

# Community-driven research on *Helicobacter pylori* infection in the Canadian Arctic: the Old Crow *H. pylori* Project

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**H***elicobacter pylori* infection has been a growing health concern in northern Canada due to the awareness of its link to stomach cancer. Both *H. pylori* prevalence and stomach cancer rates are elevated in Arctic Aboriginal populations (1). This project arose as an extension of the Canadian North *Helicobacter pylori* (CANHelp) Working Group's pilot project, the Aklavik *H. pylori* Project. The CANHelp Working Group links researchers from the University of Alberta with northern community leaders and health officials. The initial *H. pylori* project was established in Aklavik, Northwest Territories in 2007 in response to concerns about health risks from *H. pylori* raised by community leaders and their health care providers. The following year, a Member of the Yukon Legislative Assembly (MLA) for the Vuntut Gwitchin First Nation contacted the CANHelp Working Group to inquire about developing a local *H. pylori* research project in response to similar health concerns raised by residents of Old Crow, Yukon (population: 250, ~90% Aboriginal). Later that year, the Vuntut Gwitchin General Assembly passed by consensus a resolution that the University of Alberta team carry out *H. pylori* research in Old Crow for citizens who wished to participate. As a result, the CANHelp Working Group established the Old Crow *H. pylori* Project in November 2010.

## Purpose

The Old Crow *H. pylori* Project aims to investigate the disease burden related to *H. pylori* infection and identify strategies for reducing health-related risks. This project was designed and conducted in collaboration with a local

planning committee and includes 6 main components: surveys of health and socio-environmental factors, urea breath test (UBT) screening for *H. pylori* infection, upper gastrointestinal endoscopy, treatment, knowledge exchange and policy development.

## Methods

During 2010 and 2011, all residents of Old Crow were invited to be screened for *H. pylori* infection by UBT and interviewed using structured questionnaires to ascertain health factors, individual-level socio-environmental factors and household-level environmental factors. All residents of Old Crow who gave informed consent were eligible. Parental consent and child's assent were obtained for participants <17 years of age.

In 2012, we invited all residents of Old Crow to undergo endoscopy with gastric biopsy, in temporary endoscopy units in the Old Crow Health Centre. A team of gastroenterologists, endoscopy nurses, service aids and an endoscopy technical support specialist travelled to Old Crow for 1 week to perform the procedures. This component aimed to characterise prevalent gastric disease and bacterial strains among *H. pylori*-positive project participants. Participants ≥15 years of age could also enrol in a treatment trial comparing 2 of the best available *H. pylori* therapies. Both therapies were 10 days long: sequential therapy consisted of a proton pump inhibitor and amoxicillin for days 1–5, followed by a proton pump inhibitor, clarithromycin and metronidazole for days 6–10; quadruple therapy consisted of a proton pump inhibitor with bismuth, metronidazole and tetracycline for days 1–10.

**Table I.** Pathology findings (Sydney classification) from 63 Old Crow *H. pylori* Project participants

	All participants (n = 63)	All <i>H. pylori</i> -positive participants (n = 57)
Inflammation		
Mild (%)	5	3
Moderate (%)	29	32
Severe (%)	59	65
Atrophy (%)	67	74
Intestinal	33	35
metaplasia (%)		

## Results

From November 2010 to August 2012, 199 residents consented to participate in the Old Crow *H. pylori* Project; 50% were male aged 1–88 years. Of the 199 participants, 145 completed questionnaire-based interviews, 192 underwent a UBT (UBT positivity = 68%), 65 consented to upper gastrointestinal endoscopy, 63 had biopsies collected for culture and histopathology, 86 consented to treatment and 70 enrolled in the treatment trial.

Gastric biopsies were examined at the University of Alberta and analysed to estimate the frequency of endoscopically visible gastric abnormalities, pathological disease outcomes and *H. pylori* strains resistant to antibiotics. Pathologic findings from 63 endoscopy participants with biopsies are given in Table I.

Antibiotic resistance frequencies from 53 participants with successful culture were as follows: 42% for metronidazole, 25% for clarithromycin, 8% for ciprofloxacin, 2% (borderline) for tetracycline and 0 for amoxicillin, nitrofurantoin and rifampicin.

Treatment trial participants also underwent a follow-up UBT to determine the success of each therapy, for which preliminary results are available. For those prescribed sequential therapy (n = 20), treatment success was 60% (12/20; 95% confidence interval 36–81%), while for those given quadruple therapy (n = 20), treatment success was 92% (17/20; 95% confidence interval 62–97%). Despite the small numbers with a post-test, this

difference is large enough to demonstrate a clear superiority of quadruple therapy.

## Discussion

These results contribute to evidence demonstrating that communities in northern Canada are disproportionately affected by *H. pylori* infection, considering the high prevalence observed in Old Crow relative to the prevalence across southern Canada, typically around 30% (2). The frequency of severe inflammation among project participants in Old Crow is also uncommonly high. *H. pylori* infection, in nearly any population, is almost always accompanied by chronic gastritis, which is usually mild and asymptomatic (3). In contrast, high prevalence of severe inflammation is more characteristic of populations at high risk of stomach cancer. The success of the Old Crow *H. pylori* Project, as demonstrated by the high level of participation, is the result of close partnership with the local planning committee and ongoing community engagement.

## Conclusion

Findings from the Old Crow *H. pylori* Project show that community concerns over risks from *H. pylori* infection are well placed. The effective collaboration with community members and health officials strengthens the CANHelp Working Group's ability to effectively address community concerns about this infection.

## References

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