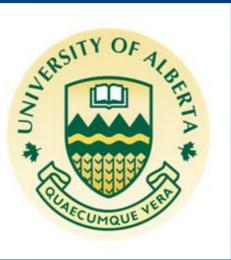


# Community-driven Research on *Helicobacter pylori* infection in Northern Canada



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## Background

*Helicobacter pylori* (*H. pylori*) is a gram-negative bacterium that infects the lining of the stomach and/or duodenum, and has been linked to the development of peptic ulcers and gastric cancer. While a decline in prevalence has been observed in major urban centers across Canada, evidence has highlighted the disproportionately high prevalence in northern Aboriginal populations. This has instigated growing concern as the observed frequencies of *H. pylori*-related disease and treatment failure are also higher than those observed across southern Canada. In response to concerns brought forth by community leaders and health care providers, the Canadian North *Helicobacter pylori* (CANHelp) Working Group was established in 2006, with three main objectives:

1. To obtain representative data from diverse settings in northern Canada for informing regional public health strategies for reducing risks from *H. pylori*
2. To conduct a policy analysis to identify cost-effective *H. pylori* management strategies that are ethically, economically and culturally appropriate for northern communities
3. To develop knowledge exchange strategies that help community members understand *H. pylori* health risks as well as available solutions and unsolved challenges for reducing these risks

## Methods

Each community project is designed in collaboration with a community planning committee and typically includes:

1. Screening for *H. pylori* by 13C-Urea Breath Test (UBT)
2. Assessment of medical history and socio-environmental exposures at both the individual and household level, through questionnaire-based interviews
3. Upper endoscopy and biopsy collection, to characterize histopathology in relation to *H. pylori* infection and estimate prevalence of strains with antibiotic resistance and virulence factors.
4. Treatment trial to assess the effectiveness of anti-*H. pylori* therapies
5. Knowledge exchange activities

## Community Projects

### The Aklavik *H. pylori* Project    The Old Crow *H. pylori* Project    Inuvialuit Settlement Region *H. pylori* Project (Tuktoyaktuk)

Feb 2007	Community approval obtained
May 2007	Community input workshops initiated
Sept 2007	NWT research license obtained
Nov 2007	Fieldwork initiated
Feb 2008	Endoscopy component completed; microbiology initiated
Apr 2008	Pathology results reported to participants
Nov 2008	Treatment trial initiated
Ongoing	Incidence/re-infection study Knowledge exchange Data analysis and presentation

Aklavik, Northwest Territories



- 2006 Population: 590
- 90% Inuvialuit (Inuit) or Gwich'in Dene (First Nation)
- Accessed by air, water or winter ice-road

Jul 2008	Presentation given at Biennial Gwitchin Gathering in Old Crow at the request of the local MLA
Aug 2008	Community approval obtained
Sept 2009	Local staff hired
May & Aug 2010	Planning workshops held with local committee
Sept 2010	Presentation by local committee at VGFN GA
Nov 2010-Feb 2011	Breath tests & surveys
Jan 2012	Endoscopy and treatment
Ongoing	Analysis and dissemination of pathology & treatment results

Old Crow, Yukon Territory



- 2006 Population: 250
- 90% First Nation (Yuntut Gwitch'in)
- Accessed only by air

Jan 2010	Inuvialuit Regional Corporation requested expansion of research to five other Inuvialuit Settlement Region communities
Jan 2010-Feb 2011	Development of a Memorandum of Agreement between the IRC and University of Alberta
Feb 2011	Memorandum of Agreement finalized
Feb & Mar 2011	Pilot Project work initiated in Tuktoyaktuk
Mar & Apr 2012	Breath tests and surveys
Ongoing	Data analysis Planning for endoscopy and treatment

Tuktoyaktuk, Northwest Territories



- 2006 Population: 870
- 84% Inuvialuit, First Nation or Metis
- Accessed by air, water or winter ice-road

## Selected Results

	Aklavik <i>H. pylori</i> Project	Old Crow <i>H. pylori</i> Project	ISR <i>H. pylori</i> Project (Tuktoyaktuk)
Signed to participate	379	195	100
Urea breath test results (# with classifiable result)	333 (313)	187 (179)	86 (80)
Clinical questionnaires	345	134	86
Risk factor questionnaires	Household	165	83
	Individual	286	125
Consented to endoscopy	200	65	-
Completed endoscopy with biopsies	194	63	-
Consented to treatment trial	111	62	-

Table 1: Participation

Apparent inflammation	Aklavik	
	Condition	Prevalence (%)
Gastritis	Gastric	13.8%
	Duodenitis	6.7%
Erosions	Gastric	6.2%
	Duodenal	0.5%
Ulcer	Gastric	3.1%
	Duodenal	0
Cancer		0

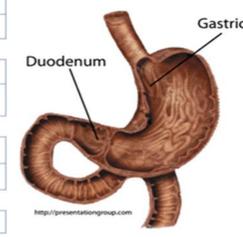


Table 3: Frequency of digestive conditions as seen through the scope in Aklavik

Project	Prevalence by 13C-UBT
Aklavik <i>H. pylori</i> Project	62% (193/313)
Old Crow <i>H. pylori</i> Project	72% (128/179)
ISR <i>H. pylori</i> Project (Tuktoyaktuk)	60% (48/80)

Table 2: Prevalence of *H. pylori* infection

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

Table 4: Frequency of inflammation, atrophy and metaplasia observed in the 194 individuals with biopsies in Aklavik

## Discussion

A high prevalence of *H. pylori* infection has been observed in all three communities (Table 2). Further research in Aklavik shows high frequencies of *H. pylori*-related stomach conditions. Lesions seen predominantly in the gastric region are associated with the development of gastric cancer, while lesions seen in the duodenal region are associated with the development of peptic ulcers. Therefore, the high ratio of gastric:duodenal lesions seen in Aklavik is characteristic of a population at an increased risk of gastric cancer (Table 3). This research also revealed a high prevalence of severe gastric inflammation, and precancerous conditions including atrophy (damaged stomach glands) and intestinal metaplasia (abnormal cells replace normal stomach tissue)(Table 4).

To provide a context for these results, we compared them with data from the University of Alberta hospital. Of *H. pylori*-positive patients, 282 had gastric inflammation, 40.4% were graded as mild, 55.0% were graded mild-moderate or moderate and only 4.6% were graded as moderate-severe or severe. Among 401 *H. pylori* positive patients, 2.2% had atrophy and 15% had intestinal metaplasia. Therefore, relative to the patient population in Edmonton, *H. pylori*-positive residents in Aklavik have a much higher prevalence of severe gastric inflammation and gastric atrophy (Table 4).

## Preliminary Conclusions and Next Steps

- High prevalence of *H. pylori* infection has been observed in Aklavik, Old Crow and Tuktoyaktuk
- High frequencies of *H. pylori*-related stomach disorders in Aklavik indicate that community concerns are warranted
- The CANHelp Working Group aims to help identify strategies for reducing the *H. pylori*-associated disease burden