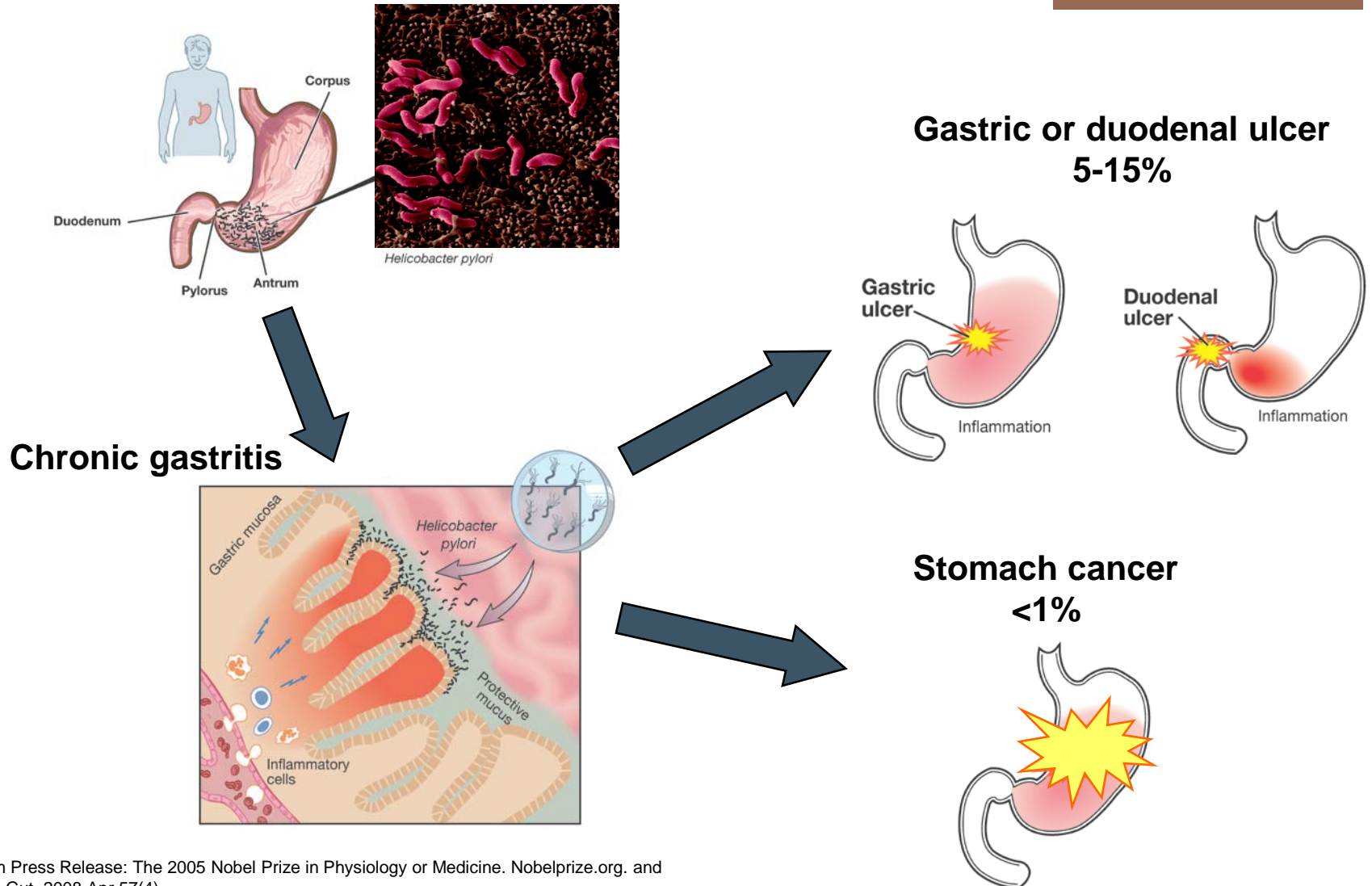


# Household risk factors and prevalence of *Helicobacter pylori* infection in Aklavik, NWT

Katharine Fagan-Garcia, Janis Geary (Huntington), Karen J. Goodman  
and *CANHelp* Working Group

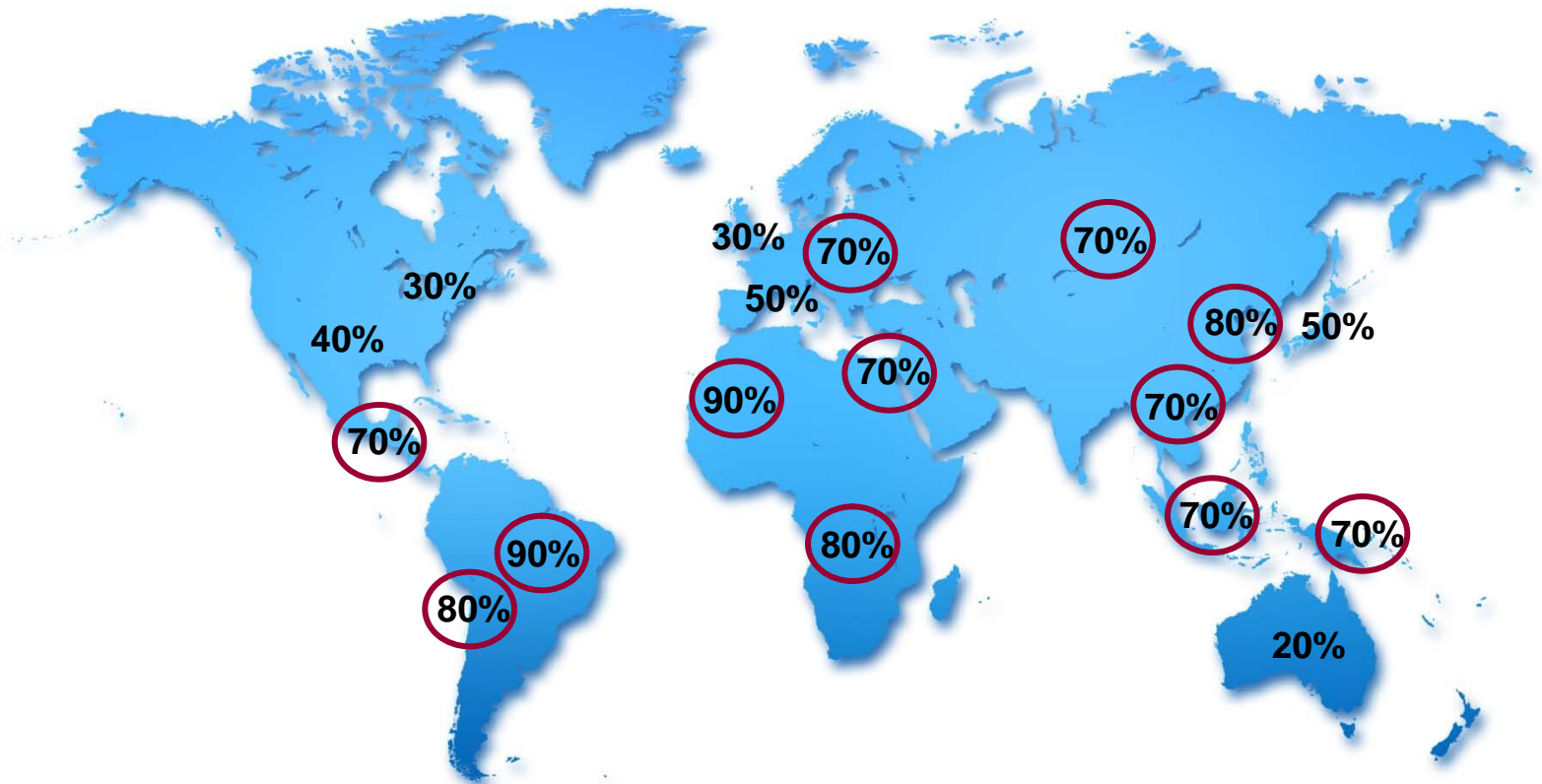
Department of Medicine (Gastroenterology) and Department of Public Health Sciences,  
University of Alberta

# *Helicobacter pylori*

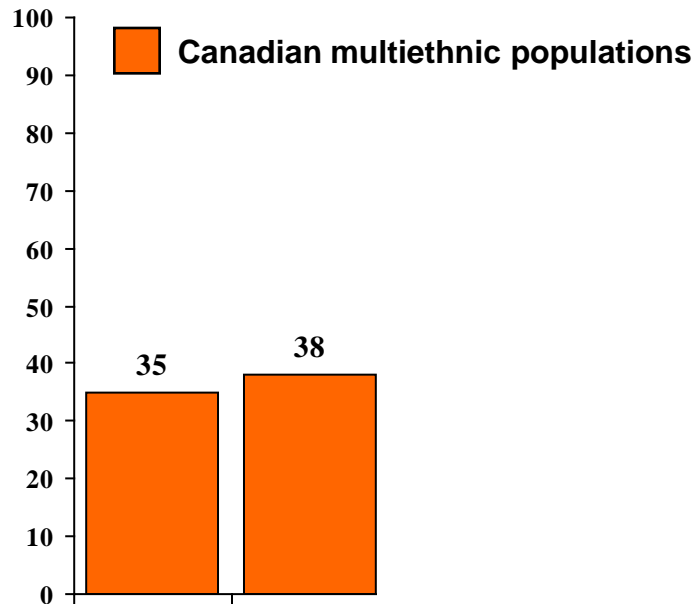


# *Helicobacter pylori*

- Estimated to infect half or more of world's population
  - High prevalence in less developed regions



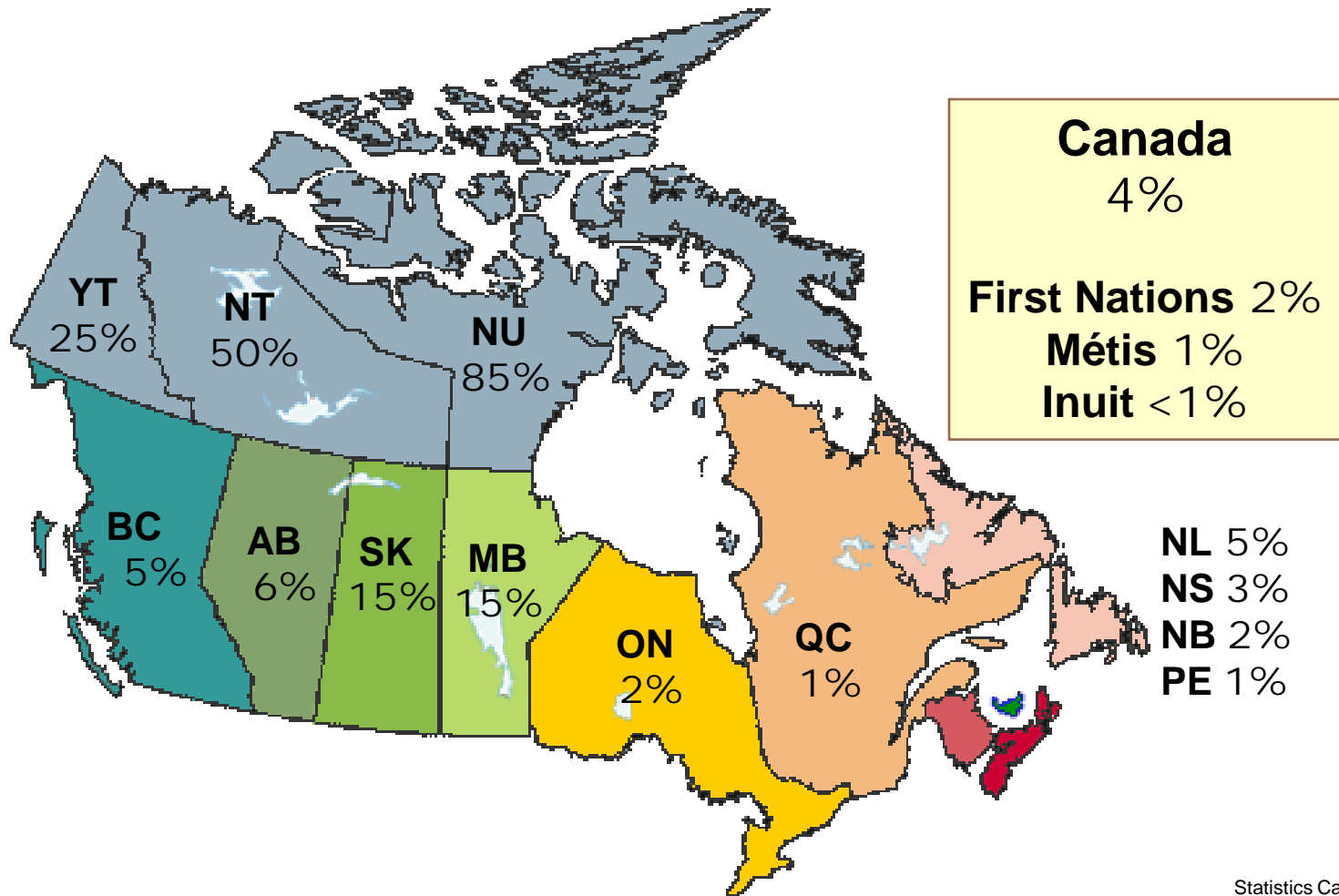
# The concern about *H. pylori* in the north



Area:	Manitoba	Nova Scotia
Year:	1997	1994
Age:	adults	adults

# Aboriginal population of Canada

- Percentage of population, by province or territory



# The concern about *H. pylori* in northern Canada

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- High level of community concern due to stomach cancer deaths in some families
- Concern of local health authorities
- Community leaders asking for research to find solutions
- Collaborative research group established to address the concerns

- Canadian North Helicobacter pylori Working Group
- Multiple community organizations
- Multiple Health authorities (Yukon, NWT and Alberta)
- External advisors (Health policy and Arctic investigations)
- Investigators from U of A
  - Epidemiology (Karen Goodman)
  - Anthropology (Christopher Fletcher)
  - Gastroenterology (Sander van Zanten, Justin Cheung, Amy Morse, Richard Fedorak)
  - Microbiology (Monika Keelan)
  - Pathology (Safwat Girgis)

- Canadian North Helicobacter pylori Working Group
  
- Use a collaborative and participatory approach:
  - **To obtain representative data for developing public health strategies for control of *H. pylori* infection**
  - **To conduct policy analysis**
  - **To develop knowledge exchange strategies**



# Aklavik, NWT

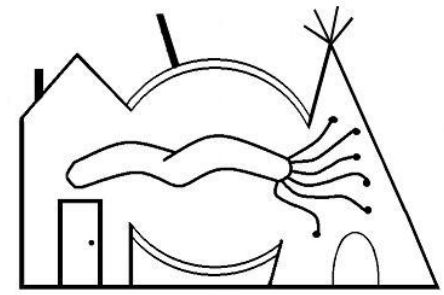


# Aklavik, NWT

- Population (2009): 645 (2008: 642) (NWT Bureau of Statistics)
  - 90% Inuvialuit (Inuit) or Gwich'in Dene (First Nation)



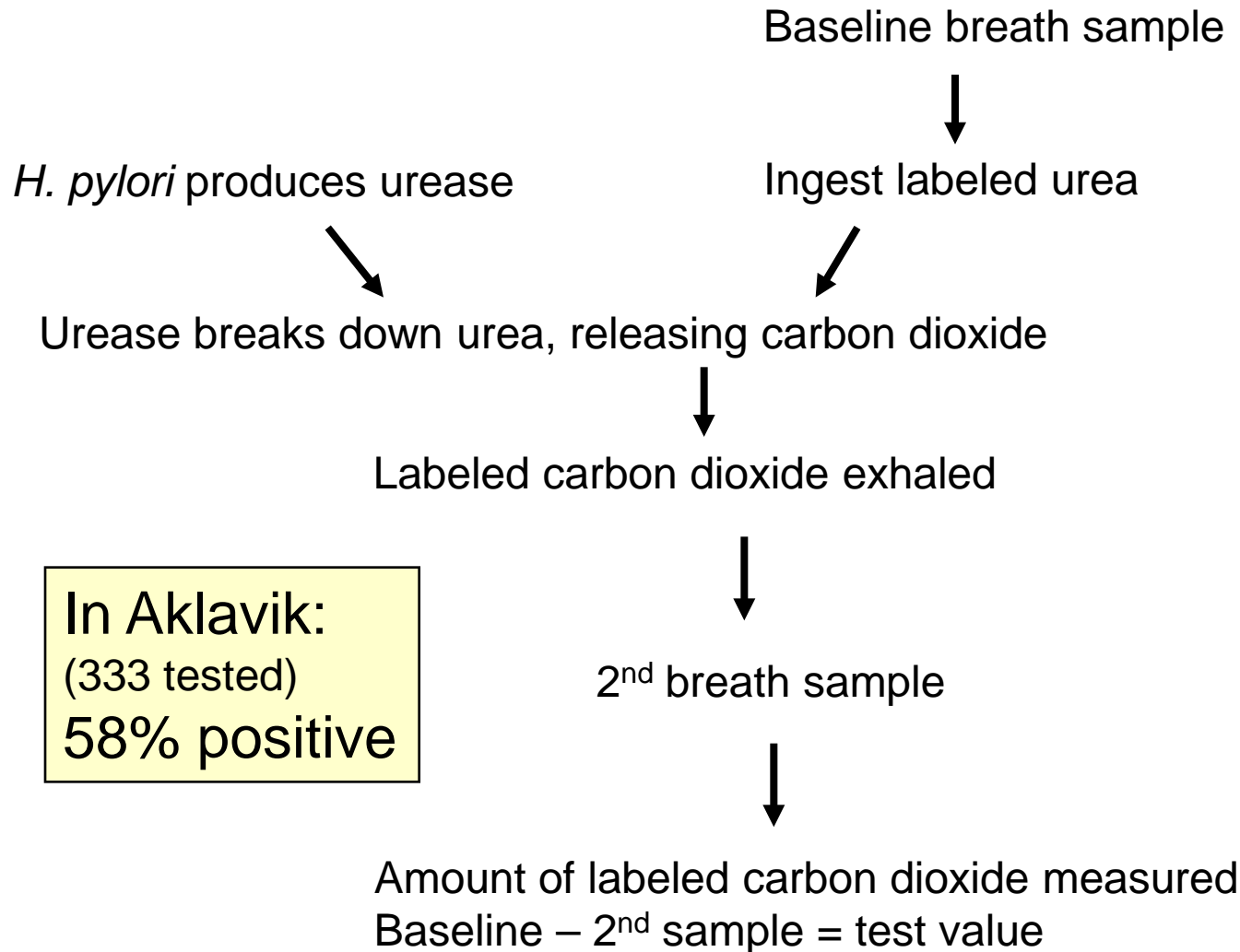
# The Aklavik *H. pylori* project



Aklavik *H. pylori* Project

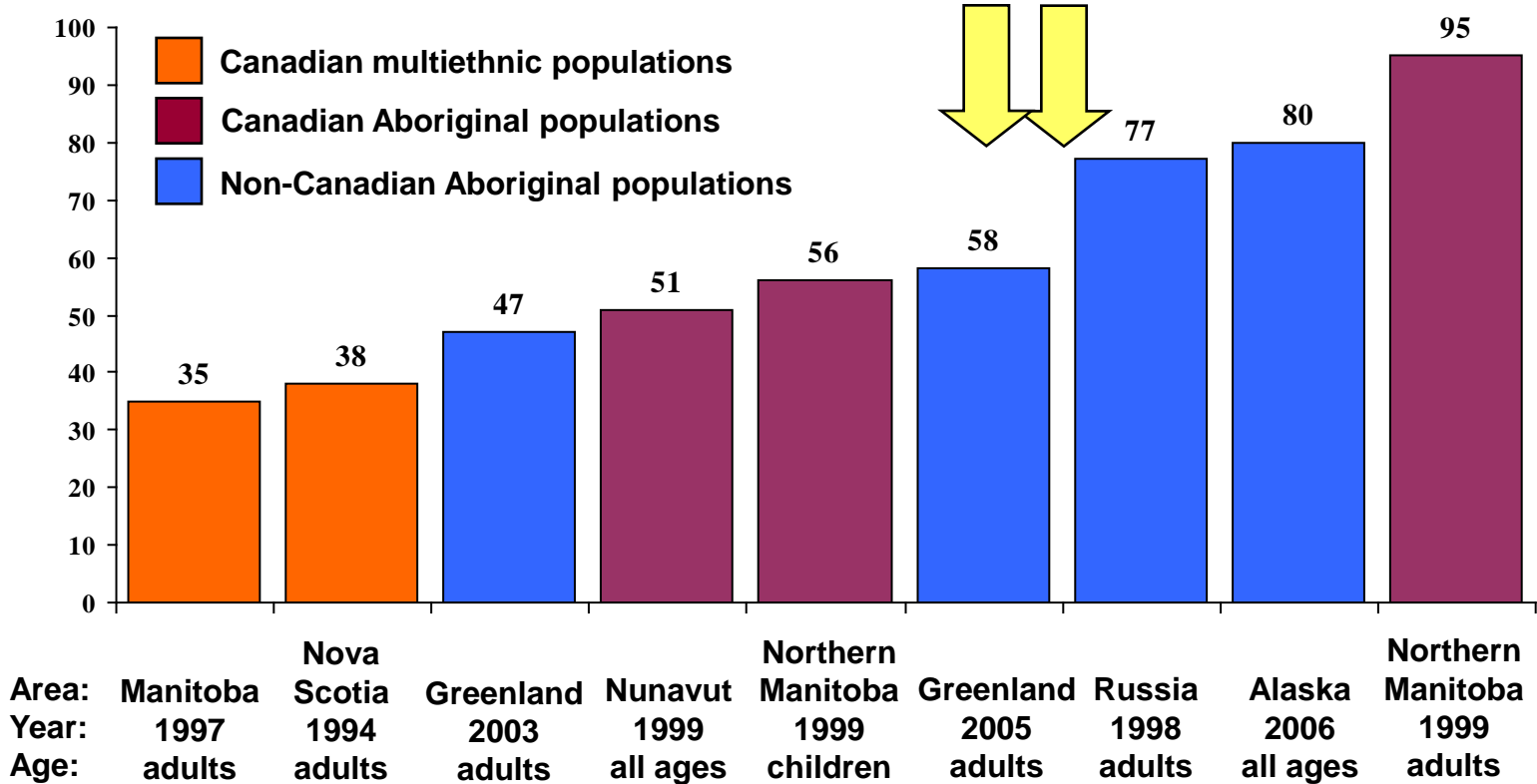
- **Pilot project**
- **Aims:**
  - **Investigate *H. pylori* infection in Aklavik**
    - Screen residents for *H. pylori* infection (UBT)
    - Collect clinical/epidemiologic data
    - Endoscopy
    - Treatment
    - Evaluate the effectiveness of anti-*H. pylori* therapies
    - Follow those treated long-term
  - **Knowledge exchange**
  - **Conduct policy analysis**

# Testing for *H. pylori*: Urea breath test

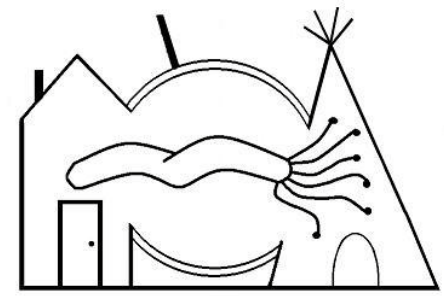


# *H. pylori* in Aklavik

In Aklavik:  
 (33 (355 tested total)  
 58 62% positive



# The Aklavik *H. pylori* project



Aklavik *H. pylori* Project

- **Pilot project**
- **Aims:**
  - **Investigate *H. pylori* infection in Aklavik**
    - Screen residents for *H. pylori* infection (UBT)
    - Collect clinical/epidemiologic data
    - Endoscopy
    - Treatment
    - Evaluate the effectiveness of anti-*H. pylori* therapies
    - Follow those treated long-term
  - **Knowledge exchange**
  - **Conduct policy analysis**

# Household questionnaire

- Representatives from Aklavik households interviewed to collect data on household characteristics
  - Questions about members of the household, the house itself (if it is owned or rented, # rooms, etc.), water uses/source, animal contact, diet, income, health care
  
- **145 participating households**
  - **64%** of Aklavik households (total 228) (2009 NWT Community Survey, Housing Component, NWT Bureau of Statistics)

# Household-level risk factors for *H. pylori* infection

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- Major mode of transmission
  - = person-to-person transmission within family
  - Early in life
- Household crowding
- Low socioeconomic status
- Low education of parents
- Also:
  - Water source
  - Diet



# Analysis

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- Compared individual *H. pylori* status (from UBT and endoscopy) to household exposures
- Analyzed all questions from household questionnaire
  - For known and hypothesized risk factors
- Calculated % *H. pylori* positive (and 95% confidence intervals) and unadjusted odds ratios for each stratified variable

# Individuals included in the analysis

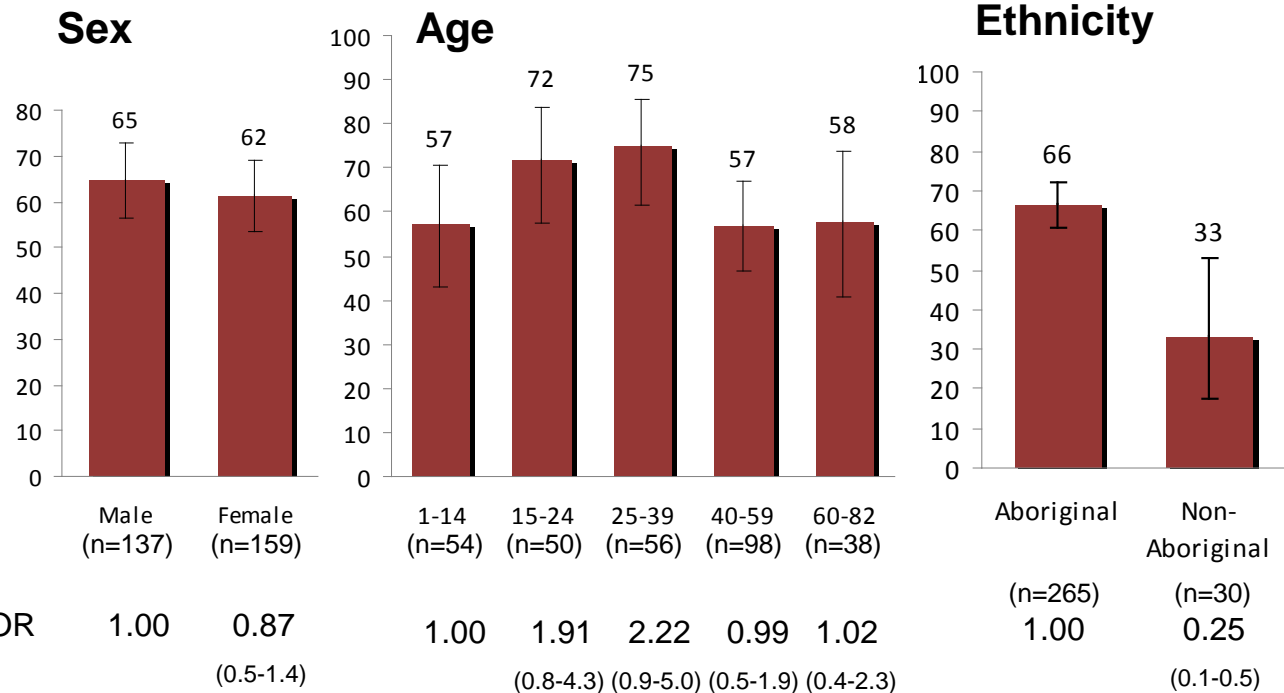
## ■ 296 individuals

- Tested for *H. pylori* and included in a household survey
- 46% of estimated 2008 Aklavik population of 642 (NWT Bureau of Statistics)

## ■ Individual demographics:

### ■ *H. pylori* positive

***H. pylori*  
infection  
63% positive**

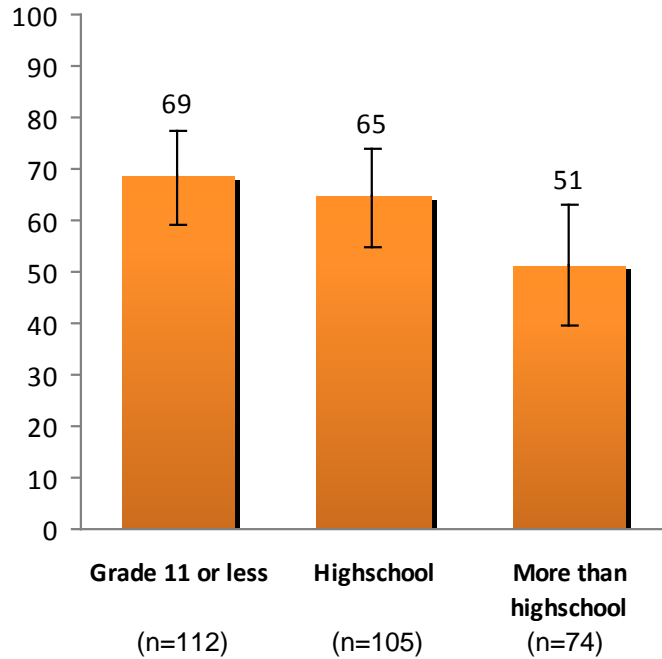




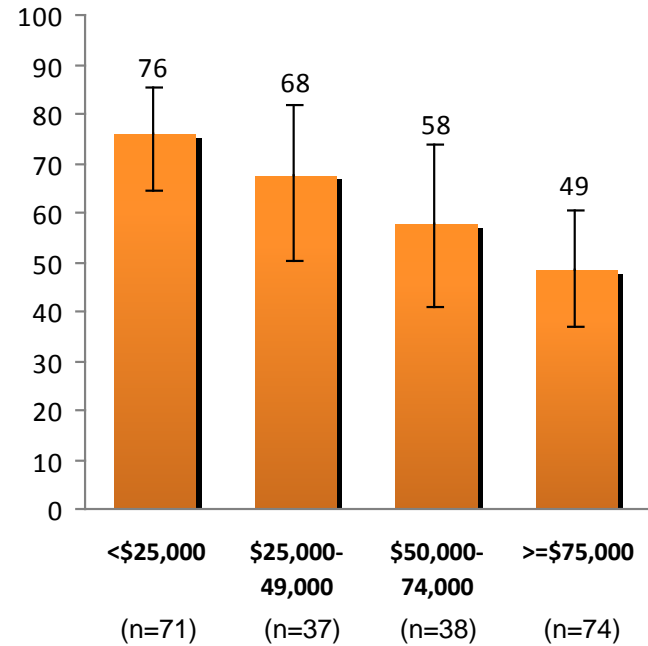
# Household demographics

■ *H. pylori* positive

**Highest education by a household member**



**Combined annual household income**



Unadjusted OR

1.00

0.83

0.48

(0.5-1.5)

(0.3-0.9)

1.00

0.65

0.43

0.30

(0.3-1.6)

(0.2-1.0)

(0.1-0.6)

# Other household characteristics

## ■ Other variables:

### ■ Higher prevalence



- More household members were born in the territories
- Living in public housing
- Presence of mice in the house

### ■ Lower prevalence



- Moved more times in the past 5 years
- Car ownership
- Anyone spent time outside Aklavik

### ■ No difference



- Years at current address
- Dogs in or around the house
- Anyone spent time on the land/in the bush
- Use of traditional healing methods





# Household diet

## ■ Other variables:

### ■ Higher prevalence

- More locally harvested meat
- More store-bought meat
- More processed meat



### ■ Lower prevalence

- More fruit
- More vegetables (raw and/or cooked)
- More store-bought fish



### ■ No difference

- Consumption of eggs
- Consumption of milk (and milk by type)



### ■ Unclear

- Smoked/salted meat
- Locally harvested fish





# Conclusions

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- Diverse known or suspected risk factors for *H. pylori* infection, assessed at the household level, appear to be strongly associated with individual *H. pylori* status among residents of Aklavik

# Future directions

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- Further analysis of associations between household exposures and *H. pylori* infection status
  - To adjust for potential confounders and household effects (multi-level analysis)
- Expansion of project to additional communities in northern Canada
  - *6 Yukon First Nations Communities, 5 NWT Inuvialuit Settlement Region Communities, International collaboration (Alaska and Greenland)*
  - Screening for *H. pylori* infection and analysis of household questionnaires

# Thank you

- **Dr. Karen Goodman**
  - **Janis Huntington**
  - **Laura Aplin**
  - **Amy Colqhoun**
  - **Megan Johnston**
  - **and other past research assistants who collected all the data**
- **The rest of the CANHelp Working Group**



- Institute of Aboriginal People's Health
- Network Environments for Aboriginal Health Research (NEAHR)
  - Anisnabe Kekendazone, Ottawa
  - Nasivvik, Université Laval
- w/ Canadian Association for Gastroenterology & Industry Partners



- Alberta Heritage Foundation for Medical Research
- ArcticNet National Centre of Excellence
- Indian and Northern Affairs Canada
- Canadian Circumpolar Institute



Inuvialuit Regional Corporation



SSHRC  CRSH



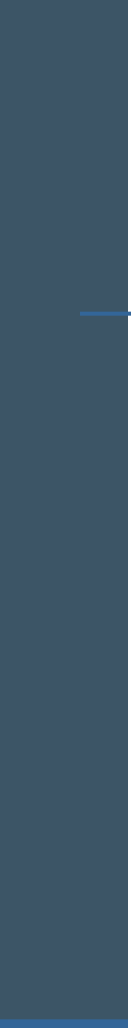
Social Sciences and Humanities  
Research Council of Canada

Conseil de recherches en  
sciences humaines du Canada



Public Health  
Agency of Canada

Agence de santé  
publique du Canada



# Other household characteristics

		% HP +	Unadjusted OR
Household members born in the territories	None	45 (24-68)	0.42 (0.17-1.03)
	Some	58 (44-71)	0.71 (0.39-1.30)
	All	66 (60-72)	1.00
Living in rented public housing	No	54 (45-62)	1.00
	Yes	73 (65-80)	2.30 (1.41-3.74)
Presence of mice in the house	No	62 (55-68)	1.00
	Yes	76 (60-88)	1.92 (0.90-4.11)
Times moved in past 5 years	0	66 (59-74)	1.00
	1-2	64 (53-75)	0.91 (0.52-1.62)
	3-5	47 (30-65)	0.45 (0.21-0.95)
Someone in house owns a car	No	73 (65-80)	1.00
	Yes	54 (45-62)	0.43 (0.26-0.70)
Anyone spent time outside Aklavik	No	69 (62-76)	1.00
	Yes	56 (46-66)	0.57 (0.35-0.94)
Presence of dogs in or around house	No	65 (56-73)	1.00
	Yes	62 (53-70)	0.89 (0.55-1.44)
Anyone spent time on the land/in the bush	No	63 (57-69)	1.00
	Yes	66 (53-78)	1.13 (0.62-2.07)
Use of traditional healing methods	No	62 (55-68)	1.00
	Yes	67 (55-78)	1.26 (0.71-2.24)

# Household water



		% HP +	Unadjusted OR
How often water tank runs out	Never	59 (48-69)	1.00
	<1/month	61 (50-72)	1.10 (0.60-2.01)
	1/month+	75 (64-84)	2.06 (1.07-3.99)
Household ever uses river water for bathing (also washing dishes/clothes)	No	62 (56-68)	1.00
	Yes	72 (57-84)	1.59 (0.80-3.17)
Drinking water is always purified or treated	No	68 (58-76)	1.00
	Yes	60 (53-67)	0.73 (0.44-1.20)
Household uses bottled water for drinking	No	63 (57-69)	1.00
	Yes	63 (45-78)	0.97 (0.47-2.02)
Household uses treated water trucked to water tank for drinking	No	63 (47-78)	1.00
	Yes	63 (57-69)	1.00 (0.50-1.98)
Problems with water/sewage	No	63 (56-69)	1.00
	Yes	64 (52-75)	1.06 (0.62-1.83)

# Household

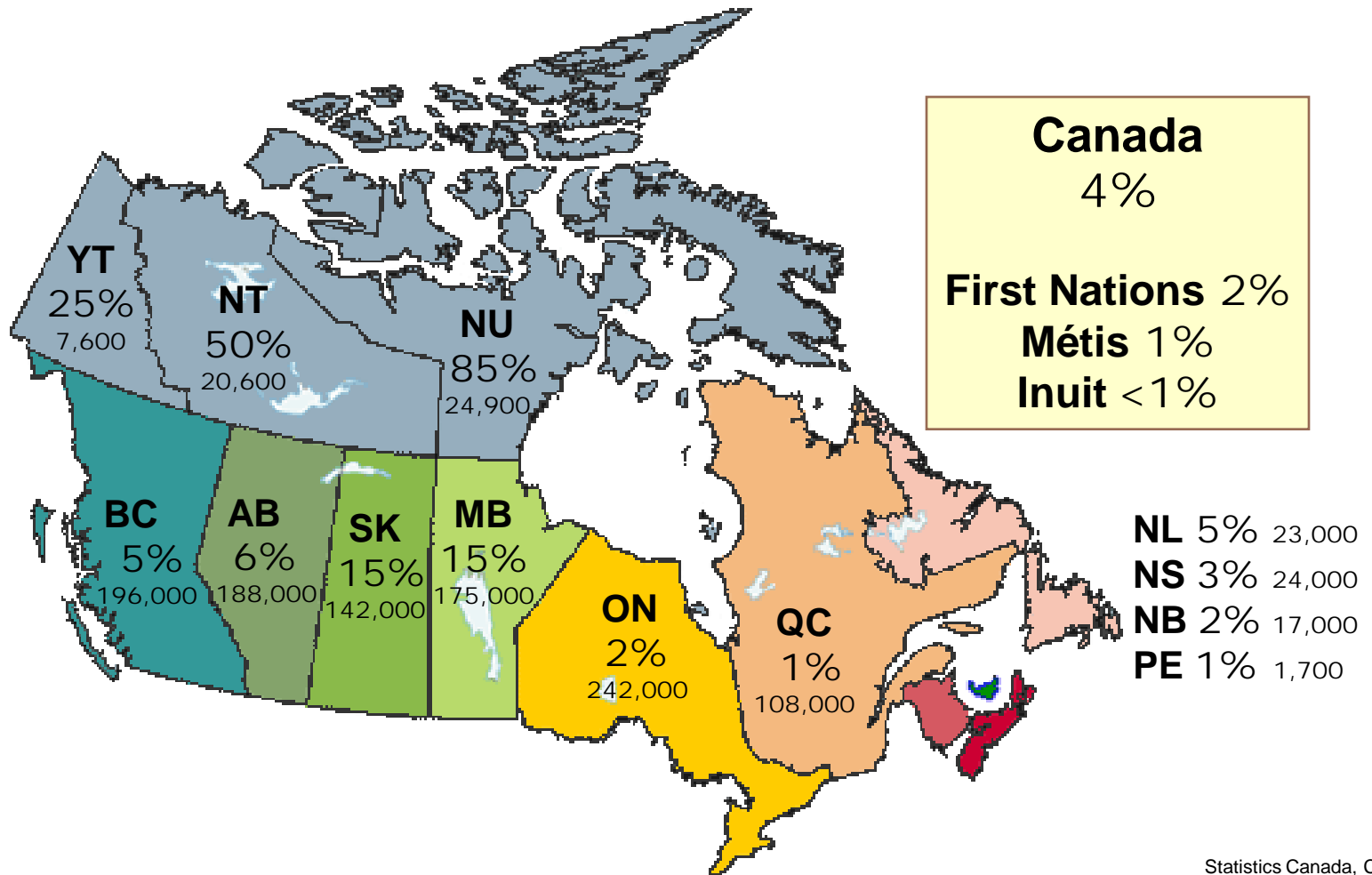
diet



		% HP +	Unadjusted OR
Store-bought meat	0-3.5	53 (42-64)	1.00
	7+	71 (61-80)	2.12 (1.16-3.89)
Locally harvested meat	0-1	61 (50-71)	1.00
	3.51+	71 (61-80)	1.59 (0.86-2.95)
Processed meat	0	54 (39-69)	0.50 (0.24-1.01)
	1.01+	70 (60-79)	1.00
Fruit	0-1	73 (63-81)	1.00
	3.51+	53 (41-65)	0.43 (0.23-0.80)
Raw vegetables	0	71 (51-87)	1.00
	3.51+	52 (37-67)	0.43 (0.16-1.18)
Cooked vegetables	0-1	72 (60-83)	1.00
	3.51+	62 (52-71)	0.62 (0.32-1.21)
Store-bought fish	0	69 (61-77)	1.00
	0.01+	58 (50-66)	0.61 (0.37-1.00)
Eggs	0-2	62 (52-71)	1.00
	7+	60 (45-74)	0.93 (0.46-1.89)
Milk	0-6.99	65 (55-74)	1.00
	7+	62 (54-69)	0.87 (0.53-1.44)
Smoked/salted meat	0	65 (55-74)	1.00
	0.01-1	59 (48-68)	0.76 (0.43-1.35)
	1.01+	68 (56-78)	1.14 (0.61-2.14)
Locally harvested fish	0-1	60 (52-68)	1.00
	1.01-2	73 (60-84)	1.77 (0.92-3.41)
	2.01+	64 (51-76)	1.17 (0.63-2.15)

# Aboriginal peoples of Canada

- Percentage of population, by province or territory





# Aboriginal peoples of northern Canada

	First Nations	Métis	Inuit
<b>Yukon</b>	21%	3%	1%
<b>NWT</b>	31%	9%	10%
<b>Nunavut</b>	<1%	<1%	84%
<b>Canada</b>	<b>2%</b>	<b>1%</b>	<b>&lt;1%</b>

