

Dietary factors and prevalence
of severe gastritis in an
Helicobacter pylori infected
population from northern
Canada

Megan Johnston, MSc

Janis Geary (Huntington), MSc

Karen J Goodman, PhD

CANHelp Working Group



Background

Canadians at High Risk of *H. pylori* Infection

- In 2006, the Canadian *Helicobacter* Study Group identified 3 groups of Canadians at high risk from *Helicobacter pylori*-associated disease:
 - Elderly people
 - Immigrants from high-prevalence regions
 - Aboriginal peoples

Background

H. pylori and Associated Diseases in
Aboriginal Peoples of Canada

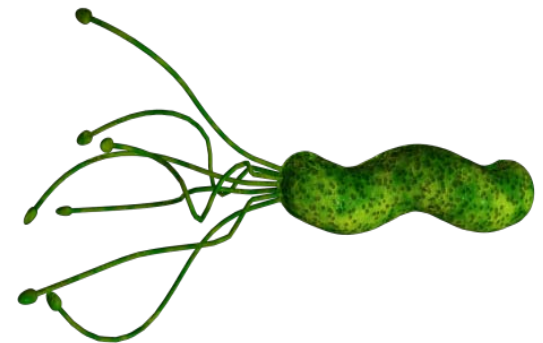


Background

H. pylori and Associated Diseases in Aboriginal Peoples of Canada

- Three main diseases associated with *H. pylori* infection:

1. Gastritis
2. Peptic Ulcer Disease (PUD)
3. Gastric Cancer



H. pylori and Gastric Cancer

- Worldwide:
 - 4th most common cancer
 - 2nd leading cause of cancer-related death
- Epidemiological evidence for risk factors:
 - Infection with *H. pylori*
 - Smoking
 - Chronic gastritis, Intestinal metaplasia
 - Dietary factors
 - Salted, smoked, pickled foods
 - Dried fish & meats
 - Fruits & vegetables: protective effect



H. pylori and Peptic Ulcer Disease & Gastritis

- Interesting history!
 - Early years (mid-20th century) – “known fact” bacteria could not survive in stomach
 - Stress hypothesis: stress \longrightarrow PUD
 - Barry Marshall & Robin Warren (1982)
 - *H. pylori* hypothesis:
H. pylori \longrightarrow PUD & gastritis





H. pylori and Peptic Ulcer Disease & Gastritis

- Lancel: Saturday 16 June 1984:

**UNIDENTIFIED CURVED BACILLI IN THE
STOMACH OF PATIENTS WITH GASTRITIS
AND PEPTIC ULCERATION***

- Won Nobel Prize (2005):
 - Discovery of the bacterium *H. pylori* and its role in gastritis and peptic ulcer disease

H. pylori and PUD / Gastritis: Other Risk Factors??

- Peptic Ulcer Disease
 - Prospective Danish Cohort (2003):
 - Tobacco smoking
 - Alcohol (spirits)
 - Mild tranquilizers
 - Protective: Alcohol (wine)
 - Prospective US Cohort (1997):
 - Weak association with coffee, tobacco smoking, alcohol
- Chronic Gastritis:
 - Older age
 - Use of NSAIDS
 - Tobacco smoking
 - Alcohol
 - ?? Caffeine

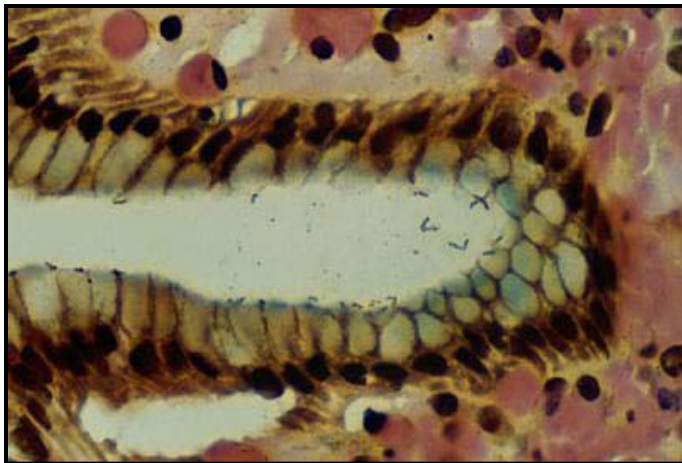
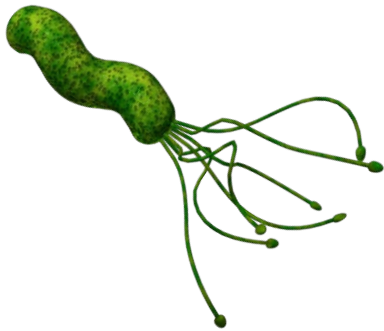


Rosenstock S, et al. *Gut*. 2003;52:186–193

Wing L, et al. *Epidemiology*. 1997;8(4):420-424

H. pylori and Associated Diseases

Mechanism of Gastric Carcinogenesis



Infection of *H. pylori*



Progressive gastritis



Intestinal metaplasia
Atrophy



Gastric Cancer



Little Data on *H. pylori*-associated **Gastric Cancer** in Aboriginal Canadians

○ Northwest Territories, 1998-2007

- Compared to Canadian average, age-adjusted incidence rates are increased in:
 - NWT men (2x Canadian rate)
 - First Nations and Inuit men in NWT, *and also*
 - *Alaska Native men relative to US average*
 - *Native Greenlanders relative to Danes*
- But not in Manitoba Registered Indians (*Bernstein 1999*)

Little Data on *H. pylori*-associated **Peptic Ulcer Disease** in Aboriginal Canadians

- Increased ratio of gastric to duodenal ulcer

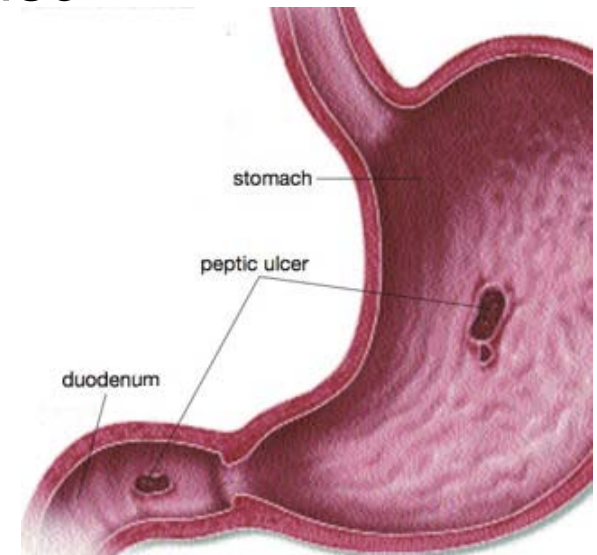
- Inuit of northern Labrador, *and also*

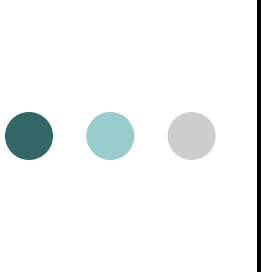
- *Alaska Natives*
- *Native Greenlanders*
- *Residents of Arctic Norway*

- Increased hospitalizations associated with PUD diagnoses

- In Manitoba, Registered Indians had nearly 2x rate of other persons

(Bernstein 1999)





Little Data on *H. pylori*-associated Atrophic Gastritis prevalence

- Although gastritis is an important step in the pathway of gastric cancer, data on prevalence are rare and even non-existent for most countries of the world
 - Common among elderly
 - Prevalence varies widely
 - Norway (1991): 50.5%
 - Australia (1993): 22%
 - Japan (1996): 52.9%
 - China (1998): 82.2%
 - Sweden (2000): 28%

- ● ● | Addressing Concerns about Health Risks from *H. pylori* infection in Northern Canada





Initial Research Project

Aklavik *H. pylori* Project Goals

1. Investigate *H. pylori* infection in Aklavik
2. Include community members in research planning and conduct
3. Develop effective activities to inform community members of the research results

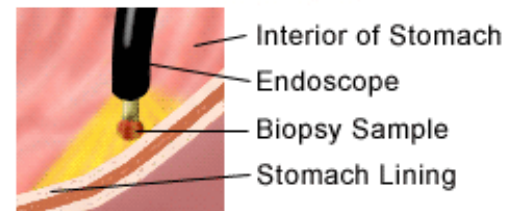
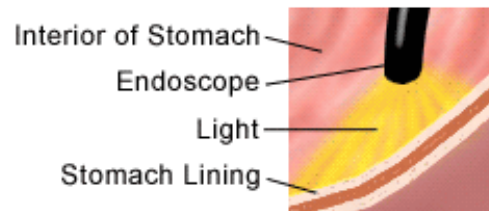
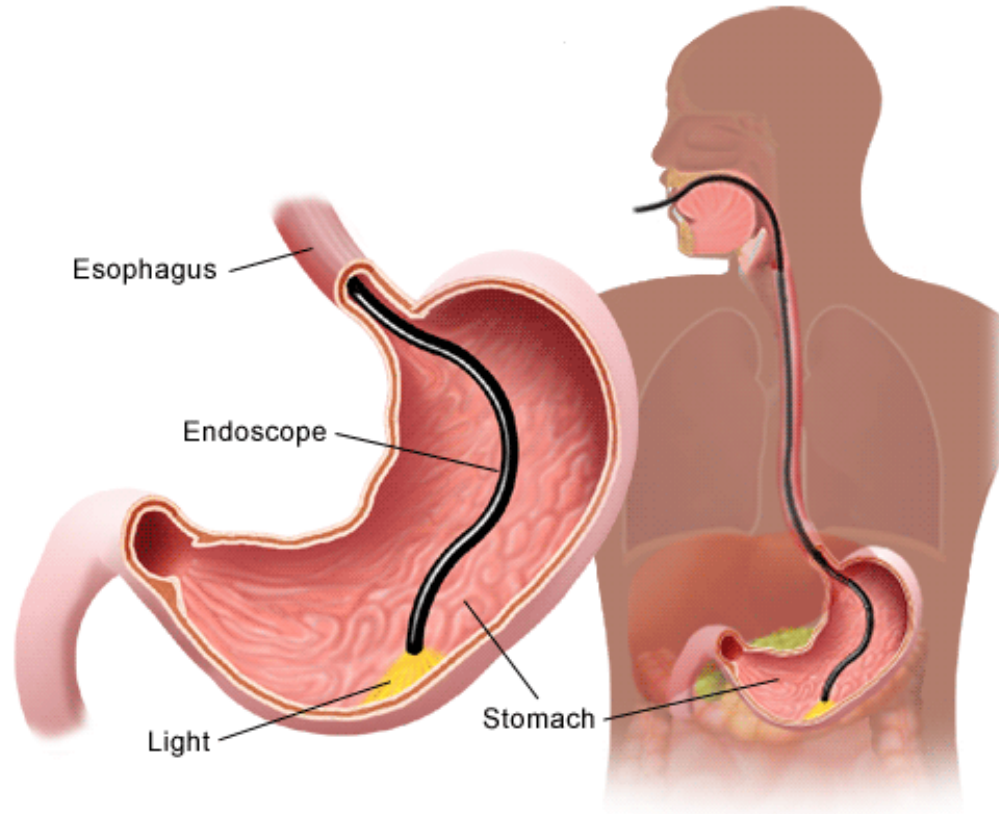


Aklavik *H. pylori* Project

Integrating Scientific and Patient Care Goals

- 6 Components:
 - Screen residents for *H. pylori* infection (UBT)
 - Questionnaire Data
 - Endoscopy
 - Treatment
 - Knowledge Exchange
 - Policy Development

Aklavik *H. pylori* Project Endoscopy

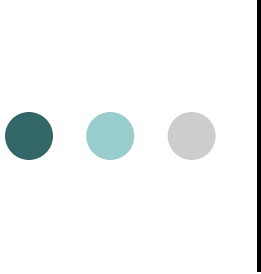


Aklavik *H. pylori* Project

Endoscopy

- Aklavik residents aged ≥ 15 years targeted
- Children (10-14 years) enrolled at parents' request
- Endoscopies performed in Aklavik Health Centre by visiting gastroenterologists (Feb 2008)
- Equipment transported temporarily to Health Center
- Transnasal ultrathin gastroscopes
- 5 gastric biopsies obtained from each participant





Aklavik *H. pylori* Project Endoscopy

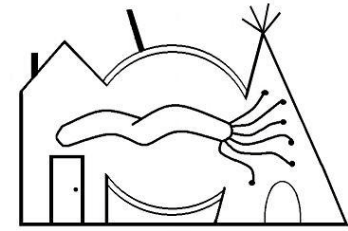
- Biopsies were obtained from **194** individuals (42% men)
- Participants were primarily Inuvialuit (Inuit) or Gwich'in Dene (Athabaskan First Nations)
- Participants were aged 10-80

Ethnicity	<i>n</i>	%
Gwich'in	53	27
Inuvialuit	114	59
Other Aboriginal	8	4
Non-Aboriginal	18	9
Missing	1	1

Age (years)	<i>n</i>	%
10-17	19	10
18-29	42	22
30-49	75	39
50-69	47	24
70-80	11	5

Aklavik *H. pylori* Project

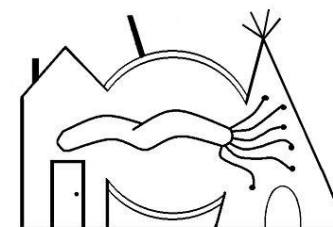
Endoscopic Abnormalities



Aklavik *H. pylori* Project

Apparent Inflammation	Gastritis	13.8%
	Duodenitis	6.7%
Erosions	Gastric	6.2%
	Duodenal	0.5%
Ulcers	Gastric	3.1%
	Duodenal	0
Cancer	Cancer	0

Aklavik *H. pylori* Project Histopathology



Aklavik *H. pylori* Project

Prevalence of selected histopathology classifications

	All <i>H. pylori</i>+	All participants
<i>n</i>	129	194
Inflammation		
Mild (%)	8	7
Moderate (%)	47	31
Severe (%)	43	29
Atrophy (%)	21	14
Intestinal Metaplasia (%)	11	8



Methods: Assessing **Dietary Factors** and prevalence of **Severe Gastritis**

1. Used data from the *H. pylori* + subjects who completed both the endoscopy with biopsies and individual epidemiological questionnaire
 - Endoscopy: n = 129
 - Endoscopy + questionnaire: n = 107
2. Used descriptive statistics to identify some dietary factors potentially associated with severe gastritis

Methods: Dietary Questionnaire

- Dietary data available for **107** / 129 subjects

Diet

We would like to know how many servings of certain foods you ate in the last week, and how many you usually eat in a typical week in summer and winter.

(Approximate serving sizes specified)	in past week (If unsure enter "777", if refused to answer enter "999")	number of servings	
		in a typical week in summer	in a typical week in winter

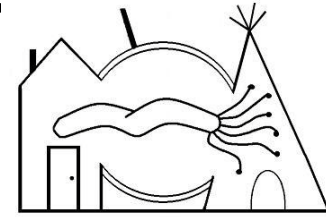
8. Fresh fruit (1 whole or ½ cup diced)	1	1	1
9. Fruit juice (from real fruit) (½ cup = 4 oz, small glass)	4	LESS	4
10. Raw vegetables (½ cup)	2	2	2
11. Cooked vegetables (½ cup)	4.5	4.5	4.5
12. Fresh or frozen fish, caught locally (6-8 oz)	1	4.5	1
13. Fresh or frozen unprocessed fish, store-bought (6-8 oz)	0	0	<1
14. Uncooked fish or fish eggs (fresh or frozen) (6-8 oz)	0	0	0
15. Smoked, salted, or cured fish (6-8 oz)	0	1	0

Results: Dietary Questionnaire

Dietary Factor	Number of <i>H. Pylori</i> + Participants (max n = 107)	% with severe gastritis (95% CI)
Pop		
≤ 1 serving / day	62	37 (25-50)
> 1 serving / day	43	51 (35-67)
Coffee		
≤ 1 serving / day	42	52 (36-68)
> 1 serving / day	62	35 (24-49)
Tea		
≤ 1 serving / day	58	52 (38-65)
> 1 serving / day	47	32 (19-47)
Alcohol		
≤ 1 serving / day	19	47 (24-71)
> 1 serving / day	87	43 (32-54)
Fruit / vegetable		
≤ 1 serving / day	49	39 (25-54)
> 1 serving / day	53	49 (35-63)
Smoked / salted meat or fish		
< 2 servings / week	78	41 (30-53)
≥ 2 servings / week	27	52 (32-71)

Aklavik *H. pylori* Project

Summary

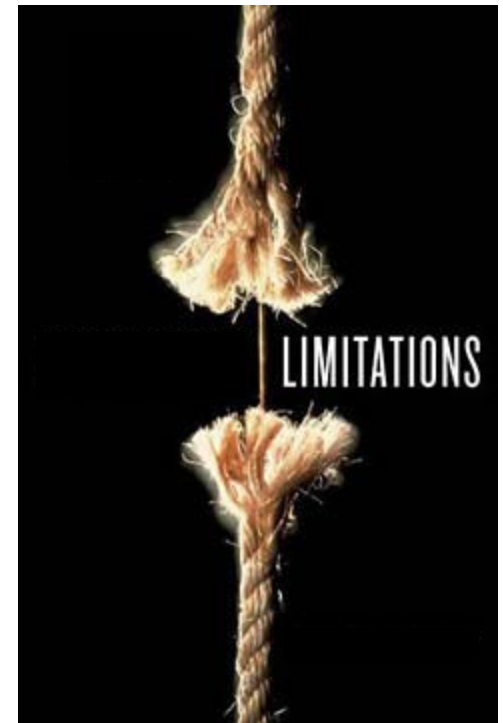


- High prevalence of *H. pylori* infection with elevated frequencies of:
 - Severe Gastritis
 - Gastric atrophy
 - Intestinal metaplasia
- Dietary factors associated with severe gastritis:
 - ↑ Pop
 - ↑ Smoked / salted meat & fish
 - ↑ Fruit & Vegetables
 - ↓ Alcohol
 - ↓ Coffee
 - ↓ Tea

Aklavik *H. pylori* Project

Limitations

- Potential for:
 - Confounding from unadjusted analysis
 - Selection bias
 - ?? “Volunteer bias”
 - Questionnaire answers deviating from truth due to social desirability
- Small sample size



CAN*Help* Working Group

Next Steps...plans to expand

- 6 Yukon First Nations Communities
- 5 Inuvialuit Settlement Region Communities
- International Collaboration
 - Alaska
 - Greenland

