INCIDENCE RATES IN THE UNITED STATES, 1999–2006. *L M Duong, R J Wilson, U A Ajani, S D Singh, C R Ehemam, (Centers for Disease Control and Prevention, Atlanta, GA 30341)

We investigated whether observed decreases in combined hormone replacement therapy are correlated with incidence of estrogen-dependent type I endometrial cancers compared to type II endometrial cancers, which are non-estrogen-dependent. We used data from central cancer registries in the National Program of Cancer Registries (NPCR) and Surveillance, Epidemiology, and End Results (SEER) programs, 1999–2006. Our analyses included females with microscopically confirmed invasive uterine corpus cancer ($n = 257,039$). We conducted age-adjusted incidence rates by type I and type II endometrial cancers and trend analyses. There were 145,922 cases of type I endometrial cancers and 15,591 cases of type II. We found that type I endometrial tumors occurred most frequently among women aged 50–64 years, who were white and non-Hispanic, and whose tumors were more likely to be low-grade and present at a localized stage. Type II tumors occurred most frequently among women aged 65–79 years, who were white and non-Hispanic, and whose tumors were more likely to be high-grade and present at a localized or regional stage. Type I endometrial cancers have been increasing since 1999 while type II endometrial cancers have been stable throughout the 1999–2006 period. During the past decade, the overall burden of uterine cancer has been stable, although there have been changes in underlying histologies (e.g. endometrial). To help women at increased risk for developing more aggressive types of endometrial cancer, our findings indicate that further research is needed to understand the burden of endometrial cancer in relation to histologic cell types.

1208

FRACTURES IN BREAST CANCER PATIENTS TREATED WITH HORMONAL THERAPIES: A RETROSPECTIVE COHORT STUDY. S S Johnston,*C D O'Malley, L A Palmer, B-C Chu and L C Richardson (Thomson Reuters, Washington, DC 20008)

Adjuvant therapy has significantly improved survival for women with hormone-positive breast cancer. Treatment is not without risk, however, as treatment involving chemotherapy-induced menopause and anti-estrogen therapies may accelerate bone loss and fractures. Using administrative data, we compared fracture incidence and risk between aromatase inhibitor (AI) and tamoxifen users. Women newly-diagnosed with breast cancer between 1/1/2003 and 12/31/2007, ≥ 55 years of age at the time of diagnosis, and subsequently treated with either an AI ($n = 8,911$) or tamoxifen ($n = 3,031$) were included. Fracture incidence was measured for 3 fracture endpoints (hip, vertebral, and other) and a composite endpoint of any fracture. A variance-corrected proportional hazards model was used to estimate a hazard ratio (HR) to describe the relationship between fracture risk and AI/tamoxifen use, adjusted for demographic and clinical factors (chemotherapy, radiation, previous fracture history, comorbidities, medication). Age-adjusted fracture rates were higher in the AI group than the tamoxifen group for any site, hip, and other (35.9/1000, 6.9/1000 and 28.6/1000 vs. 32.1/1000, 4.8/1000 and 25.2/1000, respectively.) Tamoxifen users were significantly more likely to be older, to have had a prior hip fracture and to have previously used bisphosphonates, suggesting a channeling of high risk patients away from AIs. After adjusting for demographic and clinical characteristics, the AI group had a 22% higher risk of any fracture than the tamoxifen group (HR = 1.22, 95% confidence interval 1.05 - 1.43). When AIs are the chosen treatment, careful attention should be given to the risk and prevention of fractures.

1207

SOCIODEMOGRAPHIC AND BEHAVIORAL CORRELATES OF ADIPONECTIN AND LEPTIN IN MIDDLE-AGED WOMEN. *S Everson-Rose, C Clark, Q Wang, H Guo, J Bromberger, H Kravitz, P Mancuso, MF Sowers (University of Minnesota, Minneapolis, MN 55414)

Adiponectin and leptin, abundant anti- and pro-inflammatory adipokines, respectively, are critically involved in metabolic regulation, energy balance, and autonomic nervous system functioning. Inflammatory properties of these adipokines and their potential role in cardiovascular disease risk are widely recognized, yet empirical data linking adiponectin or leptin to socio-demographic or behavioral risk factors in healthy cohorts are sparse. This analysis examined cross-sectional associations of adiponectin and leptin with age, race, education, income, smoking, alcohol consumption, caloric intake, and physical activity in a cohort of 574 healthy women (61.3% white, 38.7% African American (AA); mean (SD) age, 45.6 (2.5) years) who were participants at the Pittsburgh and Chicago sites of the Study of Women's Health Across the Nation. Adiponectin and leptin were assayed in duplicate using commercially available enzyme linked immunosorbent assays. AA women had higher leptin and lower adiponectin levels than white women ($p < .0001$). Significant differences in both adiponectin and leptin were noted for smoking status ($p < .05$), alcohol consumption ($p < .01$), and physical activity ($p < .0001$). Additionally, adiponectin levels were positively related to income ($p = .03$) and inversely related to caloric intake ($p = .03$) whereas leptin was positively associated with age ($p = .03$). Neither adipokine varied by education. This study provides new information on the relation of critical inflammatory biomarkers to key socio-demographic characteristics and behavioral risk factors known to influence a variety of health outcomes. [Supported by NIH/DHHS grants HL091290, AG012505, AG012546, MH59770, MH59689, AG17719.]

1209-S

CLINICIANS' KNOWLEDGE OF STATE ABORTION LAWS AND REGULATIONS. *L E Dodge, S Haider, M R Hacker (Beth Israel Deaconess Medical Center, Boston, MA 02215)

OBJECTIVE: To determine the accuracy of knowledge of state-level abortion laws and regulations among practicing clinicians. METHODS: A self-administered survey was completed by members of several reproductive health professional organizations. Respondents were asked if laws and regulations were present in the state where they worked, with the option to choose "I don't know." Responses were graded according to the Guttmacher Institute's "State Policies in Brief: An Overview of Abortion Laws." A response of "I don't know" was considered incorrect. RESULTS: A total of 151 surveys were completed. Twenty-five respondents did not report the state where they work and were excluded; 20 were excluded because they do not currently provide clinical care or they practice outside the US. Of the remaining 106, 51.9% were physicians, 31.1% were physician assistants, 10.4% were advance practice nurses, 1.9% were health educators and 0.9% were program managers. Nearly all (93.3%) currently provide options counseling and over a third (35.9%) provide abortion services. Eighty-three percent consider themselves to be informed about the abortion laws and regulations in their state. The median overall score was 72.7% (interquartile range: 54.5–81.8). Only 4.7% of respondents answered all questions correctly. Most (92.3%) knew whether individuals are allowed to refuse to participate in providing abortion services, but only 35.9% knew whether so-called "partial-birth" abortion was legal in their state. CONCLUSION: Practicing clinicians had low knowledge of abortion laws and regulations in the states where they practice. As the majority of respondents reported providing options counseling it is clear that women do not receive accurate information about abortion care, which may prevent or delay their care and thus harm their health.

1210-S

PATTERNS OF COMMUNICATION OF STATE-LEVEL ABORTION LAWS AND REGULATIONS WITHIN PRACTICES PROVIDING WOMEN'S HEALTH CARE. *L E Dodge, S Haider, M R Hacker (Beth Israel Deaconess Medical Center, Boston, MA 02215)

OBJECTIVE: To determine the communication patterns surrounding state-level abortion laws and regulations in facilities providing women's health care. **METHODS:** A self-administered survey was completed on paper or online by volunteer members of several reproductive health professional organizations. **RESULTS:** A total of 151 surveys were completed. Twenty-five respondents did not report the state where they work and were excluded; 20 were excluded because they do not currently provide clinical care or they practice outside the US. Nearly all (93.3%) currently provide options counseling and over a third (35.9%) currently provide abortion services. Among all participants, 41.5% reported that the staff at their practice is ever reminded of state abortion laws and regulations. Among those reporting reminders, 25.6% reported these reminders happening yearly and 20.9% reported reminders only when a new law or regulation is issued. Seven percent reported month reminders and 7% reported quarterly reminders. Respondents who reported initiating these reminders had better knowledge of state laws and regulations than people who did not initiate reminders, though the difference was not statistically significant ($p = 0.16$). Among respondents who reported that their practice provides abortion services, 55.3% reported staff receiving reminders. **CONCLUSION:** Fewer than half of respondents reported working at a practice that had staff reminders about abortion laws and regulations. Of those who did, reminders were reported as often being irregular and infrequent. This lack of reminders likely contributes to low knowledge of abortion laws and regulations among staff members and thus inaccurate knowledge being disseminated to patients.

1212

DOES PHYSICAL ACTIVITY REDUCE INFLAMMATION IN MIDLIFE CHINESE WOMEN? *S C Ho, S H Wu, R Yu, A Sham A (The Chinese University of Hong Kong, China)

Background: Limited data on the relation between physical activity and C-reactive protein (CRP) in the Asian population are available. **Objective:** We investigated the association between physical activity and CRP concentration in midlife Chinese women. **Methods:** 515 healthy women aged 50-65 years were recruited from the general population in Hong Kong through random telephone dialing. Physical activity was assessed by the modified Baecke questionnaire validated in the Chinese population, and a total physical activity index (PAI) summing activities from work, housework, leisure time and sport was obtained. Serum CRP was measured with a high-sensitivity chemiluminescence immunoassay. An elevated CRP concentration was defined as 3 mg/L. **Results:** Women with elevated CRP had significantly lower mean PAI of 8.49 (SD = 1.25) compared with 8.92 (SD = 1.47) in women with non-elevated CRP concentration ($P = 0.014$). After adjusting for age, the odds ratios for elevated CRP concentration (≥ 3 vs. < 3 mg/L) were 1.27 (95% confidence interval (CI) = 0.70-2.30), 0.45 (0.22-0.93) and 0.38 (0.18-0.80) across the increasing quartile categories of PAI (P for trend = 0.001) compared with the lowest quartile. The increasing trend remains significant after controlling for additional potential confounders, including income, years since menopause, HDL-cholesterol, LDL-cholesterol, triglycerides, glucose, systolic blood pressure, diastolic blood pressure, body mass index and waist circumference. **Conclusion:** Our findings suggest that high level of physical activity is associated with reduced inflammation, a critical mediator in the pathogenesis of cardiovascular disease.

1211

USING GENDER ANALYSIS TO ASSESS WOMEN'S HEALTH NEEDS IN A COMMUNITY. *K Lewis (James Madison University, Harrisonburg, VA 22807)

The Harrisonburg-Rockingham Healthy Community Council (HCC) is a community-based organization established in 1995 with the mission "to enhance the quality of life for the community through collaborative efforts of individuals, agencies, and institutions." Community assessments are conducted every five years. Data from each assessment has been utilized to determine community need and provide rationale for selecting community priorities. Data from an assessment conducted in 2006, revealed the need for emphasis on women's health challenges in the community. Based on the data, a Coalition for a Healthier Community grant was received to assess data specific to Women's and Girl's Health. Gender-specific analysis was conducted to assess the health of women residing in the community. Approximately, 440 (53%) women completed the assessment conducted in fall 2010. In assessing self-reported health status, 13% of women reported their health to be fair or poor. Disease prevalence among women included 39% with high blood pressure, 36% with high blood cholesterol, 40% with arthritis, and 30% were overweight. In assessing health screening, 45% had not received a pap smear and 34% had not received a mammogram. Sixty-eight percent did not conduct a monthly breast exam. Based on recent assessment data, there should be a focus on cardiovascular health among women. The importance of health screenings including self-breast exams should be emphasized among this population.

1213

SMOKING, SMOKING CESSATION, AND MORTALITY AMONG NORWEGIAN WOMEN. *I T Gram, S Sandin, T Braaten, E Lund, E Weiderpass (University of Tromsø, 9037 Tromsø, Norway)

We examined the effect of smoking on mortality and the benefits of quitting during follow-up in the Norwegian Women and Cancer Study (NOWAC) cohort. We used data from a large prospective cohort study in Norway including 85,320 women, aged 31-70 years at cohort enrolment. We followed women who completed a first questionnaire and whom we subsequently sent a second questionnaire by linkages to national registries through December 2008. Questionnaire data included information on disease history, reproductive variables, and lifestyle, including history and current status of cigarette smoking. Poisson regression models were fitted to estimate rate ratios (RR) with 95% confidence intervals (CIs). At start of follow-up, women were classified as never (35%), former (30%) and current (35%) smokers. Among current smokers 16% ($N = 4729$) reported to have quit smoking during follow-up. Altogether 2,842 [(15% Cardiovascular Diseases (CVD) and 11% Lung cancer (LC)] death events were identified during follow-up by linkage with the Central Population Register. The median follow-up time was 14 years. The multivariable adjusted model containing terms for attained age, birth cohort, menopausal status, education, consumption of alcohol and body mass index yielded a doubling in risk of dying (RR = 2.4; 95% CI 2.2-2.6) among current smokers and a 40% (RR = 1.4, 95% CI 1.2-1.5) increased risk among former smokers compared with never smokers at enrollment. Quitting smoking during follow-up had a significant benefit on overall (RR = 0.8, 95% CI 0.6-0.9), CVD (RR = 0.3, 95% CI 0.2-0.7) and lung cancer (RR = 0.4, 95% CI 0.2-0.7) mortality compared with those who did not. Our study confirms the importance of quitting smoking.

1214-S

EPIDEMIOLOGY AND DETERMINANTS OF INDOOR TANNING AMONG YOUNG WOMEN. K Lostritto, *L M Ferrucci, B Cartmel, D J Leffell, A M Molinaro, A E Bale, S T Mayne (Yale University, New Haven, CT 06520.)

Despite educational campaigns to convey the risks of indoor tanning, many Americans continue to engage in this practice. We describe the epidemiology and evaluate the sociodemographic and lifestyle determinants of indoor tanning among white women under 40 years of age ($n = 275$) enrolled as controls in a case-control study of early-onset basal cell carcinoma. Controls were randomly sampled from individuals in Yale's Dermatopathology database who had a benign diagnosis and were frequency matched to cases on age, gender, biopsy year, and biopsy site. In-person interviews elicited detailed information on lifetime history of indoor tanning. Ever indoor tanning was reported by 73% of women, with median age at first use of 17. Among indoor tanners the median number of indoor tanning sessions was 72 (Interquartile Range = 16-240) and 39% had at least one burn from indoor tanning. Using stepwise selection, in the multivariate logistic regression model, women who tanned indoors as compared to those who did not were significantly more likely to have darker eye color and sunbathed outdoors more frequently. In addition, persistent indoor tanners, defined as those who consistently tanned indoors starting in their teens, drank significantly more alcohol, sunbathed outdoors more, and were less educated than non-persistent tanners. In summary, indoor tanning was quite common in this population of women and was associated with other high-risk behaviors. With unique data on lifetime indoor tanning history, we observed differences between persistent and non-persistent tanners. Our findings suggest a need to target female indoor tanners for multi-faceted behavioral interventions aimed at health promotion/disease prevention.

1216-S

KNOWLEDGE OF BREAST SCREENING AND COMPLIANCE WITH ANNUAL SCREENING IN WOMEN WITH A FAMILY HISTORY OF BREAST CANCER. *S Edwards, A Chiarelli, G Glendon, L Mirea, J Knight, I Andrulis, P Ritvo (Cancer Care Ontario, Toronto, ON, Canada M5G 2L7)

Background: The aim of this study was to examine how knowledge of breast cancer risk factors and screening guidelines influences compliance with mammography screening in women with a family history of breast and/or ovarian cancer. Methods: This study included 901 women aged 20 to 71 years from the Ontario site of the Breast Cancer Family Registry who had at least one first-degree relative diagnosed with breast and/or ovarian cancer. Information was obtained from a telephone questionnaire completed at the time of recruitment and a follow-up telephone questionnaire. Knowledge of breast cancer screening guidelines and risk factors were compared between women returning within 18 months or less of their last mammogram (compliers), women returning beyond 18 months (non-compliers) and women who never had a screening mammogram (non-screeners) using logistic regression analyses. Results: There were 329 (36.5%) compliers, 386 (42.8%) non-compliers and 186 (20.7%) non-screeners. A majority of women knew the appropriate frequency of screening for high risk women with 93.0% of compliers, 73.4% of non-compliers, and 70.4% of non screeners indicating they should have a mammogram at least annually. In addition, women who reported the correct frequency (across these groups) were significantly more likely to comply with screening guidelines. Women's knowledge of the importance of breast cancer risk factors such as a high fat diet, alcohol use, lack of exercise and family history of breast cancer did not influence compliance. Conclusions: This study found that knowledge of breast screening guidelines among women with a family history of breast cancer improved adherence to annual screening.

1215

THE ROLE OF DEMOGRAPHIC CHARACTERISTICS ON THE OUTCOME OF CATARACT SURGERY AND THE GENDER ROLE IN EYE CARE UPTAKE RUNNING TITLE: DEMOGRAPHY AND CATARACT SURGERY OUTCOME. H Hashemi, S-F Mohammadi, H Z-Mehrjardi, M Majdi-N, *E Ashrafi, S Mehravaran, A Mazouri, R Rouhipour, and M Khabazkhoob, (Eye Research Center, Farabi Eye Hospital, Tehran University of Medical Sciences, Tehran, Iran)

Purpose To explore the effect of demographic characteristics on the outcome of cataract surgery in terms of visual acuity and patient satisfaction, and the gender role in uptake of post-operative care Methods The sampling framework included 478 subjects (558 eyes) of subjects over the age of 50 years at the time of surgery who underwent surgery for age-related cataract. Full demographics were inquired, comprehensive ocular examination was performed, and surgical records were reviewed interactively Results Male subjects had a significantly better outcome in terms of uncorrected visual acuity (UCVA) and best corrected visual acuity (BSCVA) (mean difference of 0.12 and 0.13 Log MAR; $p = 0.004$ and < 0.001 , respectively). Women were significantly less satisfied than men (73.2% vs. 83.6%; $p = 0.011$). Post-operative UCVA and BSCVA were better in patients with higher levels of education (p values < 0.000). Age had an inverse association with UCVA and BSCVA ($p = 0.004$ and < 0.000 , respectively). Females were twice as likely to need capsulotomy ($p = 0.001$) and they had a higher rate of prior capsulotomy. Men's uptake for post-operative refractive care was 4 times greater than women's (31% vs. 7%). In the regression model, age, presence of ocular comorbidity, state of need (need for capsulotomy, spectacle prescription, and other cares) were associated with post-operative UCVA. Conclusion Female participants were shown to be at a clear disadvantage for cataract surgery; as the outcome of the procedure and their post-operative care were both poorer. Studying gender-related barriers for uptake of post-operative care is recommended.

1217-S

COMPARISON OF BREAST CANCER RISK FACTORS AMONG WOMEN SCREENED BY DIGITAL AND SCREEN-FILM MAMMOGRAPHY IN AN ORGANIZED SCREENING PROGRAM. *S Edwards, A Chiarelli, V Majpruz, K-A Cox, R Shumak, M Yaffe, S Done, P Brown (Cancer Care Ontario, Toronto, ON, Canada M5G 2L7)

Background: Digital mammography (DM) has received attention as an improved imaging modality over screen-film mammography (SFM) for detecting breast cancer, particularly in women pre/perimenopausal and with dense breasts. Objectives: To compare risk factors among women screened by DM to those screened by SFM and diagnosed with breast cancer. Methods: A cohort design was used to identify two concurrent groups of women aged 50 to 74 screened within the Ontario Breast Screening Program (OBSP) in 2008; one cohort will have been screened by DM and the other by SFM. Women were eligible if they are alive, diagnosed with invasive breast cancer in 2008 and agreed to receive information on breast cancer studies. Information on mammographic density at screening and risk factors collected by a telephone administered questionnaire will be compared between the SFM and DM cohorts and interval and screen detected cancers within the cohorts. Results: There were 404,897 women aged 50-74 screened in 2008 within the OBSP and 1,549 women diagnosed with invasive breast cancer eligible to participate in our study. In total, 1,031 (66.6%) women were screened with SFM and 518 (33.4%) with DM. For the SFM group, there were 832 (80.7%) screen detected and 199 (19.3%) interval cancers and for the DM group there were 413 (79.7%) screen detected and 105 (20.3%) interval cancers. Risk factors of both screen and interval detected cancers within the SFM and DM group will be compared using logistic regression models. Conclusions: It is important to examine how this new technology has improved breast screening for women and to identify which subgroups of women would benefit most.

1218

AGE AT MENOPAUSE AND PHYSICAL PERFORMANCE IN LATER LIFE: A STUDY FROM LATIN AMERICAN WOMEN. *C Lord, B E Alvarado, M P Vélez, M-V Zunzunegui, (Unité de Santé Internationale, Département de médecine sociale et préventive, Université de Montréal, Montreal, QC, Canada)

Objective: The association between surgical menopause and poor physical function in old age has been established. The goal of this study is to assess if early age of natural menopause is associated with poorer physical performance in women over 60 years of age in Latin America and the Caribbean, taking into account life-course circumstances, height, weight and smoking. Methods: Self-reported age at menopause and measures of grip strength, chair rise time and standing balance were extracted from the SABE surveys (Salud, Bienestar y Envejecimiento; Spanish for health, wellbeing and aging). The analytical sample included 2435 community dwelling women aged 60-79 in five Latin American and Caribbean cities. Linear and logistic regressions were used to test the associations between age at menopause and the physical performance measures. Results: Twenty eight percent reported age at menopause before 45 years old whereas only 6% after 55 years of age. Women with earlier age at menopause were more likely to fail the balance test and had lower grip strength. These differences attenuated for balance and remained significant for grip strength after extensive controlling for height and weight, life-course socio-economic indicators, reproductive factors and smoking. Conclusion: Early menopause is more frequent in Latin America and the Caribbean than in high income countries and is associated with lower grip strength and poorer balance. Given the rapid aging in Latin America and the Caribbean, preventive measures against muscle and bone density loss after menopause are needed.

1220-S

CIRCADIAN DISRUPTION AND FEMALE REPRODUCTIVE FUNCTION: THE IMPACT OF ROTATING SHIFT WORK ON MENOPAUSAL TIMING. *D Stock, ES Schernhammer, J M Raboud, M Cotterchio, J A Knight (Samuel Lunenfeld Research Institute, Mount Sinai Hospital, Toronto, ON, Canada)

Background: Circadian disruption has been implicated in reproductive function in women. Though results are conflicting, elevated shift work exposure has been associated with poorer reproductive outcomes including preterm birth and low birth weight, disruption of menstrual cycle patterns, and increased risk of reproduction-linked chronic diseases, the most prominent of which is breast cancer. Currently it has yet to be assessed whether variation in shift work exposure is associated with later menopausal onset, an established independent risk factor for breast cancer. Methods: We assessed the association between both current and cumulative (updated biennially) rotating shift work on risk of menopausal onset in 81,995 women of the Nurse's Health Study II cohort, followed for 14 years (1993-2007). Cox proportional hazards models were adjusted for age, smoking status, BMI, physical activity, alcohol consumption and other reproductive factors. Results: 17,725 women achieved menopausal status over follow-up. A moderate statistically significant 7% increased risk of earlier menopausal onset (Hazard Ratio: 1.07, 95% Confidence Interval: 1.00-1.13) was observed for women who experienced between 2 and 6 years of rotating shift work relative to non shift workers. Recent rotating shift work exposure was not observed to be associated with menopausal timing. Conclusion: While these findings may further support a regulatory effect of circadian disruption on reproductive function, they do not suggest that increased shift work exposure contributes to increased postmenopausal breast cancer risk via the same mechanisms that link later menopause to this outcome.

1219

DECLINING INCIDENCE OF HOSPITALIZATION FOR STROKE AFTER 2002 AMONG WOMEN IN CALIFORNIA. *J Lacey, Jr., N Chung, H Anton-Culver, S Wang, J Voutsinas, C Clarke, E Chang, G Ursin, D Deapen, S Neuhausen, K Henderson, H Ma, C Dieli-Conwright, D Nelson, P Horn-Ross, P Reynolds, L Bernstein. (City of Hope, Duarte, CA 91010)

The abrupt decline in U.S. breast cancer incidence rates after 2002 is thought to be largely due to widespread and rapid cessation of menopausal hormone therapy (HT) use after the July, 2002, early termination of the Women's Health Initiative (WHI) estrogen plus progestin trial. If breast cancer rates fell because of declining HT use, then rates of other clinical endpoints that are associated with HT, such as stroke, might have also fallen, but few studies have examined trends for outcomes other than breast cancer. We used data from the California Teachers Study (CTS) cohort, which has followed 133,479 women since 1995-1996, to examine stroke incidence from 1/1/1997 through 12/31/2006. For CTS participants residing in California, regular linkages with California's Office of Statewide Health Planning & Development captured in-patient hospitalizations, and linkages with mortality databases identified deaths. Using ICD codes, we generated annual rates of hospitalization for non-fatal (N = 1976) and fatal (N = 756) strokes among 122,738 participants who were over age 40 years and had no history of stroke at baseline. Age-adjusted incidence rates steadily rose 35% from 1997 (78 per 100,000) to 2002 (105 per 100,000), and then fell 50% in 2003 (52 per 100,000). Rates in 2004, 2005, and 2006 were all 39%-48% lower than 2002 rates. Similar trends emerged for fatal strokes and in multiple sensitivity analyses. Because HT increases the relative risk of stroke, the sharp post-WHI drop in HT use may have contributed to lower rates of both non-fatal and fatal strokes after 2002.

1221

VENOUS THROMBOEMBOLISM IN WOMEN AFTER TRANSFUSION. *M A M Rogers, N Blumberg, J M Heal, K M Langa. (University of Michigan, Ann Arbor, MI 48109)

Transfusion has been associated with post-surgical venous thromboembolism, and after injury women's blood has been shown to be more hypercoagulable than men. Therefore, we studied the incidence of deep vein thrombosis (DVT) and pulmonary embolism (PE) in a cohort of 9429 women from the Health and Retirement Study, a longitudinal study using a representative sample of older Americans. Data were linked to Medicare records from 1991 through 2007 (individuals with DVT or PE during the first 2 years were excluded; n = 417). Participants were followed for 90 days post-discharge from the hospital, emergency room or outpatient facility for evidence of DVT or PE. For a given hospitalization or visit, the unadjusted risk of DVT/PE was 6.2% within 90 days for women who received a transfusion and 3.0% for those without a transfusion. In a logit model, receipt of a transfusion increased the odds of DVT/PE 2-fold (odds ratio (OR) = 2.03, 95% CI 1.74, 2.38) after adjustment for demographic factors and comorbidities. The odds of DVT/PE was increased in Caucasian women (OR = 1.38, 95% CI 1.06, 1.79) and obese women (OR = 2.40, 95% CI 1.31, 4.41). Hispanic women were at reduced risk (OR = 0.64, 95% CI 0.44, 0.93). The odds of DVT/PE increased by 4% with each year of age (95% CI 1.03, 1.05). Adjustment for major surgeries did not appreciably change the results. Using survey weighting, 20.5% of older women who received at least one transfusion and 6.9% of those who were never transfused developed DVT/PE within a 10-year period.

BLOOD PRESSURE TRAJECTORIES PRIOR TO DEATH IN PATIENTS WITH DIABETES MELLITUS. *M A M Rogers, K Ward, T R Gure, H Choe, P Lee, C S Blaum (University of Michigan, Ann Arbor, MI 48109)

The goal of this cohort study was to investigate trajectories of blood pressure (BP) in adults with type 2 diabetes mellitus and the association of trajectory patterns with mortality. A total of 3766 Medicare patients with diabetes were followed from 2004 through 2008. Data were extracted from a registry of Medicare beneficiaries which was developed by a large academic practice that participated in the Physician Group Practice Medicare Demonstration. BP trajectories were modeled using multilevel mixed-effects linear regression with both random intercepts and coefficients. Over the course of the study, 10.7% of patients died, half of whom were > 75 years of age. There was a greater decline in systolic and diastolic pressures in patients who died than in those who did not die in both crude and adjusted models. In a model adjusted for gender, race and time-varying covariates (age, BP medications, statins, insulin, hemoglobin A1c, cholesterol, body mass index and comorbidities), the mean systolic pressure decreased by 3.2 mm Hg/year ($p < 0.001$) in the years prior to death and by 0.7 mm Hg/year ($p < 0.001$) in those who did not die ($p < 0.001$ for the difference in trajectory slopes). Similarly, mean diastolic pressure declined by 1.3 mm Hg/year for those who died ($p < 0.001$) and by 0.6 mm Hg/year for those who did not die ($p < 0.001$); the difference in trajectory slopes was significant ($p = 0.021$). In secondary analyses, these differences in BP trajectories were not found to be due to older age or the presence of congestive heart failure. In conclusion, both systolic and diastolic BP declined more rapidly in the 4 years prior to death than in patients who remained alive.

1224-S

TYPES OF SMOKERS, DEPRESSION AND DISABILITY IN TYPE 2 DIABETES: A LATENT CLASS ANALYSIS. *G Garipey, A Malla, J Wang, L Messier, A Lesage, I Strychar, N Schmitz (Douglas Mental Health University Institute, Montreal, QC, Canada)

Despite the detrimental effects of smoking on health, a high number of adults with type 2 diabetes continue to smoke. Identifying distinct profiles of smokers could help tailor smoking intervention programs in this population and may help uncover high risk subgroups with unfavourable health outcomes. This study examined whether smokers with type 2 diabetes could be classified into different profiles based on socioeconomic characteristics, smoking habits and lifestyle factors. Depression and disability outcomes were compared across smoking profiles. A community sample of adults with self-reported diabetes was selected from random digit dialing. Analyses included 383 participants with type 2 diabetes who were current smokers. Participants were interviewed at baseline (2008) and re-interviewed one year later (2009). Latent class analysis was used to identify types of smokers. We uncovered three meaningful classes of smokers: (1) long-time smokers with long-standing diabetes ($n = 105$), (2) heavy smokers with deprived socioeconomic status, poor health and unhealthy lifestyle characteristics ($n = 105$), (3) working and active smokers, recently diagnosed with diabetes ($n = 173$). Members of class 2 were significantly more likely to be disabled and depressed at baseline and follow-up compared with others. They were also less likely to have quit smoking at follow-up, despite attempting to quit as often as others. Different profiles of smokers exist among adults with type 2 diabetes. One class of smokers is particularly linked with depression, disability and a deprived socioeconomic situation. Distinguishing between types of smokers may enable clinicians to tailor their approach to smoking cessation.

ASSOCIATION BETWEEN DIAGNOSED DIABETES AND SELF-REPORTED CANCER AMONG U.S. ADULTS: FINDINGS FROM THE 2009 BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM. *C Li, L S Balluz, E S Ford, C A Okoro, J Tsai, G Zhao (Centers for Disease Control and Prevention, Atlanta, GA 30333)

To assess the association between diagnosed diabetes and self-reported cancer among U.S. Adults, we analyzed data from the 2009 Behavioral Risk Factor Surveillance System were analyzed ($N = 397,783$). Diabetes diagnosis and cancer were self-reported. Log-linear regression analyses were performed to estimate prevalence ratios (PR) and their 95% confidence intervals (CI). The crude prevalence of self-reported cancer was 7.52% (standard error [S.E.], 0.11%) and 15.98% (S.E., 0.44%) for men without and with diabetes, and 10.41% (S.E., 0.11%) and 17.10% (S.E., 0.38%) for women, respectively. After adjustment for age, race/ethnicity, health insurance coverage, current smoking, heavy drinking, obesity, and physical inactivity, men with diabetes had a significantly higher prevalence of cancer of colon (PR, 1.3; 95% CI, 1.1-1.7), pancreas (PR, 3.8; 95% CI, 1.5-9.8), rectum (PR, 2.1; 95% CI, 1.0-4.3), urinary bladder (PR, 1.6; 95% CI, 1.2-2.2), and kidney (PR, 1.9; 95% CI, 1.2-3.0) than their non-diabetic counterparts (all $P < 0.05$). Women with diabetes had a significantly higher prevalence of cancer of breast (PR, 1.1; 95% CI, 1.0-1.3), cervix (PR, 1.3; 95% CI, 1.0-1.5), endometrium (PR, 1.7; 95% CI, 1.3-2.2), liver (PR, 3.3; 95% CI, 1.1-9.9), and leukemia (PR, 2.3; 95% CI, 1.3-3.9) than their non-diabetic counterparts (all $P < 0.05$). In conclusion, in this large population-based sample, adults with diabetes had significantly higher prevalence of self-reported cancer than those without diabetes. Diabetes may be associated with specific types of cancer differently among men and women.

1225

THE BI-DIRECTIONAL RELATIONSHIPS BETWEEN DIABETES MELLITUS AND DEPRESSION: EVIDENCE FROM TWO COHORT STUDIES BASED ON THE SAME POPULATION. *C-Y Li, Y-Y Li, Y-T Li (National Cheng Kung University Medical College, Tainan, Taiwan, 701)

We conducted two separate cohort studies, based on Taiwan's National Health Insurance (NHI) claims, to determine the temporal link between type 2 diabetes (ICD-9-CM: 250×0 or 250×2) and depression (ICD-9-CM: 296, 309, or 311), and vice versa. The first cohort analysis identified all 390,011 diabetic patients of Taiwan in 2000 and the same number of randomly selected non-diabetic beneficiaries. The second cohort analysis identified 5,847 depressive patients and a random sample of non-depressive beneficiaries of the same number in 2000; samples analyzed in the second cohort study were selected from the NHI data of a random sample of one million beneficiaries in 2000. The subsequent information on incident depression and diabetes was retrieved from ambulatory cares from 2000 to 2006. The person-year (PY) approach with Poisson assumption was used to estimate the incidence density rate (IDR). We also evaluated the age- and sex-specific relative hazards of depression/diabetes in relation to diabetes/depression with Cox proportional hazard regression model adjusted for potential confounders. The first cohort analysis noted a depression IDR of 7.03 per 1,000 PY and 3.92 per 1,000 PY for diabetic and non-diabetic subjects, respectively, representing a covariate adjusted hazard ratio (HR) of 1.43 (95% CI 1.38-1.48). The second cohort analysis noted a diabetes mellitus IDR of 27.59 per 1,000 PY and 9.22 per 1,000 PY for depressive and non-depressive subjects, respectively. The covariate adjusted HR was also significantly increased at 2.02 (1.80-2.27) for incident diabetes associated with baseline depression. The two cohort studies provided support for the bi-directional relationships between diabetes and depression, with a stronger association noted for the depression predicting onset of diabetes. We also noted that the bi-directional relationships were most obvious in younger (< 35 years) patients, regardless of gender.

1226-S

EPIDEMIOLOGICAL AND PREVENTIVE CARE PROFILE OF ADULTS WITH DIABETES IN PUERTO RICO: A PRACTICAL USE OF THE BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM OPTIONAL DIABETES MODULE, 2009. *J Irizarry-Ramos, L Perez-Rivera, C Santiago-Diaz, R A Serrano-Rodriguez (Puerto Rico Department of Health, San Juan, PR)

The optional diabetes module of the Behavioral Risk Factor Surveillance System (BRFSS) was first made available to Puerto Rico (PR) in 1999. The diabetes module collects information on preventive care, self-management, and diabetes education. Data gathered from the 2009 PR BRFSS were analyzed to construct an epidemiological and preventive care profile of adults with diabetes in PR. Data were weighted to obtain estimates representative of the total adult population in PR. The prevalence of self-reported diabetes in PR was 12.9%. Most subjects with diabetes were age ≥ 45 years (85.1%), women (54.5%), were diagnosed at age ≥ 35 (83.5%), were covered by health insurance (96.0%), and belonged to a low socioeconomic level (59.9%). Among all adults with diabetes, 30.2% were using insulin, 46.4% practiced self-monitoring blood glucose, and 81.4% examined their feet at least once a day. In the last year, 89.1% visited a health care provider for diabetes care, 78.2% had the hemoglobin A one C (HbA1C) checked, 49.0% had their feet examined at least once by a health care provider, and 60.4% received a dilated eye examination. Only 34.8% of the adults with diabetes took a course or class in how to self-manage diabetes. PR BRFSS diabetes module provides the evidence-base data required by the public health system to evaluate preventive care in diabetes and to trace strategies focused in reducing the burden associated with diabetes and diabetes-related complications.

1228

SOCIOECONOMIC POSITION AND MORTALITY: THE CONTRIBUTION OF HEALTH CARE ACCESS AND PSYCHOLOGICAL DISTRESS AMONG U.S. ADULTS WITH DIAGNOSED DIABETES. *S Saydah, G Imperatore, G Beckles (Centers for Disease Control and Prevention, Hyattsville, MD)

Although several studies have examined the association between socioeconomic position (SEP) and mortality in the general population, few have investigated the relationship in the diabetic population and fewer still have evaluated the contribution of health care access and psychological distress to this relationship. We analyzed data from 6,177 adults aged ≥ 25 years with diagnosed diabetes who participated in the National Health Interview Surveys (1997 - 2003) linked to mortality data (follow-up through 2006). SEP was measured by: education attained, wealth (either stocks/dividends or home ownership), and the Poverty-Income-Ratio (PIR). We used proportional hazards models to calculate adjusted relative hazards (RH) for each measure of SEP, controlling for demographic, clinical, behavioral, healthcare access and psychological distress variables. In unadjusted analysis, for both education and the PIR, there was significant risk of death for people at lower levels compared to those at the highest level. However, after multivariate adjustment, the associations remained significant only for persons with the lowest level of education (RH 1.51, 95% CI 1.03, 2.22). The risk of death for persons without wealth is significantly greater (RH 1.56, 95% CI 1.06, 2.28) than for those without wealth after multivariate adjustment. Health care access and psychological distress did not significantly change the strength or direction of any SEP association. The findings suggest that education and wealth, factors which may be related to cumulative life socio-economic position, are stronger predictors of mortality risk among adults with diabetes than more volatile factors such as income.

1227-S

IDENTIFICATION OF CONFOUNDERS ON THE ASSOCIATION BETWEEN SELF SELECTED BODY FIGURE AND DIABETES IN A STUDY OF OVERWEIGHT AFRICAN-AMERICAN WOMEN. *S C Cretella, S-A Bowen, A Diedhiou (University of South Carolina, Columbia, SC 29208)

The purpose of this study is to examine the association of overweight women who do not identify with an overweight body figure and their risk for diabetes and to identify characteristics that confound this association. Data was collected from a questionnaire administered at the annual African American conference on Diabetes (AACD) and the IMARA women empowerment tour. Only participants who identified themselves as African American women (age 18 or greater) answered yes or no to having been diagnosed with type II diabetes, self reported height and weight that yielded a BMI equal to or greater than 25, and selected a body figure were included in the final analysis (n = 406). The crude risk ratio (RR) measures the association between their body figure selection (overweight or not overweight) and type II diabetes (yes or no). Self-reported characteristics are independently included in the crude model and the adjusted and crude RRs are compared. A variable that causes a 10% or greater change is considered to be a confounder. Characteristics found to be confounders are added to a final model beginning with those that cause the greatest change. Hypertension and age independently modified the crude RR 1.2 (95% CI .8, 1.7). The RR is 1.1 (95% CI .9, 1.4) after adjustment for age and hypertension. Among overweight African American women the risk of having diabetes among those who choose an overweight body figure is modified by age and hypertension. Overweight individuals who do not perceive their body figures as overweight are underestimating their risk for a variety of chronic diseases including diabetes.

1229-S

EFFECTS OF OBESITY AND TYPE 2 DIABETES ON THE 30 YEAR RISK OF CARDIOVASCULAR EVENTS IN YOUNG ADULTS. *P R Khoury, S R Daniels, T R Kimball, E M Urbina, L H Dolan (Cincinnati Children's Hospital Medical Center, Cincinnati, OH)

Using the Framingham Thirty Year Risk Scores of Pencina et al., we compared 215 young adults who were either normal weight (N, n = 78), obese non-diabetic (O, n = 71), or obese with Type 2 diabetes (T, n = 66) for 30 year risk of cardiovascular disease (CVD) events. Four risk scores were calculated using either body mass index (BMI), or lipids; for either "hard", or "full" CVD events. Hard CVD includes coronary death, myocardial infarction or any stroke. Full CVD includes hard CVD plus coronary insufficiency, angina pectoris, transient ischemic attack, intermittent claudication and congestive heart failure. The scores were comprised of the risk factors: sex, age, SBP, diabetes, smoking, BP treatment, and either BMI, or cholesterol and HDL. Analysis of covariance was used to estimate mean risk levels (LSMEAN) adjusting for race and gender. Results: The distribution of race was 40% White (W), 60% African American (AA); sex was 33% male (M), 66% female (F); age range was 20.0-24.0 years; mean BMI was 22, 39, and 37 for N, O, and T respectively. Risk (LSMEAN) for hard CVD events was 1.3%, 2.9%, and 8.6% using the BMI model, and 1.1%, 1.9%, and 6.1% using the lipid model for N, O, and T respectively. Risk for full CVD events was 2.9%, 6.0%, and 14.0% using the BMI model, and 2.5%, 4.2%, and 10.2% using the lipid model for N, O, and T respectively. Using the BMI models, AA had 25% higher risk than W for T (P < .001), but not N or O groups. M had twice the risk of F in all models. Conclusion: For young adults with T2DM, there is a 3 to 6 fold increase in 30 year risk for CVD events compared to normal weight, and a 2 to 3 fold increase compared to (heavier) obese non diabetic subjects.

1230

URINARY F2-ISOPROSTANES AND THE RISK OF TYPE 2 DIABETES IN THE IRAS COHORT. D Il'yasova, I Spasojevic, H Zhang, F Wang, S Young, R B D'Agostino, Jr, and L E Wagenknecht (Duke University, Durham, NC)

Type 2 diabetes (T2D) and its risk factors are associated with increased F2-IsoPs levels cross-sectionally. In contrast, our pilot case-control study nested in the Insulin Resistance Atherosclerosis Study (IRAS) cohort showed an inverse association between frequently measured urinary F2-IsoP (2,3-dinor-5,6-dihydro-iPF(2alpha)-III) and T2D risk. To confirm this finding, we extended our study to a larger subcohort and measured four urinary F2-IsoPs: iPF(2alpha)-III, 2,3-dinor-iPF(2alpha)-III, iPF(2alpha)-VI, and 8,12-iso-iPF(2alpha)-VI. Measurements were conducted in baseline urine samples collected in 1992-1994. All biomarkers were quantified using liquid chromatography-tandem mass spectrometry. Incident T2D cases were identified at the end of the 5-year follow-up. The current analytical subcohort included 140 incident T2D cases and 177 non-cases randomly selected from 600 IRAS participants who remained free of T2D at the end of follow-up. The linear estimates of the association with T2DM risk showed weak inverse associations: the odds ratios (ORs) and their 95% confidence intervals (CIs) for the difference between 75th -25th percentiles were 0.78 (0.56-1.07), 0.72 (0.53-0.99), 0.82 (0.58-1.17), and 0.71 (0.53-0.96) for the four F2-IsoPs, as named above respectively. When stratified by obesity status, these inverse associations were confined to the obese subgroup: the ORs and their 95% CIs were 0.50 (0.27-0.84), 0.56 (0.33-0.93), 0.64 (0.35-1.09), and 0.48 (0.27-0.77). These results confirm our pilot findings and our hypothesis explaining the inverse association between F2-IsoPs and T2D published earlier (Obes Res 2005;13:1638)

1232-S

CONTROL OF HYPERTENSION AMONG CANADIAN ADULTS WITH DIABETES IN 2007-2009. *M Gee, I Janssen, W Pickett, C M Bancej, F A McAlister, M Joffres, H Johansen, N Campbell (Queen's University, Kingston, ON, Canada)

Background: In 1986-1992, treatment and control of hypertension was poor in individuals with diabetes, with less than 2% having treated blood pressure below 130/80 mmHg. Objectives: We estimate prevalence, awareness, treatment and control of hypertension among Canadians with diabetes and seek to determine if a treatment gap exists for individuals with diabetes. Methods: Using measured blood pressure data from the 2007-2009 Canadian Health Measures Survey, estimates of hypertension prevalence, awareness, treatment, and control, weighted to reflect the Canadian household population, were described and compared between individuals with and without self-reported diabetes. Results: Three quarters (74%; 95%CI:62%-86%) of Canadians reporting diabetes had hypertension in 2007-09; of these 88% (95% CI:81%-94%) were taking antihypertensive drug therapy and 55% (95% CI:45%-66%) were controlled below 130/80 mmHg. Among individuals with diabetes and hypertension treated with pharmacotherapy, control below 130/80 mmHg was achieved by 63% (95% CI:53%-74%). Among those treated with pharmacotherapy, 39% (95% CI:31% to 48%) were taking one medication, 29% (95% CI:18% to 40%) were taking two medications, and 31% (95% CI:22% to 39%) were taking three or more medications. Proportions aware, treated and controlled did not differ markedly according to diabetes status. Conclusions: Control of hypertension among Canadians with diabetes has improved since 1992 but still a high proportion of people with diabetes are above the hypertension treatment target. Health care professionals should continue to increase their efforts in helping patients with diabetes achieve appropriate blood pressure targets, with emphasis on lifestyle management and pharmacotherapy.

1231

LOW PREVALENCE OF SELF-REPORTED PREDIABETES AMONG ADULTS IN THE UNITED STATES, 2007-2009. *N R Burrows, P Cho, I Hora, L Geiss (Centers for Disease Control and Prevention, Atlanta, GA 30341)

People with prediabetes are at increased risk of developing type 2 diabetes. About one-third of adults in the United States are estimated to have prediabetes. Awareness of prediabetes is needed before one can take steps, e.g., lose weight and increase physical activity, to prevent or delay type 2 diabetes. We assessed prevalence of self-reported prediabetes among U.S. adults using National Health Interview Survey data from 2007-2009. Participants who reported having prediabetes, impaired fasting glucose, impaired glucose tolerance, borderline diabetes, or high blood sugar but not diabetes were considered to have prediabetes. Prevalence was estimated by age, sex, and race/ethnicity, and age-adjusted based on the 2000 U.S. standard population. Ethnicity groups were Hispanic or non-Hispanic (NH); NHs were categorized as whites (NHW), blacks (NHB), American Indians/Alaska Natives (AIAN), or Asians. In 2007-2009, among U.S. adults aged ≥ 18 years, the prevalence of self-reported prediabetes was 3.6%. Prevalence was greater with increasing age—2.2% among people aged 18-44 years, 4.6% among those aged 45-64 years, and 5.5% among those aged ≥ 65 years. The age-adjusted prevalence was higher among women than men (3.9% vs. 3.1%, $p < 0.001$), and was similar across race/ethnicity groups. Compared with NHW (3.6%), the age-adjusted prevalence was 3.0% among NHB ($p = 0.10$), 3.3% among Hispanics ($p = 0.44$), 3.5% among Asians ($p = 0.73$), and 7.3% among AIAN ($p = 0.08$). Prevalence of self-reported prediabetes is extremely low. Efforts to increase awareness of prediabetes are needed for both patients and providers to identify people at risk of developing diabetes, promote lifestyle interventions, and reduce the burden of diabetes.

1233-S

BARIATRIC SURGERY AMONG DIABETIC PATIENTS. *K Johnson (University of South Carolina, Columbia, SC 29209)

Background: Due to the limited evidence and the growing interest in bariatric surgery to treat diabetes, this study assessed the trend of bariatric surgery particularly among diabetics in South Carolina (SC). Methods: We used 2000-2008 South Carolina ICD-9 coded hospital discharge data, from both ambulatory surgery and inpatient visits, to study bariatric surgery procedure as an intervention among people with diabetes. Descriptive statistics were calculated and the differences between groups were determined using chi-square statistics. Results: A total of 1,169,774 (12%) discharges were due to diabetes, with 16,409 (0.17%) patients undergoing bariatric surgery of which 3,985 (24%) were diabetic. Overall, there were more whites, females, those aged 60+, those with Medicare, and those who resided in urban counties (68.7%) who were diagnosed with diabetes in both hospital settings. In regards to diabetic patients who underwent bariatric surgery, there were more patients who were white, female, those aged 40-59, those using private insurance, and resided in urban counties for both hospital settings. The number of inpatient surgeries increased from 2000 ($n = 609$) to 2004 ($n = 2442$), with a slight decrease between 2004 ($n = 1729$) and 2006 ($n = 1633$). In outpatient surgeries, from 2000 ($n = 7$) to 2008 ($n = 759$), the number of bariatric surgeries increased over time. Conclusion: South Carolina follows along with the national trend in an increasing rate of bariatric surgery, with the cost of the procedure increasing as well. Since 2000, more than 16,000 surgeries of whom 3,795 were patients with diabetes. Although there is a racial disparity in prevalence of diabetes, morbid obesity and mortality between black and white sub-population in SC, when it comes to bariatric surgery the disparity is reversed.

1234-S

URINARY PHTHALATE LEVELS AND TYPE 2 DIABETES IN WOMEN. *T James-Todd, Jt Rich-Edwards (Brigham and Women's Hospital, Harvard Medical School, Boston, MA 02120)

Previous studies show that women have higher levels of certain phthalates. Increased phthalate levels are associated with obesity, a risk factor for type 2 diabetes (T2DM). However, no study to our knowledge has examined the association between phthalate levels and T2DM in women. We evaluated the association between six phthalates: mono-cyclohexyl (MCP), mono-ethyl (MEP), mono-(2-ethyl)-hexyl (MHP), mono-isononyl (MNP), mono-n-octyl (MOP), and mono-benzyl phthalate (MZP) and T2DM in women participating in the National Health and Nutrition Examination Survey (1999-2004). We analyzed 2,235 women age 20-85 years with complete data on urinary phthalate levels, T2DM status, age, race/ethnicity, education status, total caloric intake, and body mass index (BMI). Phthalate levels were divided into quintiles for MEP, MHP, MZP. Due to less variability MCP, MNP, and MOP were dichotomized. T2DM was defined by self-report of physician diagnosis. We used multivariable logistic regression to calculate odds ratios (OR) and 95% confidence intervals (95% CI) for the independent association between each phthalate and T2DM. We adjusted for urinary creatinine, age, race/ethnicity, education, and total caloric intake as potential confounders; BMI was considered a potential mediator. Phthalate levels significantly varied by age, race/ethnicity, total caloric intake, and BMI ($p < 0.05$). A total of 192 (8.7%) women self-reported T2DM. Study participants with the highest quintile of MZP had ~2-fold increased odds of T2DM (OR: 1.99, 95% CI: 1.07-3.70). High MOP exposure was associated with a 1.46 increased odds of T2DM (95% CI: 1.01-2.11). BMI did not attenuate the association. Decreasing exposure to MZP and MOP could reduce the risk of T2DM in women.

1236

RISK OF LUNG CANCER IN ASIAN AMERICANS: PUZZLING DISPARITIES. *H N Tran, Y Li, D Baer, G D Friedman, S Siu, N Udaltsova, AL Klatsky (Kaiser Permanente, Oakland, CA 94611)

Limited prior reports about lung cancer incidence in Asian Americans (Asian) suggest high risk in women nonsmokers, especially for adenocarcinoma. We studied incident lung cancer in a multi-ethnic Northern California cohort of 129,987 persons who supplied baseline data at health examinations from 1978-1985. Self-classified ethnicity yielded 13,719 (10.6%) Asians with 6,062 Chinese, 1,722 Japanese, and 4,308 Filipinos as main subgroups. We used Cox proportional hazards models adjusted for age, sex, ethnicity, alcohol intake, and education to estimate relative risk (RR) and 95% confidence intervals (CI). Through 2008, lung cancer was diagnosed in 1,852 persons, with 209 never smokers and 132 Asians. Compared to whites, the RR (CI) for any lung cancer in Asian women was 1.5 (1.1-1.9) and in Asian men it was 0.9 (0.7-1.2). Asian women were at increased risk for adenocarcinoma 1.8 (1.2-2.7) and squamous cell carcinoma 2.2 (1.2-4.2). There was disparity in smoking strata: Asian female never-smokers and exsmokers each had RR of 2.2 versus RR's of 1.1 and 0.7 in < 1 and ≥ 1 pack per day (ppd) smokers, respectively. Smoking was a weaker predictor of lung cancer in Asians: RR of ≥ 1 ppd/never smokers was 21.1 in whites, 30.2 in blacks, 27.6 in Hispanics, and 5.3 in Asians. There was also disparity between Asian ethnic subgroups: Among women, the RR of lung cancer was 1.7 (1.2-2.4) for Chinese, 2.5 (1.6-3.8) for Filipinos and 0.9 (0.5-1.7) for Japanese versus whites. In a model limited to Asians, with Japanese as referent, the RR was 2.0 (1.1-3.6) for Filipinos and 1.7 (1.0-3.0) for Chinese. We conclude there are unexplained disparities of lung cancer in Asian American related to sex, smoking, cell type, and ethnic subgroup.

1235

ASSOCIATION BETWEEN DIABETES AND CARDIOVASCULAR DISEASE RISK FACTORS AMONG JAPANESE URBAN WORKERS AND THEIR FAMILIES. T Namekata and *M Nakata, K Suzuki and C Arai (Pacific Rim Disease Prevention Center, Seattle, WA 98165),

The purpose of the study is to examine the association of diabetes mellitus with cardiovascular disease (CVD) risk factors. Subjects were 11,481 employees and families (5,073 men and 6,408 women) who completed screening tests and filled out the self-administered questionnaire in major cities in Japan for 2006-7. After 12-hour fasting the venous blood was taken from each subject and a single plasma glucose concentration was measured. The criterion for defining diabetes used is > 126 mg/dl of plasma glucose concentration and/or $> 6.2\%$ of glycosylated hemoglobin A1c (HbA1c), as recommended by Japan Diabetes Society. Multiple logistic regression analysis was conducted using diabetes status as a dependent variable and CVD risk factors as covariates. Significant odds ratios of diabetes were found in age 40-59 years old (reference(rf): age < 40): 1.38 (95% confidence interval: 1.05-1.80) and age > 60 years old: 6.60 (4.78-9.16), hypertension: 17.60 (14.09-21.98), abnormal high scores of cardio-ankle vascular index: 3.25 (2.61-4.06), 40-59mg/dl of high density lipoprotein cholesterol (HDL-C) (rf: < 40 mg/dl): 0.15 (0.11-0.19) and > 60 mg/dl of HDL-C: 0.09 (0.07-0.13), < 20 of body mass index (BMI) (rf: 23-24.9): 3.75 (2.57-5.47), > 27 of BMI: 1.74 (1.25-2.42), and 5-7 drinks/week (rf: nondrinkers): 0.69 (0.53-0.90) among men. Similar results were found among women, except for current smokers, ex-smokers and 5-7days/week of drinkers associated positively with diabetes and BMI < 20 associated negatively with diabetes. Our results imply that some lifestyle factors may impact on diabetes differently between genders in this Japanese population.

1237

ETHNIC DIFFERENCES IN THE EFFECTS OF BODY MASS INDEX ON MORTALITY: THE MULTIETHNIC COHORT STUDY. *S-Y Park, L Wilkens, S Murphy, K Monroe, B Henderson, and L Kolonel (University of Hawaii, Honolulu, HI 96813)

To examine ethnic differences in the association of body mass index (BMI) with mortality, we used a population-based prospective cohort of 183,241 men and women aged 45-75 years who enrolled in the Multiethnic Cohort Study in 1993-1996. Participants were African Americans, Native Hawaiians, Japanese Americans, Latinos, and Whites living in Hawaii and California. During an average 11 years of follow-up, we identified 29,023 deaths. After rigorous control for tobacco use, through comprehensive smoking models, and other potential confounders, both underweight (BMI < 18.5) and obesity (BMI ≥ 30) at cohort entry were associated with an increased risk of mortality overall, compared to the high-normal category (BMI 23-24.9). The association of obesity with mortality was weakest among African Americans both in men and women. For cancer, BMI above normal was significantly associated with increased mortality in Latinos (especially women), but not in the other groups. For cardiovascular diseases, BMI above normal showed increased mortality risk in all groups, but was more pronounced among Japanese Americans and Whites. In addition, for all-cause mortality, associations with overweight and obesity at age 21 were stronger (especially in African Americans and Native Hawaiians) than at baseline, but BMI below normal at age 21 was not related to increased mortality in any ethnic group. In conclusion, in this large multiethnic population, the effects of BMI on mortality varied across the five ethnic groups. Further research on ethnic disparities in body composition and fat distribution in relation to disease and mortality may help to explain these findings.

1238-S

ETHNICITY OF GASTRIC CANCER PATIENTS REPRESENT DIFFERENT PATTERN OF SURVIVAL; A POPULATION BASED EXPERIENCE FROM BRITISH COLUMBIA, CANADA. M Bashash*, A Shah, G Hislop, N Le, A Brooks-Wilson, C Bajdik (BC Cancer Agency, Vancouver, BC, Canada)

The current study was conducted to examine the effect of ethnicity as a host-related factor on survival of gastric cancer in British Columbia, Canada. Data were obtained from the population-based BC Cancer Registry for patients diagnosed with invasive esophageal and gastric cancer between 1984 and 2006. The ethnicity of patients was estimated according to their names and categorized as Chinese, South Asian, Iranian or Other (more than 80% of "Other" are British and Western Europeans). Cox proportional hazards regression analysis was used to estimate the effect of ethnicity adjusted for patient sex and age, disease histology, tumor location, disease stage and treatment. Result from this study indicates a significantly different pattern of survival among ethnic groups ($p < 0.01$). Significant differences were only seen at non-metastatic disease ($p < 0.01$). In multivariate analyses adjusting for patient factors, disease factors and treatment, there was a significant difference among ethnic groups. Only Chinese had significantly longer survival as compared to the Other ethnicities. This survival advantage in Chinese was only seen for non-metastatic disease (HR = 0.78, 95% CI = 0.64-0.95). Ethnicity may represent underlying genetic factors. Such factors could influence host-tumor interactions by altering the tumor's etiology and therefore its chance of spreading. Alternatively, genetic factors may determine response to treatments. Finally, ethnicity may represent non-genetic factors that affect survival. Differences in survival by ethnicity support the importance of ethnicity as a prognostic factor, and may provide clues for the future identification of genetic or lifestyle factors that underlie these observations.

1240

EXPOSURE TO VIOLENCE DURING ADOLESCENCE AND CARDIOVASCULAR RISK IN YOUNG ADULTHOOD. *S F Suglia, R Boynton-Jarrett, S Cohen, N R Kressin, N R (Boston University School of Medicine, Boston MA 02118)

Low childhood socioeconomic status has been associated with increased cardiovascular risk in adulthood. However, the role of specific psychosocial stressors, in particular violence, experienced during childhood and adolescence has not been evaluated. We examined the relationship between adolescent violence exposure and cardiovascular indices in young adulthood in the National Longitudinal Study of Adolescent Health. Adolescents (mean age 15.5, $n = 3844$) reported on their experiences of child abuse and neglect, witnessing and experiencing community violence and dating violence during waves 1 (1994-1995) and 2 (1996) of follow-up. A cumulative violence measure was created from these measures. During wave 3 of follow-up (2001-2002), the presence/absence of having received a diagnosis of elevated blood pressure and cholesterol was assessed by self-report. Fifty-five percent of men and 42% of women reported some type of violence exposure. In adjusted models, men were at increased risk of having elevated blood pressure if they experienced low (OR 1.6 95%CI 0.8, 3.1), medium (OR 2.8 95%CI 1.3, 6.1) or high (OR 4.1 95%CI 2.0, 8.7) violence exposure, these associations remained after adjusting for BMI and smoking status. Men were also at increased risk of having elevated cholesterol if they experienced high violence exposure (OR 2.3 95%CI 1.0, 5.6). No significant associations were noted among women. There appear to be gender differences in the relationship between adolescent violence exposure and cardiovascular indices in young adulthood. Violence exposure may be directly affecting cardiovascular health through activation of the stress pathway or indirectly by modifying health behaviors.

1239

ABUSE AND THE PROGRESSION OF UROLOGIC SYMPTOMS: RESULTS FROM THE BOSTON AREA COMMUNITY HEALTH (BACH) SURVEY. *C L Link and J B McKinlay (New England Research Institutes, Watertown MA 02472)

We have previously reported on cluster analyses of urologic symptoms (British Journal of Urology International, 2008, 101(10), 1247-1366) which resulted in 6/5 clusters for men/women (no symptoms, minimally symptomatic, to most symptomatic). With the completion of the first follow-up of the Boston Area Community Health (BACH) survey we consider the association of sexual, physical, and emotional abuse experienced as a child or as an adult at baseline and progression of urologic symptoms represented by the clusters. BACH recruited 5502 Boston residents (2301 men and 3201 women; 1767 Black, 1876 Hispanic, 1859 White) aged 30-79 years at baseline (2002-5) and re-interviewed 4145 respondents (1610 men and 2535 women; 1327 Black, 1341 Hispanic, 1477 White) after a median follow-up time of 4.8 years (2006-10). Progression was defined as a movement to a more symptomatic cluster between baseline and follow-up (for those who were not in the most symptomatic cluster). Men who had experienced emotional abuse as a child or as an adult increased their odds of urologic symptom progression by 2.25, $p = .0012$ after adjusting for age decade and baseline symptoms. Women who had experienced physical abuse as a child increased their odds of urologic symptom progression by 1.69, $p = .0368$, after adjusting for age decade and baseline symptoms. These results suggest that abuse may lie on the causal pathway for urologic symptoms. Supported by Award Numbers U01DK56842 from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (NIH). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIDDK or the NIH.

1241-S

INTIMATE PARTNER VIOLENCE AND DEVELOPMENT OF TYPE 2 DIABETES IN WOMEN. *S Mason, R Wright, E Hibert, D Spiegelman, and J Rich-Edwards (Harvard Medical School, Boston, MA 02120)

Background: Intimate partner violence is a prevalent source of stress for women in the United States. Stress is thought to be an important cause of chronic disease, but little is known about the relationship between intimate partner violence and health in women. We sought to estimate the association between intimate partner violence and incidence of type 2 diabetes. Methods: In 2001, participants in the Nurses' Health Study II ($N = 67,853$) reported physical and sexual intimate partner violence and completed the Women's Experiences with Battering Scale, a measure of psychological abuse. We used Cox proportional hazards models to estimate the association between intimate partner violence reported in 2001 and incidence of type 2 diabetes from 2001 to 2007. Results: Twenty-two percent of women reported physical and 10% reported sexual abuse by an intimate partner. Around 10% reported moderate and 1.6% reported severe psychological abuse. Adjusted hazard ratios (HRs) for type 2 diabetes were 1.13 (95% CI: 1.00, 1.27) and 1.15 (95% CI: 0.98, 1.34) for physical and sexual intimate partner violence, respectively. Moderate psychological abuse was not associated with type 2 diabetes (HR = 1.08; 95% CI: 0.87-1.34), but severe psychological abuse was associated with an HR of 1.83 (95% CI: 1.28, 2.62). All associations were stronger among women with a history of child abuse, although tests for interaction were not significant. Conclusions: Physical and sexual intimate partner violence were modestly associated with incidence of type 2 diabetes, while severe psychological battering appeared to substantially increase type 2 diabetes risk.

* = Presenter; S = The work was completed while the presenter was a student

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MEDIATION OF HIV/STI RISK AMONG PERSONS REPORTING EARLY LIFE SEXUAL ABUSE BY MENTAL HEALTH DISORDERS. T Sweet, S L Welles, (Drexel University School of Public Health, Philadelphia, PA 19145)

We evaluated whether mental health disorders mediated the association of early life (< 18 years) sexual abuse (ELSA) with acquiring HIV or other sexually transmitted infections (STIs) in a nationally representative adult sample. Using data from the National Epidemiologic Survey on Alcohol and Related Conditions, we analyzed the relationship between ELSA and recent incident HIV/STIs at Wave 2 (2004-2005) while examining three mental health disorders (MHD) reported during Wave 1 (2001-2002) as putative mediators: major depressive disorder (MDD), dysthymia, and generalized anxiety disorder (GAD). Among this sample of 33,902 adults, ELSA was associated with a 2.6-fold [Odds Ratio (OR) 2.55 (95% confidence interval): 1.74,3.75]) and 2.4-fold [OR 2.43 (1.74-3.39)] adjusted risk of HIV/STI positivity in the past year for men and women, respectively, compared with those who reported no ELSA. ELSA was associated with MDD, dysthymia, and GAD in men (3.7-fold risk [OR 3.68 (3.25,4.16)], 4.5-fold risk [OR 4.48 (3.76,5.33)], and 7.0-fold risk [OR 6.97 (5.66,8.59)], respectively) and women (3.8-fold risk [OR 3.82 (3.57,4.09)], 4.4-fold risk [OR 4.38 (3.92,4.89)], and 3.3-fold risk [OR 3.32 (2.97,3.72)], respectively) compared to those reporting no ELSA. All three mental health disorders were associated with a 2 to 3-fold risk of HIV/STI positivity (all p-values < 0.0001). The magnitude of mediation by MHD varied widely by mediation method ranging between 33-82%. Findings suggest that ELSA may put adults at an increased risk of developing HIV/STIs directly and via MHD subsequent to abuse. Accordingly, the identification and treatment of MHD in adults who report ELSA could mitigate their risk for acquiring HIV/STIs.

1244

CULTURE AND ETHNICITY: THE MISSING DIMENSIONS OF UNTREATED PSYCHOSIS. *S P Singh, L Brown, R Gajwani, R Jasani, Z Islam (Warwick Medical School, University of Warwick, UK B91 2RR)

Early intervention in psychotic disorders is both clinically and cost effective (1). The Norwegian TIPS study confirms that an early detection strategy enhances early intervention by reducing duration of untreated psychosis - DUP (2). In the UK, ethnic minority patients experience adverse pathways into psychiatric care (3). Early detection in the UK requires exploration of ethnic and cultural factors that contribute to treatment delays. The ENRICH programme is determining the relationship between culture, ethnicity and help-seeking in first-episode psychosis in a large multi-ethnic inner city area. All consenting patients are assessed using the Nottingham Onset Schedule (4). Spontaneously generated and directly questioned symptom attribution is obtained, along with help-seeking and pathways to care. Preliminary results show that patients and carers from ethnic minority groups, especially those of British-Pakistani background seek help from faith institutions due to spiritual/religious attributions attribution for symptoms. Culturally-mediated attributions therefore contribute to long DUP in minority groups and are an important and as yet unexamined cause of ethnic differences in pathways to care. 1. Singh SP (2010) Early intervention in psychosis: a reappraisal. *Br J Psych*, 196: 343- 345; 2. Melle I et al. (2004), Reducing the duration of untreated first-episode psychosis: effects on clinical presentation. *Arch Gen Psych*, 61, 143-50; 3. Singh, S.P. et al. (2007) Ethnicity and the Mental Health Act 1983. *Br J Psych* 191, 99-105; 4. Singh SP et al (2005) Determining the chronology and components of psychosis onset: The Nottingham Onset Schedule (NOS). *Schizophr Res*, 80, 117-130

1243

LIFE EXPECTANCY AT BIRTH FOR PEOPLE WITH SERIOUS MENTAL ILLNESS FROM A SECONDARY MENTAL HEALTH CARE CASE REGISTER IN LONDON, UK. *C-K Chang, R D Hayes, G Perera, M T M Broadbent, A C Fernandes, W E Lee, M Hotopf, and R Stewart (Institute of Psychiatry, King's College London, UK SE5 8AF)

Despite improving healthcare, the gap in mortality between people with serious mental illness (SMI) and general population persists, especially for younger age groups. The electronic database from a large and comprehensive secondary mental healthcare provider in London was utilized to assess the impact of SMI diagnoses on life expectancy at birth. People who were diagnosed with SMI (schizophrenia, schizoaffective disorder, substance use disorder, and depressive disorders) before the end of 2009 and under active review by the South London and Maudsley NHS Foundation Trust (SLAM) in southeast London during 2007-09 comprised the sample, retrieved by the SLAM Case Register Interactive Search (CRIS) system. We estimated life expectancy at birth for people with SMI and each diagnosis, from national mortality returns between 2007-09, using a life table method. A total of 31,719 eligible people, aged 15 years or older, with SMI were analyzed. Among them, 1,370 died during 2007-09. Compared to national figures, all disorders were associated with substantially lower life expectancy: 8.0 to 14.6 life years lost for men and 9.8 to 17.5 life years lost for women. Highest reductions were found for men with schizophrenia (14.6 years lost) and women with schizoaffective disorders (17.5 years lost). The impact of serious mental illness on life expectancy is marked and generally higher than similarly calculated impacts of well-recognised adverse exposures such as smoking, diabetes and obesity. Strategies to identify and prevent causes of premature death are urgently required.

1245-S

USE OF MENTAL HEALTH SERVICES BY PATIENTS WITH FIRST-EPISODE PSYCHOSIS: AN ADMINISTRATIVE DATABASE STUDY. *K Anderson, A Malla, D Buckeridge, R Fuhrer (McGill University, Montreal, QC, Canada)

Patients with first-episode psychosis (FEP) access health services via complex pathways, which may lead to delays in treatment initiation and extend the duration of untreated psychosis, an important determinant of outcome. Few studies have examined patterns of service use by patients with FEP using population-based data. We used linked administrative data from physician billings, hospitalizations, and public health dispensaries in Montreal to examine the use of services prior to a first diagnosis of psychosis. Incident cases of schizophrenia-spectrum psychosis occurring from 2004 through 2006 among individuals between 14 and 25 years of age were identified, and mental health contacts in the four years preceding the index diagnosis were analyzed. We identified 455 cases, yielding a cumulative incidence of 84.2 per 100,000 for men and 33.1 per 100,000 for women. Thirty-five percent of cases had no contact with services preceding the index diagnosis. Of those with contacts, approximately 25% made first contact with the emergency department (ED). Nearly 50% of all cases received the index diagnosis in the ED. High neighbourhood-level social deprivation was predictive of ED diagnosis for women but not for men. Individuals with a history of service contact for substance abuse problems had high levels of service use across multiple indicators. These results support clinical findings that patients with FEP are heavy users of emergency services, and that socio-demographic characteristics may predict patterns of service use. Given that hospital-based samples are unlikely to capture all cases seeking treatment, population-based administrative data is an important source of information for understanding patterns of health services use.

1246

A LOSS OF COLOUR: MENTAL HEALTH IN SOUTH LABRADOR COASTAL COMMUNITIES. *J Valcour, D Martin, J Bull, M Paul, J Graham, D Wall (Memorial University of Newfoundland, St. John's, NL, Canada A1B 3V6)

The health status of people who live in NunatuKavut communities along the south-east coast of Labrador is largely unknown due to a lack of data having been collected in this region. People who live in many of these communities experience difficulties accessing basic health and social services which are readily available in other parts of Canada. A comprehensive community health needs assessment (CHNA), using qualitative and quantitative methods, was conducted in NunatuKavut communities in 2010 to assess prevalent health and social issues; health care needs; and community perceptions of health care services in the area. Mental health issues and the lack of access to mental health services were identified as issues. Within NunatuKavut communities, it is often said that when someone is experiencing mental health problems that they have 'lost their colour'. Approximately 22% of the individuals reported being depressed in the past 12 months. This is higher than the national average, but similar to other aboriginal groups. Individuals who reported feeling depressed were 6.6 times (95% confidence interval [2.2, 20.7]) more like to have attempted suicide. Qualitative analysis identified mental health issues as a problem, particularly that issues were not talked about. This could indicate an under-reporting of the true level of mental health issues in the communities. Community members rely heavily on family and friends for support, while this has some benefit, it may not be the ideal situation as these individuals may not be able to adequately address the needs of the person suffering from mental health issues. There is an evident need for increase mental health support services in this area.

1248

PHYTOESTROGEN INTAKE FROM FOODS, DURING ADOLESCENCE AND ADULTHOOD, AND THE RISK OF BREAST CANCER BY ESTROGEN AND PROGESTERONE RECEPTOR (ERPR) TUMOR SUBGROUP AMONG ONTARIO WOMEN. *L N Anderson, M Cotterchio, B Boucher, N Kreiger (Cancer Care Ontario, Toronto, ON, Canada)

Phytoestrogen (PE) intake has been shown to reduce breast cancer risk. Few studies have comprehensively evaluated if this association varies by breast tumor hormone receptor subgroup (ERPR). Cases were identified from the Ontario Cancer Registry (2002-2003) and ERPR status was available from immunohistochemistry results on pathology reports for 83% of cases ($n = 2588$). Controls were identified through random digit dialling of Ontario households ($n = 3471$). PE values, from a recently published food database, were applied to food frequency questionnaire responses to comprehensively assess PE intake of isoflavone, lignan, and total PE, during adolescence and adulthood. Polytomous multivariate logistic regression was used to estimate adjusted odds ratios (ORs) for the association between PE intake from foods and breast cancer risk according to tumor subgroups ER+PR+, ER-PR-, and ER+PR-. Preliminary results show that among postmenopausal women, adolescent PE intake was associated with reduced breast cancer risk, and this finding did not vary substantially by hormone receptor status; however, this association was not statistically significant among certain ERPR subgroups. The highest versus lowest tertile of adolescent lignan intake was inversely associated with both ER+PR+ (OR = 0.78; 95%CI: 0.64, 0.95) and ER-PR- (OR = 0.80; 95% CI: 0.60-1.06) breast cancer risk. Among premenopausal women, no significant differences were observed across tumor subgroups. PE intake from foods during adolescence is modestly associated with a statistically significant reduced breast cancer risk independent of hormone receptor tumor status.

1247-S

RISK ADJUSTED INCIDENCE RATES FOR FEMALE BREAST CANCER IN THE UNITED STATES. A Sloan and *R Merrill (Brigham Young University, Provo, UT, 06040)

A risk-adjusted method has been previously proposed for estimating cancer incidence rates for data collected by the Surveillance, Epidemiology, and End Results (SEER) program using the first primary cancer and adjusting for population-based cancer prevalence. The intent of this measure is to better reflect the average cancer risk for individuals in the cancer-free, at risk population. This measure is rarely reported in practice because, for most cancer sites, multiple cancer primaries are rare and the prevalence of the disease is low. However, an exception is female breast cancer, which has a comparatively high risk of subsequent primary cancers and is the most prevalent cancer in women. The result of applying this risk-adjusted method to SEER female malignant breast cancer data is reported in this paper. In whites, compared with conventionally reported rates, risk-adjusted rates are 6.5% lower in ages 30-39, 9.3% lower in ages 40-49, 11.6% lower in ages 50-59, 14.0% lower in ages 60-69, 18.2% lower in ages 70-79, and 20.4% lower in ages 80 years and older. Corresponding percentages for black women are 8.1%, 9.3%, 12.2%, 16.1%, 17.6%, and 19.4%, respectively. Age-group specific trends in breast cancer incidence rates tended to decrease for both white and black women from 2000 through 2007, with risk-adjusted rates decreasing more so than conventional rates. For example, in the age group 70 years and older, conventional rates decreased 10.8% for white women and 4.3% for black women, while risk-adjusted rates decreased 15.4% for white women and 10.4% for black women. Risk-adjusted rates can differ significantly for female breast cancer and provide a better indication of breast cancer risk for those without a previous diagnosis of the disease.

1249

A PROSPECTIVE COHORT STUDY OF TEA CONSUMPTION WITH CANCER INCIDENCE AND MORTALITY IN CHINESE WOMEN. Sarah Nechuta*, X-O Shu, H-L Li, G Yang, Y-B Xiang, H Cai, Y-T Gao, W Zheng (Vanderbilt University, Nashville, TN 37203)

Data from in-vitro and animal studies support a protective role for tea in cancer development; however, results from prospective cohort studies have been inconsistent. We investigated the association of regular tea intake (≥ 3 times/week for ≥ 6 months) with cancer incidence and mortality in the Shanghai Women's Health Study, a prospective cohort study of adult Chinese women recruited during 1996-2000. Adjusted hazard ratios (HRs) and associated 95% confidence intervals (CIs) for tea and cancer incidence and mortality were derived from Cox regression models. Among 71,246 women who never smoked or drank alcohol regularly, 28% drank tea regularly at baseline (88% drank only green tea). After a mean follow-up of 10 years, 3,310 women were diagnosed with incident cancer (1,350 died from cancer). Regular tea intake was associated with a reduced risk of cancers of the digestive tract (804 cases, HR = 0.83, 95% CI 0.70-0.99), and the reduction in risk increased as amount and years of tea consumption increased (p-value for trend = 0.043 and 0.004, respectively). For example, women who consumed tea for ≥ 20 years had a 35% reduced risk of digestive tract cancers (HR = 0.65, 95% CI 0.49-0.85). No apparent associations were observed for tea intake and all cancers combined or other major cancers (lung, breast, ovarian, endometrial, thyroid, pancreatic, and liver cancer). A reduction in cancer mortality risk was found only for cancers of the digestive tract (HR = 0.77, 95% CI 0.60-0.99) and all cancers combined (HR = 0.86, 95% CI 0.75-0.97). Our study provides strong evidence for a potential protective role of regular tea consumption in the prevention of cancers of the digestive tract.

* = Presenter; S = The work was completed while the presenter was a student

1250-S

POSTMENOPAUSAL SEX HORMONES IN RELATION TO BODY FAT DISTRIBUTION. *S Liedtke, M E Schmidt, A Vrieling, A Lukanova, S Becker, R Kaaks, A Benner, D Flesch-Janys, J Chang-Claude, K Steindorf (German Cancer Research Center, Heidelberg, Germany, D-69120)

Background: Overweight and obese women are at a higher risk of postmenopausal breast cancer than lean women, which might be at least partly related to endogenous sex hormones and sex hormone-binding globulin (SHBG). We investigated whether surrogates for central obesity (waist circumference; waist-to-hip ratio, WHR) and peripheral obesity (hip circumference) were associated with sex hormones and SHBG independently of body mass index (BMI). Methods: A cross-sectional study was conducted among 1,180 postmenopausal women recruited as controls in the case-control study MARIE. Generalized linear models were used to assess associations between obesity measures and estrone, total and free estradiol, androstenedione, total and free testosterone, and SHBG. Models were adjusted for potentially confounding reproductive and lifestyle factors. Results: All obesity measures were positively associated with estrogens and free testosterone and negatively with SHBG. After accounting for BMI, associations between hormones and both waist circumference and WHR persisted, while those with hip circumference were abolished. In stratified analyses, waist circumference and WHR correlated with SHBG, free estradiol, and free testosterone in women with a BMI < 30 kg/m² but not in women with a BMI ≥ 30 kg/m². Conclusions: Our results suggest that waist circumference and WHR, but not hip circumference, are associated with levels of postmenopausal sex hormones and SHBG independently of BMI. The BMI-independent influence of a central body fat distribution on hormone levels may be greater in women with a BMI < 30 kg/m² compared to women with a BMI ≥ 30 kg/m².

1252-S

WHEN INTERACTION ESTIMATES IN LOGISTIC REGRESSION ARE CONFOUNDED? *A Liu, M Abrahamowicz, J Siemiatycki (McGill University, Montreal, QC, Canada, H3A1A2)

Interactions are increasingly investigated in modern epidemiology. Yet, while confounding bias due to unobserved risk factors is of major concern in observational research, the conditions under which interaction estimates are confounded have received surprisingly little attention. We investigate necessary and sufficient conditions for an unobserved variable U to act as a confounder for a two-way interaction between two binary exposures E1 and E2 in logistic regression with binary outcome Y. First, we rely on algebraic derivations to prove under which conditions U will act as a confounder of the E1*E2 interaction. We demonstrate that, under some plausible simplifying assumptions, the necessary and sufficient conditions correspond to the conjunction of the following: (i) U has to be associated with Y, and (ii) the association between U and E1 (or E2) has to vary across the strata of E2 (or E1). The latter condition (ii) implies an interaction between E1 and E2 for their effects on U. We then rely on large-scale simulations to investigate a wider range of situations and to assess how the resulting confounding bias of the interaction OR depends on relevant parameters. Simulations show that the bias increases with increasing (a) strength of the U → Y association, (b) prevalence of U, and (c) strength of the E1*E2 interaction for U. Interestingly, we also demonstrate that U may be an important confounder for E1*E2 interaction even if it does not meet the standard criteria for a confounder of the 'main effects' of either E1 or E2. Our results may help epidemiologists, who plan to investigate interaction effects, identify potential confounders and, thus, optimize the study design and results interpretation.

1251

IS A LACK OF QUALITY FOLLOW-UP CARE RELATED TO SHORTER SURVIVAL IN LATINO CANCER SURVIVORS? *J Smith-Gagen, A Ang, J E Carrillo, E Perez-Stable (University of Nevada, Reno, NV)

Despite having a lower incidence of breast cancer and better health behaviors, Latina women are 22% more likely to die of breast cancer in the 5 years after diagnosis than non-Latinas with the same age and stage of cancer. Reasons for differential breast cancer survival between white and black women have been studied extensively and include differences in tumor biology and social determinants of health, but disparities that impact breast cancer survival among Latina women remain understudied. Our goal was to identify factors that account for the diminished survival disadvantage of Latina breast cancer patients. We evaluated breast cancer specific survival among 50,332 women using Medicare data reported to the National Cancer Institutes Surveillance Epidemiology and End Results Program between 1992-2000 and followed for 5-15 years. Cox models with time-dependent variables were used to assess age, stage, surgery, radiation, comorbidities, receipt of mammograms, colorectal cancer screening and yearly primary care, physician specialty, marital status, proportion of non-English speaking neighbors and median income. Analysis of deviance identified the most important explanatory factors that specifically reduced the excess risk of death for Latina women; receipt of adequate surgery and/or radiation, yearly mammograms and primary care. The hazard of death at any time was 7.0 times more likely if she did not receive annual follow up mammograms (95% CI, 6.6,7.5), 1.1 times more likely if a woman did not receive adequate surgery or radiation (95% CI 1.1,1.2), and 2.5 times more likely if she did not visit her primary care provider (95% CI 2.3,2.6). These results suggest survival disadvantages for breast cancer specific death in Latina women may be due to lower quality of care, lack of access to primary care that results in undetected cancer recurrence.

1253

UNFAVORABLE CHILDHOOD SOCIOECONOMIC CONDITIONS AND ADULT-ONSET MULTIPLE SCLEROSIS RISK: A GENE-ENVIRONMENT INVESTIGATION. *F Briggs, B Acuna, L Shen, P Ramsay, H Quach, A Bernstein, C Schaefer, L Barcellos (University of C Berkeley, Berkeley CA 94720; ²Kaiser Division of Research, Oakland CA 94611)

Multiple sclerosis (MS) is an inflammatory and demyelinating autoimmune disease with a complex genetic and environmental component. We hypothesize that adverse childhood socioeconomic status (cSES) may contribute to adult onset MS, and that genetic variation within hypothalamic-pituitary-adrenal (HPA) axis and other related candidate genes may modify effects of exposure on risk. Childhood SES was determined using highest parental education and parental home ownership at age 10 in 1,871 non-Hispanic whites (1,230 cases, 641 controls) recruited through Kaiser Permanente Northern California Region. Higher parental education was associated with decreased risk of MS (odds ratio [OR] = 0.93, [95% confidence interval: 0.88-0.99], p = 0.017) in logistic models, adjusted for age, gender, smoking status, and current education. The association was stronger when parental education was categorized as presence/absence of a 4-year college degree (OR = 0.72 [0.59-0.89], p = 0.0028). Also, subjects whose parents owned their home had decreased risk of MS (OR = 0.76 [0.58-0.99], p = 0.045). Similar results were observed for analyses adjusted for HLA-DRB1*1501, and for models with both cSES predictors. We investigated gene-environment (GxE) interactions for SNPs within ~160 genes. Among HPA-related genes and other candidate genes, respectively, there was strong evidence for interactions between parental education and DRD3 (p = 0.0067) and MYOM2 (p = 9.5 × 10⁻⁶) and parental home ownership and NPY (p = 0.0082) and CNTNAP2 (p = 0.00025). Our results for the first time suggest GxE interactions involving adverse cSES exposures contribute to MS risk.

1254

DITHIOCARBAMATE PESTICIDE EXPOSURES, ALDEHYDE DEHYDROGENASE INHIBITION, AND RISK OF PARKINSON'S DISEASE. S L Rhodes, A G Fitzmaurice, M Cockburn, J M Bronstein, *Beate Ritz (University of California, Los Angeles, CA)

Chronic exposure to pesticides has been associated with increased risk of sporadic PD in humans. A hallmark of PD is the selective degeneration of dopaminergic neurons in the substantia nigra. Several studies have suggested that 3,4-dihydroxyphenyl-acetaldehyde (DOPAL), the MAO-B product of dopamine metabolism, is toxic to dopaminergic neurons. We hypothesized that exposure to certain pesticides can potentiate this toxicity by inhibiting aldehyde dehydrogenase (ALDH) which would otherwise oxidize DOPAL to the less toxic DOPAC. Furthermore, human genetic variability in ALDH might influence susceptibility to PD in the presence of pesticide exposure. To investigate this hypothesis we used both biochemical and epidemiologic approaches. Spectrophotometrically we determined the ALDH inhibiting activity of 30 pesticides in mitochondrial preparations containing rat hepatic ALDH and exposed primary neuronal cultures to these pesticides to determine the loss of dopaminergic neurons. In parallel, we performed genotyping of the ALDH2 gene on DNA samples from a case-control study of 363 incident PD patients and 427 population controls recruited in a region of California with extensive commercial agriculture. A geographical-information systems computer model we developed was used to assess each subject's exposure to commercial pesticides for the years 1974-1999, using state-mandated pesticide use reports, land use maps, and residential/occupational addresses. Age, gender, and smoking adjusted odds ratios of PD were estimated in logistic regression models including average lifetime exposure to specific pesticides, ALDH2 clade, and an interaction term. We found 50-200% increases in PD risk associated with exposure to fungicides identified in our biochemical screens (e.g. thiram, mancozeb, maneb) and observed a suggestive interaction between the ALDH2 clade and pesticide exposures. Our results suggest that certain pesticides can impact ALDH function and may lead to increased PD risk. Furthermore, genetic variability in the ALDH2 gene appears to potentiate this effect.

1256

DISASTER EPIDEMIOLOGY: INCORPORATING LESSONS LEARNED FROM RETROFITTING RESEARCH IN THE CONTEXT OF DISASTER RESPONSE. *R Kwok and *L Engel (NIEHS and UNC Chapel Hill, NC)

Each environmental or man-made disaster, with its attendant health consequences, is unique. However, valuable lessons can be learned from each one that can inform responses to future disasters, potentially reducing both acute and long-term adverse health effects. Unfortunately, in a disaster setting, the identification of affected persons and the methodical collection of samples and data, which are essential for epidemiologic research, are hindered by the limited time to prepare, the frequently dispersed setting, and a crisis that understandably prioritizes immediate needs, such as saving lives or containing and hazard, over future health concerns. As a result, precious opportunities to advance the science that could mitigate the public health impact of future disasters may be lost or diminished. To address these challenges and to help move this field forward, we will explore the dynamics between emergency preparedness and epidemiologic research, using salient examples such as the WTC and the Deepwater Horizon oil spill disasters. Speakers will discuss approaches to, and findings from, public health research in previous disasters; the limitations of this research; and how we might prepare to more rapidly and effectively conduct such research in the future. Speakers: *Identifying Research Needs and Response Strategies During a Crisis* - Aubrey K. Miller (Senior Medical Advisor, National Institute of Environmental Health Sciences) *Building Research Capacity in the Middle of a Public Health Disaster: Science on the Fly* - Stephen Levin (Center for Occupational & Environmental Medicine, Mount Sinai School of Medicine) *The Gulf STUDY: Challenges in Studying the Health of Oil Spill Cleanup Workers after the Deepwater Horizon Emergency Response* - Dale Sandler (Chief, Epidemiology Branch, National Institute of Environmental Health Sciences) *Should Science be a Component of Emergency Response?* - Nicole Lurie (Assistant Secretary for Preparedness and Response, US Department of Health and Human Services) Moderated Discussion - Larry Engel (University of North Carolina at Chapel Hill)

1255

CONCEPTS OF INTERACTION: WHAT SHOULD WE TEACH AND WHEN? *P Howards (Emory University, Atlanta, GA)

Concepts of interaction are fundamental to epidemiology, but a lack of consistency in the terms used, definitions intended, and application of these concepts remains. The word interaction is used with reference to etiologic co-action as well as a short hand for heterogeneity or effect measure modification. Often distinctions between these concepts are blurred or ignored. For new epidemiology students, it can be difficult to understand the difference between confounding and interaction, let alone the complex nuances of concepts of interaction. Potential outcomes, sufficient and component causes, tests of heterogeneity, stratified analyses, and product interaction coefficients in regression models are all aspects of conceptualizing and assessing interaction that overlap under some conditions but not others. What does an epidemiology student need to know about interaction? How do we make abstract conceptualizations of causal interaction tangible to students focused on real world applications? Is it sufficient to focus on synergism, which under specific conditions can tie many concepts of interaction together? Where do antagonism and effect reversal fit in? What is the practical, conceptual, or theoretical basis for assessing statistical interaction on the multiplicative scale? How do we present current concepts of interaction accurately and usefully without overwhelming students or oversimplifying? Speakers: *Frequently Asked Questions About Interaction and Effect Modification* - Charles Poole (Department of Epidemiology, Gillings School of Global Public Health, University of North Carolina) *Infrequently Asked Questions About Interaction and Effect Modification* - Miguel Hernan (Department of Epidemiology, Harvard School of Public Health) *Summary: Implications for Teaching and Practice* - Jay Kaufman (Department of Epidemiology, Biostatistics and Occupational Health, McGill University)

1257

SHOULD SCIENCE BE A COMPONENT OF EMERGENCY RESPONSE? *N Lurie, (Assistant Secretary for Preparedness and Response, US Department of Health and Human Services, Washington, DC)

Consensus is building among emergency responders and federal officials that science must be an essential component of emergency response from the outset. Scientific inquiry and methods need to become an integrated part of the framework of response to ensure that critical knowledge gaps are addressed before the "next" event. Would inclusion of a science response annex in the National Response Framework provide the mechanism to integrate and embed the science in the disaster response activity? The Office of the Assistant Secretary for Preparedness and Response in the U.S. Department of Health and Human Services is putting in place a concept of operations for a science response to health and public health emergencies – an All Hazards Science Response. The talk will address several aspects of an All Hazards Science Response including: What are the major components of an All Hazards Science Response? How do we operationalize this response? What infrastructure and supporting pieces need to be put in place before the next event? What are the barriers that can be overcome with a concerted up front coordinated science response plan?

1258

EPIDEMIOLOGIC THEORIES FOR ANALYZING HEALTH INEQUITIES: CONTRIBUTIONS FROM LATIN AMERICA AND NORTH AMERICA – IN GLOBAL CONTEXT. *M L Barreto (Universidade Federal da Bahia Instituto de Saude Coletiva, Salvador, Brazil)

Growing recognition of the “social determinants of health” is spurring renewed debate about who – and what – determines health inequities. In this symposium, we discuss – and place in historical context – diverse epidemiologic frameworks for investigating societal determinants of health and health inequities, drawing on rich theoretical frameworks employed in both Latin America and North America. **Naomar Almeida-Filho**, in his presentation on “*Theories on social determination of health-disease-care: contributions of Latin American Critical Epidemiology*,” will discuss selected theories drawn from Latin American Social Medicine and Collective Health. Examples include Laurell’s labor process model; Breilh and Granda’s social class model; Samaja, Testa, and Possas’ theory of mode of life and health; and Almeida-Filho’s synthesis in an ethnoepidemiologic model. **Nancy Krieger**, in her presentation on “*Epidemiologic theories of disease distribution: critical perspectives from the Global North*,” will discuss the corresponding critical social epidemiologic theories employed in North America and Europe. These theories include: (a) sociopolitical: political economy of health and social production of disease; social determinants of health and population health; health and human rights; (b) psychosocial; and (c) the ecosocial theory of disease distribution. Concrete examples of why choice of theories matter will be provided. **Anne-Emanuelle Birn**, in her presentation on “*WHO’s international health? International/ global health and the politics of cooptation, 1960s-present*,” will place these theories in historical and global context, including in relation to the WHO’s 1978 Declaration of Alma Ata Declaration and the 2008 report of its Commission on the Social Determinants of Health. Challenging mainstream formulations that downplay issues of dominance and power, the symposium will affirm the need for explicit theoretical frameworks that engage, intellectually and epistemologically, with how societies produce and reproduce social inequity, political dominance, labor relations, modes of life, and ecological contexts. Attention to processes, politics, and history is critical if we are to understand how people both shape and are shaped by – and hence biologically embody – their societal and biophysical contexts. **Sponsoring Society:** International Epidemiological Association (IEA)

1260

OPPORTUNITIES FOR EPIDEMIOLOGISTS IN UNIVERSAL HEALTHCARE SETTINGS: LEARNING FROM EXPERIENCED COLLEAGUES IN COUNTRIES THAT HAVE IT. *J A Gaudino, Jr. (Departments of Public Health and Preventive Medicine, School of Medicine, Oregon Health and Sciences University, Portland, OR)

In 2010, the US Congress enacted its first universal healthcare reform legislation to expand coverage: the Patient Protection and Affordable Care Act. While rules are being developed and many details need to be worked out, reforms include improvements in the availability and sharing of patient information. In contrast, most developed countries have had universal systems for some time that more readily enable population-based research. In this session, speakers from the US, Canada, Norway, the United Kingdom and other countries will discuss opportunities for epidemiologic research and surveillance in the context of their healthcare systems. A speaker will “set the stage” for coming US reforms, describing the implications for public health as well as assumptions about data sources and policies that might enhance US studies and surveillance. Other speakers will highlight research opportunities and capacity afforded by their systems and the processes that strengthen or challenge research and surveillance, and provide examples of studies enhanced by their systems. Then the panel, including additional discussants, will further discuss the pitfalls encountered in research as universal systems were implemented and currently exist, sharing lessons learned to benefit epidemiologists in countries moving to or currently with universal systems. Attendees will join a lively discussion about developing productive epidemiologic research within universal healthcare settings. **Speakers and discussants:** José F. Cordero, Decano, (La Escuela Graduada de Salud Pública de la Universidad de Puerto Rico) Colin L. Soskolne (School of Public Health, University of Alberta) Kjell Haug (The Faculty of Medicine and Dentistry, University of Bergen, Norway) Bernard Ratchet (London School of Hygiene and Tropical Medicine) Steven J. Jacobsen (Department of Research & Evaluation, Kaiser Permanente Southern California) Rolv Skjærven (The Faculty of Medicine and Dentistry, University of Bergen, Norway) Paula W. Yoon (Division for Heart Disease and Stroke Prevention, Centers for Disease Prevention and Control)

1259

METHODS TO EVALUATE REAL-WORLD POLICIES/ PROGRAMS IMPLEMENTED AT THE NEW YORK CITY DEPARTMENT OF HEALTH AND MENTAL HYGIENE. *L Thorpe (City University of New York, School of Public Health, New York NY)

This session will highlight efforts to evaluate a series of innovative but often-untested policies/programs recently implemented at the New York City Department of Health and Mental Hygiene. Evaluations of real-world policies are crucial in determining effectiveness and contributing to the limited evidence-base of community strategies to address contemporary public health challenges with scarce resources. Unique challenges exist when conducting evaluations in practice settings, compared to controlled evaluations in research settings. Speakers in this session will highlight strengths and weakness of evaluations conducted to date, highlight gaps in existing knowledge, and generate discussion on potential creative strategies to address these gaps and limitations. Specific topics include: 1) Posting of graphic health messages in all tobacco retailers to warn customers about the effects of smoking and promote the city’s smoking cessation line, 2) Public posting of restaurant sanitary scores in the form of letter grades designed to compel restaurant operators to better comply with food safety regulations, and 3) Requirement of chain restaurants to report calorie information on all menus and billboards to enable customers to make better and more informed food choices. **Speakers Tobacco-related policies - Elizabeth Kilgore Restaurant Grading - Wendy McKelvey Menu calorie labeling - Cathy Nonas**

1261

THE EPIDEMIOLOGY OF TIME SPENT SITTING IN RELATION TO DISEASE RISK AND MORTALITY. *A Patel (American Cancer Society, Atlanta, GA)

It has long been recognized that physical activity has a beneficial impact on weight control, chronic disease risk, and mortality. More recently, numerous observational studies support an association between sitting time, independent of activity, and endpoints such as obesity, type-II diabetes, cardiovascular disease, various types of cancer, and mortality. The underlying mechanism explaining the relationship between time spent sitting and disease is unknown, but may be due to better measurement of sitting time than physical inactivity or other unhealthy behaviors that are not captured well in epidemiologic studies. It is also possible that sitting time has independent effects on specific biomarkers of obesity and other chronic diseases (such as triglycerides or fasting glucose). Technologic advancements, such as computers and television, led to a decrease in total daily energy expenditure through greatly reducing occupational activity and increasing time spent sitting. These changes, along with higher caloric intake, have contributed in large part to the rise in obesity and likely influenced temporal trends in cardiovascular disease, type-II diabetes and some cancers. This presentation will focus on the epidemiologic evidence to support an association between time spent sitting, disease risk, and overall mortality. The remainder of the symposium will discuss the underlying biologic mechanisms and examine some of the methodological considerations in measuring sitting time in epidemiologic studies.

1262

THE BIOLOGICAL MECHANISMS UNDERLYING THE LINKS BETWEEN SEDENTARY BEHAVIORS AND DISEASE. *C E Matthews (Nutritional Epidemiology Branch, Division of Cancer Epidemiology and Genetics National Cancer Institute, Bethesda, MD)

Evolution has provided humans with an exquisite ability to adapt physiologically to environmental conditions. We possess the ability to conserve energy in times of famine and to expend large amounts of energy in course of doing physical work/activity (e.g., to forage, flee, fight, or exercise). In the modern world, where environmental conditions encourage sedentary behaviors to predominate, higher levels of sedentary time (sitting) has a profound effect on overall physical activity energy expenditure, and thus energy balance and metabolic health. In contrast, active behaviors can be expected to exert many beneficial physiologic effects that are both acute and chronic in nature, and sensitive to the type, amount, and intensity of the activity in which we engage. These effects are wide ranging, including: enhanced glucose disposal, greater bone loading, and other orthostatic effects. This presentation will describe consequences of prolonged sedentary time on overall activity levels and examine the impact of these behaviors on a range of biological mechanisms linked to common diseases, particularly cardiovascular disease and cancer.

1264

WHEN EPIDEMIOLOGY MEETS POLICY: CONTROVERSIES IN TRANSLATING EVIDENCE-BASED CANCER SCREENING DECISIONS TO THE MEDIA, POLICY MAKERS, AND CLINICIANS. *A Zauber (Memorial Sloan-Kettering Cancer Center, New York, NY)

Evidence-based decision analyses are the preferred basis for cancer screening recommendations, but communicating these results is challenging. Microsimulation models are a tool for integrating biologic, epidemiologic and clinical evidence to determine the harm-benefit trade-offs of competing policies. We discuss three cases of microsimulation modeling used to assist clinicians and policymakers in making decisions about cancer screening. The models were developed by members of Cancer Intervention and Surveillance Modeling Network (CISNET). Examples are: 1) In November 2009, the United States Preventive Services Task Force (USPSTF) announced new recommendations for breast cancer screening based partly on the results of CISNET models. The recommendations were incorrectly interpreted by the media and the public as denying mammograms to women ages 40 to 49. We present six breast cancer models, summarize their results, and explain the difference between the model-justified conclusions and the public's interpretation. 2) In 2008 the USPSTF presented new screening recommendations for colorectal cancer (CRC), also partly based on input from CISNET. We present two colorectal cancer models and explain how model-based recommendations are being misinterpreted in clinical practice to deny CRC screening over age 75. 3) Two decades after the introduction of the PSA test, prostate cancer screening remains controversial, with apparently conflicting results from clinical trials and different policy groups issuing quite different recommendations. In this presentation we will show how CISNET prostate cancer models are being used to reconcile the differences between published trials and to estimate the risk-benefit ratio of PSA screening. Speakers for all three examples will summarize past experience with policy-relevant research accomplishments, discuss strategies for improving the acceptability of simulation results by non-scientists, and suggest future opportunities where simulation may be especially suited for addressing policy questions related to cancer screening.

1263

ASSESSING SITTING TIME: METHODOLOGICAL AND PRACTICAL CONSIDERATIONS. *L L Craft (Department of Preventive Medicine, Feinberg School of Medicine, Northwestern University, Chicago, IL)

Sedentary time, specifically sitting, exerts profound negative affects on health that are distinct from exercising too little. Independent of time spent in physical activity, sitting time has been related to risk factors for the metabolic syndrome, obesity, and diabetes. Consequently, there is currently an increased interest in evaluating and describing both acute and chronic variations in sedentary time (sitting) and its relationship with exercise time, upright time (total time spent standing or ambulating), and chronic disease risk. This talk will focus on methodological considerations in measuring sitting time in epidemiologic studies. Specifically, options for assessing sitting time (e.g., self-report, proxies of sitting time, accelerometers, accelerometers with inclinometers) and the pros and cons of each method will be presented and discussed. Considerations regarding the timing and number of days of assessment will also be presented. Finally, practical considerations related to cost and participant burden for each method of assessment will be identified. Examples from a study that compared four methods of assessment of sitting time will be provided.