



Old Crow *H. pylori* Project Progress Report – August 2017

The Old Crow *H. pylori* Project arose from a collaborative effort of the Canadian North *Helicobacter pylori* (CANHelp) Working Group to investigate *H. pylori* infection in northern Canada with goals of addressing community concerns, improving clinical management, and reducing health risks.

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When you see a *, please refer to p.16 for a definition of the term

Old Crow *H. pylori* Project Timeline

July 2008 - September 2010

- Initial project planning

December 2010 - February 2011

- Recruitment, *H. pylori** screening* by breath test, questionnaires (health/participant/household)

January 2012

- Endoscopy* and treatment

Feb 2012 - Mar 2012

- Pathology*

March 2012

- Pathology results reported to participants

June 2017

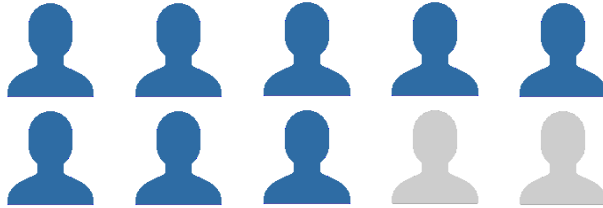
- Long-term follow-up* endoscopy

Ongoing

- Research results reported to community
- Long-term follow-up
- Knowledge exchange activities

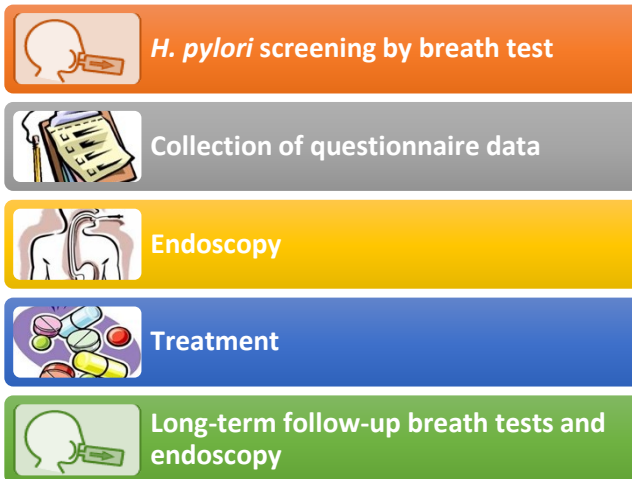
Overview of the Findings

What has been done so far?



Around **80%**
of Old Crow residents
have participated
in this project
(population ~250)

Completed components of the project include



What remains to be done?

- Knowledge exchange activities : ongoing
- Analysis of questionnaires data : ongoing
- Reporting research results back to the community: ongoing

What have we learned?

What were the scope test results?

Two-thirds of those who had a scope test and whose stomach biopsies* revealed *H. pylori**, had severe chronic inflammation of the stomach.

Does the quadruple therapy work better?

The quadruple (4-drug) therapy seems to work better than the conventional 3-drug therapy or sequential therapy, although we need treatment follow-up data from more participants to be more certain about this. The 4-drug therapy regimen is complex and may be difficult for some people to take as prescribed.

Available treatments for eliminating *H. pylori** infection are burdensome and more research is needed to find out how to make the treatments easier to take.

How many remained free from *H. pylori*?

Most people who were initially free from *H. pylori** infection or successfully treated for the infection remained *H. pylori*-free for 2 years or longer.

How many tested positive for *H. pylori*?

66% of participants screened by breath test were positive for *H. pylori** infection.

Why some tested negative, then positive after few years?

Some of the people who tested negative after treatment, tested positive few years later.

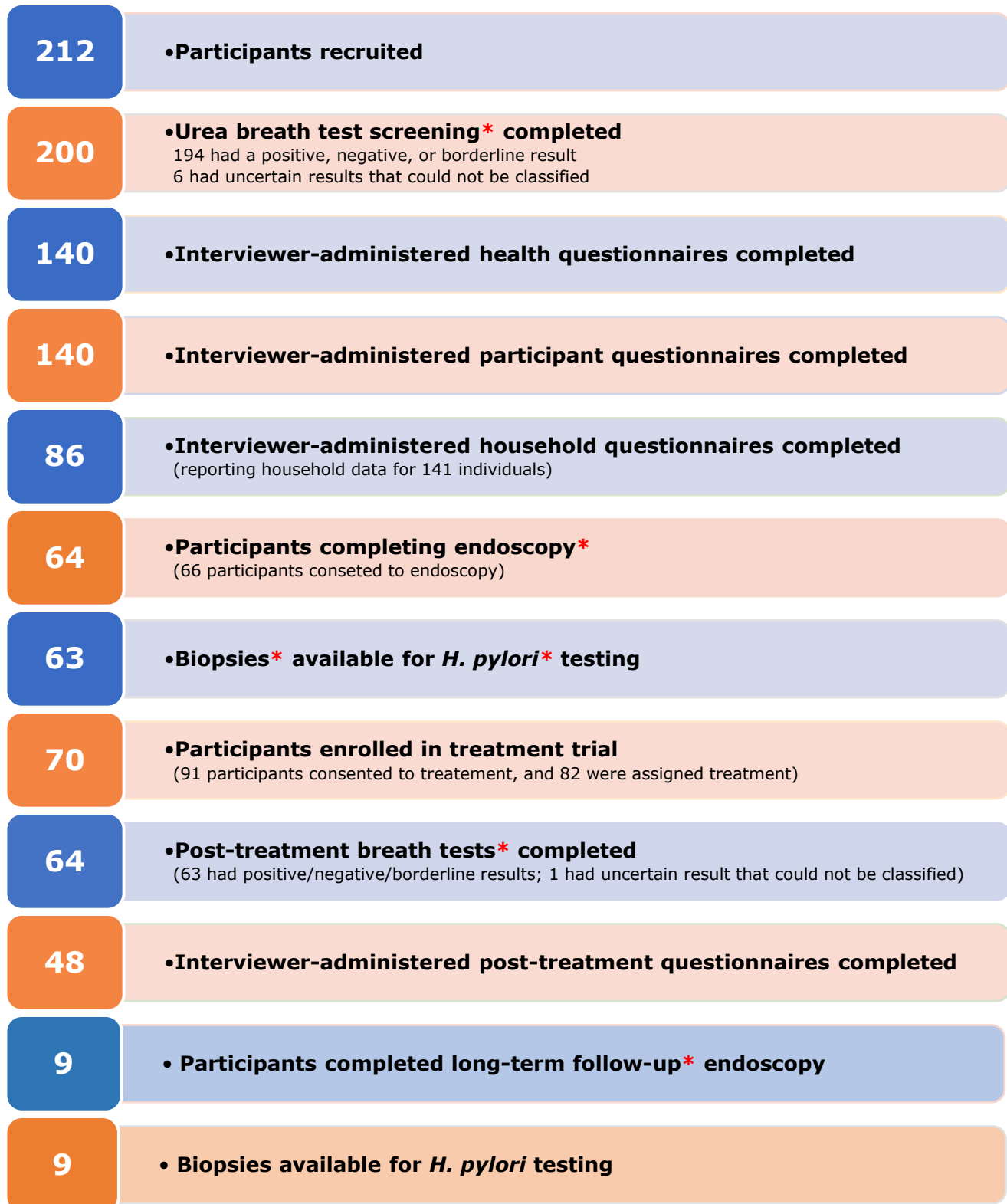
The reasons why this might happen include:

- *After-treatment test results were false negative and they still had the infection.*
- *H. pylori** reinfection.

How do we get *H. pylori*?

The CANHelp* Working Group research so far has not pinpointed an environmental source of *H. pylori** in Old Crow or other communities where *H. pylori* projects are being carried out; this is consistent with findings of research around the world: the evidence suggests that most people with *H. pylori* infection get it from direct contact with a person who has the infection.

Participation and Data Counts



Findings to Date

Proportion positive* on breath test	66% (128/193)
Endoscopic* findings from 63 Old Crow residents	
Gastritis*	13% (8/63)
Gastric* erosions	3% (2/63)
Gastric ulcer	2% (1/63)
Duodenitis*	5% (3/63)
Duodenal* erosions	0
Duodenal ulcer	5% (3/63)
Esophagitis	3% (2/63)
Barrett's esophagus	3% (2/63)
Pathology* findings (Sydney classification) from 63 Old Crow residents	
Chronic gastritis	92% (58/63)
Severe	59% (37/63)
Moderate	29% (18/63)
Mild	5% (3/63)
Atrophic* changes	67% (42/63)
Intestinal metaplasia*	33% (21/63)
<i>H. pylori</i>* positive	90% (57/63)
Chronic gastritis	100% (57/57)
• Severe gastritis	• 65% (37/57)
• Moderate gastritis	• 32% (18/57)
• Mild gastritis	• 4% (2/57)
Atrophic changes	74% (42/57)
Intestinal metaplasia	35% (20/57)
Microbiology* findings from 63 Old Crow residents	
Culture* positive	89% (56/63)
Antibiotic susceptibility* tests performed on 53 isolates from culture	
Resistance* to any antibiotics tested	51% (27/53)
• Metronidazole:	• 42% (22/53)
• Clarithromycin	• 25% (13/53)
• Ciprofloxacin	• 8% (4/53)
• Tetracycline: 2% (1/53)	• 2% (1/53)
• Amoxicillin, nitrofurantoin, rifampicin	• 0
Resistance to multiple (2 or 3) antibiotics	21% (11/53)
• Metronidazole and Clarithromycin	• 15% (8/53)
• Metronidazole, Clarithromycin and Ciprofloxacin	• 4% (2/53)
Treatment success among 52 treatment trial participants with a post-treatment breath test*	
Sequential therapy	64% (16/25)
Quadruple therapy	89% (24/27)

The breath test prevalence (proportion positive) of 66% is a better reflection of the prevalence of *H. pylori** infection in Old Crow than the 90% positive by histopathology* (or the 89% positive by culture*) among those with biopsies* from endoscopy*. Since residents who were informed of positive breath test results were motivated to undergo endoscopy, there are proportionally more positives in the group with biopsies.

Summary of Project Activities

To categorize activities, we will be using the following symbols:



Community visit



Data collection



Dissemination and knowledge exchange



Physician's visit



Planning

On-going Project Activities

1.1 Upcoming Activities

- Reporting of results of the long-term follow-up endoscopy* back to the community will start in fall-winter 2017.
- Managing Director Janis Geary will travel to Old Crow in fall 2017 to meet with the planning committee to host an end-of-grant workshop. The workshop will discuss strategies and plans before the funding for in-community activities ends. Janis and Data Dissemination Lead Emily Walker will also be hosting a community open-house to exchange knowledge with the residents.
- Emily will be sharing the results of her dissertation research with participants and the community members. Emily's project aims to investigate the hypothesis that chronic ingestion of low doses of mercury through fish consumption increases the risk of severe gastritis* and precancerous gastric* lesions among *H. pylori*-positive* residents of Arctic communities.
- MSc student Taylor Cromarty will propose her dissertation project to the Old Crow Planning Committee. Taylor's work will investigate the relationship between food insecurity and the prevalence of *H. pylori**-induced disease. If the committee and community are interested in her work, Taylor will begin consultation with the Old Crow *H. pylori* Planning Committee in September 2017 to obtain community input on a food security questionnaire. She will begin data collection in September 2017, which will continue through to December 2017.

1.2 Recent Activities – Year 2017

June 2017: Long-Term Follow-Up Endoscopy*



Community Engagement Lead Ali Assi, Research Management Lead Hsiu-Ju Chang, and Northern Health Research Consultant Kathy Gilmore held the Old Crow *H. pylori* Project's long-term follow-up endoscopy* component at the Inuvik Hospital on June 2, 2017. They were accompanied by a team of two gastroenterologists*, including CANHelp* Working Group's Lead Gastroenterologist* Dr. Sander van Zanten, and local surgeon at the Inuvik Regional Hospital Dr. Ryan Falk. One Alberta Health Services (AHS) endoscopy nurse, two AHS processing technicians, and one Vantage/Fuji Canada representative also travelled to Inuvik with the team.

On June 2, 2017, 9 participants from Old Crow enrolled for the long-term follow-up endoscopy* at the Inuvik Hospital. The program provided a round trip charter flights for the participants. Gastric* biopsies* for histopathology* and microbiology* were obtained from the 9 participants. No adverse events occurred during the endoscopy procedures, and a post-endoscopy patient satisfaction questionnaire indicated that most of those scoped tolerated the procedure well and would be willing to have it in the future, if needed. The biopsies were sent back to the University of Alberta to be processed for histopathology and culture*.

Previous Project Activities

2.1 Years 2008 to 2010

July 2008 to September 2010: Initial Stages of Research Planning



In July 2008, Lead Investigator Karen Goodman, Aklavik Health Centre Nurse in Charge Rachel Munday, and Project Manager Janis Geary (previously Huntington) travelled to Old Crow and gave a presentation to the community at the Bi-annual Gwitchin about the Aklavik *H. pylori* Project.



A unanimous resolution to bring the research to the community was passed at the Vuntut Gwitchin (VGFN) General Assembly on August 20, 2008.



After establishing the community was interested, the University of Alberta research team had many emails and telephone conversations with territorial partners to establish how *H. pylori** research would be carried out in Old Crow and Yukon.



On September 15, 2009, the team hired a person to conduct community outreach in Old Crow to inform residents face-to-face about development of the project, collect questions people might have, and estimate the level of interest in the community.



During May 5 to 6, 2010, Managing Director Janis Geary led input workshops with the planning committee to develop research plans for the community. During July 31 to August 1, 2010, Field Research Coordinator Laura McAlpine (previously Aplin) and Janis Geary led a second planning workshop in the community.



In September 2010, the Old Crow *H. pylori* Planning Committee presented a progress report to the Vuntut Gwitchin (VGFN) General Assembly.

2.2 Year 2011

December 2010 to February 2011: First Wave of Data Collection



Initial recruitment efforts were met with a positive response from the community. Most residents contacted indicated a desire to participate. The biggest challenge was getting potential participants to follow through on scheduled appointments to complete the informed consents, breath tests, and questionnaires.



Field Research Coordinator Laura McAlpine and Community Coordinator Christine Creyke initiated data collection in Old Crow in December 2010. Recruitment of participants took place by telephone and door-to-door outreach from December 2010 to February 2011. During this time, informed consent was obtained and participants were screened for *H. pylori** infection by breath test. Project staff also interviewed participants using participant (individual and household) risk factor questionnaires and health questionnaires. The coordinators created a phone list and map of the community to track coverage of households. Regular radio announcements on the Yukon radio station CHON FM were used to encourage participation throughout the recruitment and data collection processes and to respond to commonly asked questions. In December 2010, the first set of breath test results were reported to project participants. The last group of breath-test screened participants received their test results in March 2011.



On February 5, 2011, Laura McAlpine held a community information session to present a preliminary summary of breath test screening* results.

June to November 2011: Dissemination Activities and Physician Visit



On June 15, 2011, staff member Christine Creyke gave a presentation at a community meeting. On August 7, 2011, Katelyn Friendship gave a project update at the Vuntut Gwitchin (VGFN) General Assembly.



Lead Gastroenterologist* Dr. Sander van Zanten visited Old Crow during August 8 to 11, 2011 to meet with residents who were concerned about their breath test results and/or wanted more information about *H. pylori**. Throughout his visit, he met with community members one-on-one to answer their questions and address their concerns.



On August 9, 2011, the Old Crow *H. pylori* Project hosted a community dinner. At this dinner, Dr. van Zanten spoke about what the project had accomplished so far and the upcoming endoscopy* and treatment phases. He also answered questions posed by community members.



On November 30, 2011, Community Projects Lead Laura McAlpine and Research Management Lead Hsiu-Ju Chang held a community information session in Old Crow to provide information about the upcoming endoscopy* component of the project.

2.3 Year 2012

January 2012: Endoscopy* and Treatment Trial



On January 19, 2012, the day before initiating the endoscopy* component of the project, Old Crow *H. pylori* Project planning committee members, Lead Gastroenterologist* Dr. Sander van Zanten, Community Projects Lead Laura McAlpine, Data Dissemination Lead Emily Walker (previously Hastings), Knowledge Translation Lead Amy Colquhoun, and endoscopy team members held a community information session.



The endoscopy* and treatment phases of the Old Crow *H. pylori* Project took place from Friday, January 20 through Monday, January 23, 2012. Participants were primarily recruited through sign-up sheets posted at the Vuntut Gwitchin First Nation Main Reception, the John Tizya Centre, and the Old Crow Health Centre.



A community information session and meet-and-greet with the endoscopy* and treatment team was held at the Old Crow Community Hall on Thursday, January 19. Dr. Sander van Zanten gave a short presentation on endoscopy and treatment, and community members posed questions. Overall, the event was well attended and the audience was very enthusiastic about the upcoming components.



For the endoscopy* phase of the Old Crow project, gastroenterologists* Amy Morse, John Morse, and Sander van Zanten performed unsedated transoral gastrointestinal endoscopy at the Old Crow Health Centre in temporary endoscopy units equipped with rented endoscopy towers and gastroscopes, with technical support from Olympus Canada. Experienced Alberta Health Services endoscopy nurses and service workers assisted the gastroenterologists. Endoscopy protocols developed for the Aklavik *H. pylori* Project were adapted for use in Old Crow. Study participants 15+ years of age who wished to undergo endoscopy were eligible, as were children whose parents request that they be included, at the gastroenterologist's discretion. Over 4 days, the team performed 64 endoscopies; 1 participant attempted but was unable to complete the procedure, and biopsies* for culture* and histopathology* were obtained from 63. No adverse effects occurred during the endoscopy



procedures. Of the 63 individuals who completed the procedure, 57 completed an interviewer-administered post-endoscopy satisfaction survey, with 96% indicating they would be willing to have the procedure again if needed.

During this time, for participants who consented to treatment, gastroenterologists* Amy Morse, John Morse, and Sander van Zanten evaluated eligibility for the project treatment trial and oversaw the administration of therapy. Participants who were not eligible for the trial were prescribed treatment outside the trial protocol as appropriate. Consent for the treatment trial was obtained from 77 participants and 69 received medications, 61 as part of the trial, which was designed to compare sequential and quadruple therapies, two of the best available treatment regimens for eliminating *H. pylori** infection. The duration of both therapies was 10 days. 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. Participation in the treatment trial has remained open; to date, 91 participants have consented to treatment and 70 have participated in the trial.



Project staff Emily Walker and Laura McAlpine coordinated treatment follow-up activities at the Old Crow Health Centre. This included phone reminders to participants during the course of treatment as well as collection of bubble packs to count unused medication and interviews of participants using a post-therapy questionnaire.

March 2012: Pathology* Results Reporting and Additional Data Collection



Safwat Girgis, team Pathologist*, completed pathologic assessment of the gastric* tissue biopsies* in March 2012.



Community Projects Lead Laura McAlpine returned to Old Crow during March 26 to 30, 2012 to report the pathology* findings to endoscopy* participants individually. Old Crow Health Centre staff assisted gastroenterologists* Sander van Zanten and Amy Morse with making arrangements for any participants who required a follow-up endoscopy.



During her visit in March 2012, Laura also collected remaining bubble packs, administered additional post-therapy questionnaires, and carried out follow-up breath testing with participants who had completed treatment, at least 4 weeks prior, to see if their therapy was successful. Those who still tested positive by breath test were prescribed a second treatment by one of the project physicians. At least 2 weeks before the visit, community members were informed of the upcoming trip through flyers and radio announcements on CHON FM's Cool Country Morning and Vuntut Gwich'in Gijjik Nekall radio programs.

April 2012: Chart Reviews



Fieldwork Coordinator Ashley Wynne carried out chart reviews at the Old Crow Health Center in April 2012. The chart review collected information for each participant for the 5 years preceding project enrolment on digestive complaints as well as testing and treatment for *H. pylori** infection. The chart review information will enhance the completeness of the health questionnaires and help the project better estimate the burden of digestive diseases among residents of Old Crow.

**July 2012: Antibiotic Susceptibility* Testing**

Lead Microbiologist* Monika Keelan's microbiology* lab processed biopsies* for culture*. Preliminary identification of *H. pylori** was performed with biochemical testing. Antibiotic susceptibility* testing was finalized July 2012. The results of the antibiotic susceptibility analyses were taken into account for any treatment participants who required a second-line therapy for *H. pylori*.

**August 2012: Treatment Follow-Up and Physician's Visit**

Community Projects Lead Laura McAlpine travelled to Old Crow again during August 16 to 24, 2012 to collect remaining bubble packs and administer additional post-therapy questionnaires. She also carried out follow-up breath testing with participants who had completed treatment to see if their therapy was successful.



Sander van Zanten, Lead Gastroenterologist*, visited Old Crow to host a community information session and dinner at the Old Crow Community Hall on August 16, 2012. At this forum, he provided an update on project progress and shared preliminary findings from the endoscopy* and treatment components. Overall, the information session was well attended, particularly by elders in the community.

2.4 Years 2013 and 2014

**March 2013: Dissemination Activity**

Emily Walker, CANHelp* Data Dissemination Lead and PhD student, travelled to Old Crow from March 25 to 31, 2013 to present results from her MSc thesis research on environmental exposures and transmission of *H. pylori**. Emily held a presentation for community members who were interested in hearing about updates from the project and findings to date. The following is a summary of results presented to community members:

Results of Emily's indicate that the infection does not occur more frequently in individuals exposed to environmental sources that could potentially be contaminated with the bacteria, relative to participants who were not exposed to these sources. This includes environmental exposures such as untreated water, sewage, cats and dogs. Since contamination of local water sources with the bacteria is a commonly expressed concern in communities across the north, continued analysis of the role of environmental exposures in transmission of *H. pylori** will include testing water samples from northern communities to determine whether the bacteria are present and able to survive in water.

Preliminary analysis of the effect of exposure to mice indicates that prevalence of *H. pylori** infection is higher in individuals who reported having mice in their home, relative to those who are not exposed to mice. Further research is needed to fully understand whether there is a potential role for mice in transmission of *H. pylori*. It should be noted that a very small proportion of participants reported exposure to mice. Therefore, if it is possible for mice to transmit the bacteria, it is not likely that this transmission route explains the high prevalence observed in northern communities.



During her visit in March 2013, Emily completed follow-up breath tests with participants who had received treatment through the project to ensure that the infection was cleared. Individuals were then notified of their infection status and arrangements for further care were made for participants who were still positive.

March 2014: Dissemination Activities



In March 2014, Community Projects Lead Laura McAlpine travelled to Old Crow to present two public information sessions in the community. She also updated the residents on the progress of Old Crow *H. pylori* Project, and potential future research activities.



June 2014: Key Informant Interviews and Chart Review – Antibiotic Use

Data Dissemination Lead and PhD student Emily Walker visited Old Crow in June 2014 to conduct semi-structured qualitative interviews with key informants from the community to identify specific research questions that address predominantly-expressed community concerns about the health effects of regular exposure to environmental contaminants. Emily will use this information, along with information from similar interviews conducted in other communities, to focus her PhD dissertation work. She completed 7 interviews in Old Crow, which were recorded, transcribed and analyzed to identify major themes.



MSc Student Kate Williams visited Old Crow in June 2014 to collect antibiotic exposure histories from medical charts of participants who had *H. pylori** cultured from stomach biopsies* and tested for antibiotic susceptibility* and/or were treated and completed a post-treatment breath test*. For each of these participants, information was collected for the five-year period before project enrolment on: demographic factors; frequency of antibiotic prescriptions; type of antibiotics prescribed; and reason for prescription. Kate will use this information for her MSc thesis, to estimate associations of antibiotic exposures on two health outcomes: 1) the prevalence of antibiotic-resistant* *H. pylori* infection and 2) success of treatment to eliminate *H. pylori* infection.



August 2014: Dissemination Activity

Laura McAlpine and Emily Walker travelled to Old Crow in August 2014 to hold an information booth at the 2014 Biennial Gwich'in Gathering. Community members were informed of the current status of the Old Crow *H. pylori* Project and the future directions of the research program.

2.5 Years 2015 and 2016



February to October 2015: Long-Term Follow-Up* Breath Tests and Planning of Long-Term Follow-Up Endoscopy*

Community Projects Lead Laura McAlpine and student intern Alice Wang travelled to Old Crow to launch follow-up breath sample collection in the community. 55 eligible participants were enrolled in the longitudinal follow-up of the Old Crow *H. pylori* Project.



Acting Community Projects Lead Ali Assi and Collaborative Member and Lead Gastroenterologist Sander van Zanten travelled to Old Crow in October 2015, to meet with the Old Crow *H. pylori* Project Planning Committee. They informed the committee members about updates and findings related to the Old Crow *H. pylori* Project follow-up breath tests, as well as discussed plans for follow-up endoscopy* for the project participants.



January 2016: Dissemination Activities and Long-Term Follow-Up* Breath Tests



Acting Community Projects Lead Ali Assi, travelled to Old Crow with Collaborative Member and Lead Gastroenterologist* Dr. Sander van Zanten in January 2016.



During their visit, Ali and Sander met with the Old Crow *H. pylori* Project planning committee to discuss future plans for follow-up endoscopy* for Old Crow *H. pylori* Project participants.



Ali Assi and Sander van Zanten also presented a report on the follow-up breath test screening* that took place in 2015 in Old Crow; 32 community members attended the community information session held on January 27 to learn about the findings to date. Ali and Sander also shared new findings with the Old Crow *H. pylori* Project planning committee.



During his visit in January 2016, Ali offered breath testing to project participants to continue the long-term follow-up* activities initiated by student intern Alice Wang in Old Crow from February through April 2015. The aim of the follow-up breath testing is to find out if participants who were successfully treated remain free of *H. pylori** infection. Alice and Ali also offered repeat testing to participants who were *H. pylori*-negative when they were first tested as part of the project to see if they are still *H. pylori*-negative.

February to March 2016: Consultation Session and Planning of Knowledge Exchange Activities



Student intern Skye Russell and Acting Community Projects Lead Ali Assi visited Old Crow during February 15-17, 2016. Skye and Ali facilitated a community consultation session regarding knowledge exchange activities in Old Crow. The consultation session took place at the community hall and included 10 participants representing different community groups. The goal of the Old Crow community consultation session was first, to identify the main concerns and interests of the community pertaining to *H. pylori** infection and CANHelp* research activities; and second, to plan knowledge exchange activities that would communicate this information to the community in meaningful and effective ways. During his visit, Ali offered breath testing to project participants to continue the long-term follow-up* activities.

In March 2016, Skye Russell drafted a report on the consultation session held in February based on which she designed and implemented dissemination resources for the community.

June 2016: Knowledge Exchange Activities



Skye Russell, Ali Assi, Northern Health Research Consultant Kathy Gilmore, and Yukon Community Partnership Coordinator Reanna Mohamed visited Old Crow during June 17-19, 2016 for a follow-up community consultation session regarding knowledge exchange activities that were developed by the team based on the feedback from the February 2016 session.



Skye, Ali, Kathy and Reanna facilitated interactive knowledge exchange activities designed by Skye and based on the outcomes of the community consultation session that took place in February 2016. Thirteen community members completed the activities and filled the pre- and post-activities questionnaires designed to measure the impact of the activities.



November 2016: Planning of Dissemination of Results

Ali Assi held a teleconference in November 2016 with Collaborative Member Brendan Hanley, Yukon Chief Medical Officer of Health, and Michelle Belmont, Health and Social Director in Old Crow to discuss the hair mercury study and plans for returning the results to participants.

Definitions and Acronyms

Antibiotic resistance	Ability of a microorganism to withstand the effects of an antibiotic
Antibiotic susceptibility	Susceptibility/Sensitivity of bacteria to antibiotics
Atrophy	Wasting away and breakdown
Biopsy, of stomach	A tiny piece of stomach taken during endoscopy
CANHelp	Canadian North <i>Helicobacter pylori</i>
Culture	As bacteria are living organisms, they can be made to grow in laboratories under the right conditions. A culture test provides conditions that encourages bacteria to grow
Duodenal	Related to the duodenum (small intestine)
Duodenitis	Inflammation of the duodenum (small intestine)
Endoscopy, of stomach	Using a scope/tube to look inside the stomach
Gastric	Related to the stomach
Gastritis	Inflammation of the lining of stomach
Gastroenterologist	Stomach specialist
Histopathology	A test where biopsy material are made into slides so a pathologist can examine them under a microscope to see if <i>H. pylori</i> organisms are visible
<i>H. pylori</i>	<i>Helicobacter pylori</i>
Long-term follow-up	Includes both breath tests and endoscopy. It is done few years after treatment to estimate the incidence rate of <i>H. pylori</i> infection, and to examine the change in stomach lining
Metaplasia	Abnormal change in the nature of a tissue
Microbiology	Science that studies microscopic forms of life
Microbiologist	A scientist who specializes in microbiology
Pathology	Science that identifies diseases and conditions by studying tissues and organ biopsies
Pathologist	A scientist who specializes in pathology
Positive for <i>H. pylori</i>	Have the <i>H. pylori</i> infection
Post-treatment breath tests	Tests given after the participants complete their treatment
Screening	Testing
Short-term follow-up	Breath test given starting 8 weeks after treatment