Household Exposures and Prevalence of *Helicobacter pylori* Infection in Western Canadian Arctic Communities

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BACKGROUND

Helicobacter pylori is a spiral-shaped bacterium that infects the stomach lining. It often persists long-term, causing chronic gastritis, and, more rarely, peptic ulcer disease or stomach cancer.

Helicobacter pylori bacterium seen under a microscope
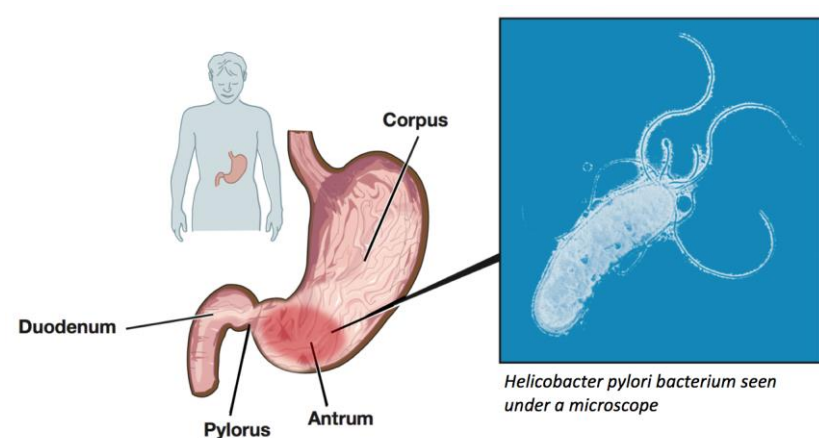
Adapted from Press Release: The 2005 Nobel Prize in Physiology or Medicine. Nobelprize.org

The Canadian North *Helicobacter pylori* (CAN*Help*) Working Group addresses concerns about health risks from *H. pylori* infection, which has a high prevalence in Indigenous Arctic communities.

Community-driven *H. pylori* projects were launched in 4 Arctic Canadian towns during 2007-2012: Aklavik, Tuktoyaktuk, Fort McPherson, and Old Crow

ec.gc.ca
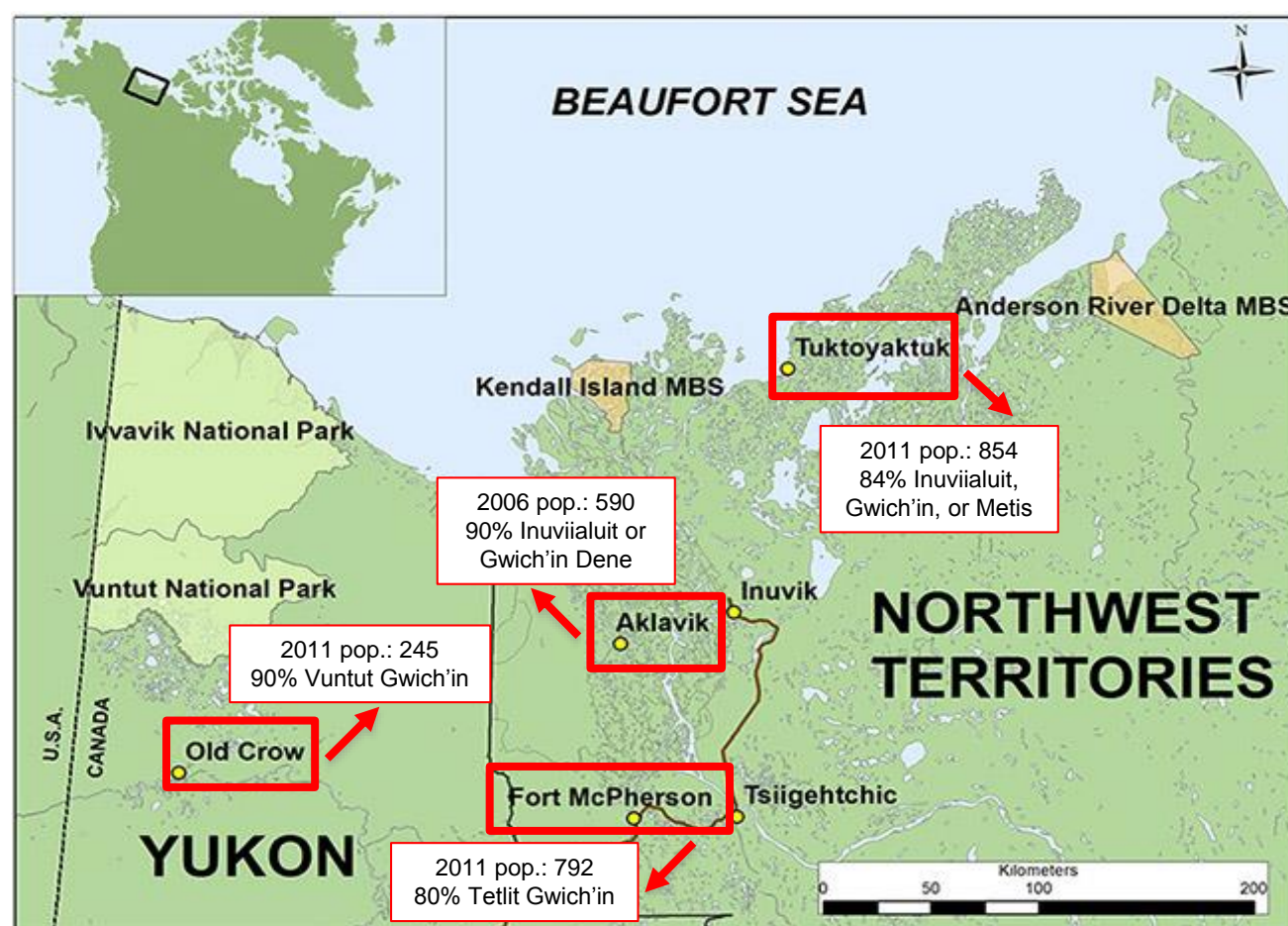
Project components, adapted with guidance from a project planning committee in each community, include interviews of participants, *H. pylori* screening by breath test, endoscopy with gastric biopsy for histopathology and microbiology, treatment, longitudinal follow-up, knowledge exchange, and policy development.

OBJECTIVE

This analysis describes associations of household exposures with *H. pylori* prevalence

METHODS

- Participants classified as *H. pylori* positive by C^{13}–urea breath test or histology

- One representative of each participating household interviewed about relevant household exposures using a structured questionnaire

- Odds ratios (OR) and 95% confidence intervals (95% CI) for associations of household characteristics with individual *H. pylori* status estimated by logistic regression with a random effect for household clustering

- Exposures selected for multivariable model if crude OR <0.67 or >1.50 and p-value <0.2

RESULTS

Participants in the 4 towns came from 412 households containing 1232 members, with 809 household members enrolled in projects.

- 523 participants from 313 households had complete data for all model variables
- 66% *H. pylori* positive
- The model was restricted to Indigenous participants due to low numbers of Non-Indigenous participants (n=46, 30% *H. pylori* positive)

Table 1: Demographic frequencies of 523 participants with complete data

	n	%
Age in years		
0-9	38	7
10-19	69	13
20-29	67	13
30-39	71	14
40-49	97	19
50-59	93	18
60-69	51	10
70+	37	7
Sex		
Male	230	44
Female	293	56
Self-identified ethnicity		
Inuvialuit (Inuit)	212	41
Gwich'in (First Nations)	283	54
Other	27	5

RESULTS

Table 2: Odds ratios for the association of household exposures with individual *H. pylori* status, n=523

	H. pylori +		Unadjusted		Adjusted *	
	n	%	OR	95% CI	OR	95% CI
People per bedroom						
1 or less	144	62	1		1	
1.01-1.5	84	67	1.3	0.71-2.5	1.5	0.71-3.1
1.51-2	84	68	1.5	0.78-2.9	2.1	0.94-4.5
More than 2	31	76	2.0	0.70-5.6	2.6	0.80-8.2
Highest education of a household member						
Less than grade 12	132	71	1		1	
Grade 12	83	69	0.92	0.46-1.8	0.65	0.29-1.4
More than grade 12	128	60	0.56	0.31-0.98	0.52	0.25-1.1
Car ownership						
No	192	71	1		1	
Yes	151	60	0.56	0.34-0.93	0.82	0.43-1.6
Rented public housing						
No	171	59	1		1	
Yes	172	74	2.1	1.3-3.5	1.9	0.96-4.0
Carpeting in the house						
No	290	68	1		1	
Yes	53	54	0.47	0.25-0.88	0.61	0.29-1.3
Years lived at current address						
Less than 5	115	66	1		1	
5-9.9	61	68	1.1	0.53-2.4	1.5	0.65-3.4
10 or more	167	65	0.95	0.54-1.7	1.6	0.78-3.1
Household member(s) spend part of year in one of the provinces						
No	331	67	1		1	
Yes	12	44	0.36	0.13-1.0	0.34	0.11-1.1
**Usual drinking water from local treatment plant or bottled ** **						
Yes	326	67	1		1	
No	17	52	0.50	0.19-1.4	0.59	0.19-1.8
Problems with sewage or water						
No	245	66	1		1	
Freezing pipes	17	47	0.37	0.14-0.98	0.30	0.10-0.85
Other issues	81	71	1.3	0.70-2.5	1.0	0.50-2.0
Presence/evidence of mice in the house						
No	300	65	1		1	
Yes	43	72	1.4	0.62-3.3	1.6	0.64-4.1
Number of animals in/around the house						
None	158	62	1		1	
1-2	160	70	1.6	0.93-2.6	1.6	0.90-2.8
3 or more	25	69	1.7	0.59-5.0	2.9	0.83-10

* Adjusted for age, community, random household effect, and all variables in this table
** Water sources include rivers, lakes, creeks, ponds, melting ice or snow

CONCLUSIONS

The 4 Indigenous Arctic communities included in this analysis are highly homogeneous on household exposures. Focusing on the 5 factors that best capture variation (household education; people per bedroom; home ownership; car ownership; presence of animals), 4 show substantial associations, with adjusted ORs estimating lower *H. pylori* prevalence odds in people living in homes owned by the family, with fewer people per bedroom, one or more members educated beyond high school, and no animals. Data from new community projects in this region will improve statistical precision of this research in future reports.