CAN *Help* WORKING GROUP

Fort McPherson *H. pylori* Project
Progress Report August 2017

The Fort McPherson *H. pylori* Project arose from a collaborative effort of the Canadian North *Helicobacter pylori* (CAN*Help*) 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.15 for a definition of the term

Fort McPherson *H. pylori* Project Timeline

November 2011 - May 2012

- Initial project planning

Jun 2012 - September 2012

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

March 2013

- Endoscopy* and treatment

May 2013

- Pathology*

May 2013

- Pathology results reported to participants

June 2017

- Long-term endoscopy follow-up *

Ongoing

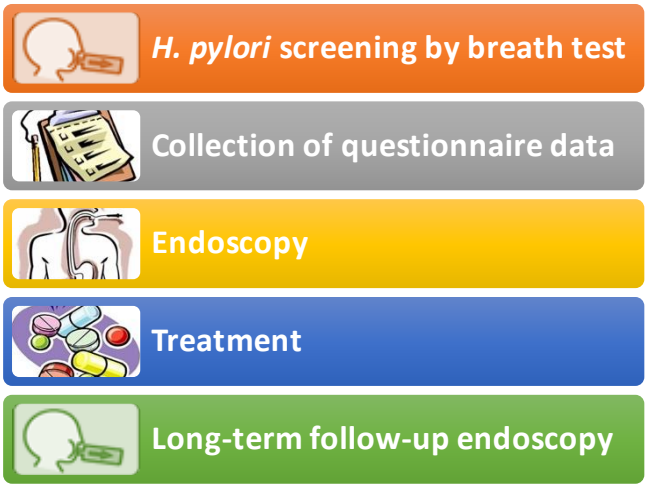
- Analysis of questionnaire data
- Research results reported to community
- Knowledge exchange activities

Overview of the Findings

What has been done so far?

About **32%**
of Fort McPherson residents
have participated
in this project
(population ~800)

Completed components of the project include



What remains to be done?

- Long-term follow-up breath tests : ongoing
- Knowledge exchange activities : ongoing
- Analysis of questionnaire 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*?	**59%** 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 CAN*Help** 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

236	•**Participants recruited**
228	•**Urea breath test screening* completed** (210 had a positive, negative, or borderline result)
175	•**Interviewer-administered health questionnaires completed**
154	•**Interviewer-administered participant questionnaires completed**
121	•**Interviewer-administered household questionnaires completed** (reporting household data for 364 individuals)
57	•**Participants completing endoscopy*** (58 participants consented to endoscopy)
53	•**Biopsies* available for *H. pylori** testing**
71	•**Participants enrolled in treatment trial** (83 participants consented to treatment, and 83 were assigned treatment)
56	•**Post-treatment breath tests* completed** (54 had positive/negative/borderline results)
55	•**Interviewer-administered post-treatment questionnaires completed**
12	•**Participants completed long-term follow-up* endoscopy**
12	•**Biopsies available for *H. pylori* testing**

Findings to Date

Proportion positive* on breath test	**59% (124/210)**
Endoscopic* findings from 53 Fort McPherson residents	
Gastritis*	**15% (8/53)**
Gastric* erosions	**11% (6/53)**
Gastric ulcer	**4% (2/53)**
Duodenitis*	**4% (2/53)**
Duodenal* erosions	**2% (1/53)**
Duodenal ulcer	**0**
Esophagitis	**11% (6/53)**
Barrett's esophagus	**0**
Pathology* findings (Sydney classification) from 53 Fort McPherson residents	
Chronic gastritis	**83% (44/53)**
Severe	**26% (14/53)**
Moderate	**38% (20/53)**
Mild	**19% (10/53)**
Atrophic* changes	**49% (26/53)**
Intestinal metaplasia*	**11% (6/53)**
***H. pylori** positive**	**70% (37/53)**
Chronic gastritis	**100% (37/37)**
• Severe gastritis	• 38% (14/37)
• Moderate gastritis	• 54% (20/37)
• Mild gastritis	• 8% (3/37)
Atrophic changes	**70% (26/37)**
Intestinal metaplasia	**14% (5/37)**
Microbiology* findings from 52 Fort McPherson residents	
Culture* positive	**58% (30/52)**
Antibiotic susceptibility* tests performed on 28 isolates from culture	
Resistance* to any antibiotics tested	**68% (19/28)**
• Metronidazole:	• 46% (13/28)
• Clarithromycin	• 29% (8/28)
• Ciprofloxacin	• 7% (2/28)
• Rifampicin	• 4% (1/28)
• Amoxicillin, nitrofurantoin, tetracycline	• 0
Resistance to multiple (2 or 3) antibiotics	**18% (5/28)**
• Metronidazole and Clarithromycin	• 14% (4/28)
Treatment success among 47 treatment trial participants with a post-treatment breath test*	
Sequential therapy	**83% (24/29)**
Quadruple therapy	**100% (18/18)**

The breath test prevalence (proportion positive) of 59% is a better reflection of the prevalence of *H. pylori** infection in Fort McPherson than the 70% positive by histopathology* (or the 58% 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

- Long-term follow-up* breath test of the Fort McPherson *H. pylori* Project will be carried out over in the next few months.
- 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 travel to Fort McPherson in winter 2018 for her dissertation project. Taylor will investigate the relationship between food insecurity and the prevalence of *H. pylori**-induced disease. She will begin consultation with the Fort McPherson *H. pylori* Planning Committee in August 2017 to obtain community input on the 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 Fort McPherson *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 CAN*Help** Working Group's Lead Gastroenterologist Dr. Sander van Zanten, and local surgeon 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, 12 participants enrolled in the 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 12 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 Year 2011

May 2011: Initial Stages of Research Planning

After the successful launch of the Aklavik *H. pylori* Project in 2007, news about the project spread and Lead Investigator Dr. Karen Goodman was asked to take the research to other Northwest Territories and Yukon communities.

In May 2011, The Teetl'it Gwich'in Council extended an invitation to Dr. Goodman to initiate a study in Fort McPherson similar to the Aklavik *H. pylori* Project.

Between November 2011 and May 2012, a Memorandum of Agreement between the Fort McPherson *H. pylori* Project Planning Committee and the University of Alberta was developed, and the Fort McPherson *H. pylori* Project was launched.

2.2 Years 2012 and 2013

June 2012: First Wave of Data Collection

Community Projects Lead Amy Colquhoun, Fieldwork Lead Laura McAlpine (previously Aplin), Fieldwork Coordinators Emily Walker (previously Hastings) and Monica Sierra, and Community Research Assistant Maria Peterson and Donna Koe initiated data collection in Fort McPherson in June 2012.

A project launch event was held on Wednesday June 6, 2012 at the Recreation Complex to mark the start of the Fort McPherson *H. pylori* Project. Activities included a community dinner, an information session, and a viewing of "Never Say Die: The Aklavik *H. pylori* Project." On June 15, 2012, the project team announced the winner of the logo contest on CBQM, the local radio station. The contest was open to all school-aged children attending Chief Julius School. Students were asked

to draw a logo representing the Fort McPherson *H. pylori* Project. The winner of the contest was Johanna Edwards for her very creative drawing depicting *H. pylori** throughout the local environment.

Recruitment of participants took place via radio announcements and door-to-door outreach for the month of June 2012. During this time, project staff obtained informed consent and screened participants for *H. pylori** infection using the urea breath test. Project staff also interviewed participants using participant (individual and household) risk factor questionnaires and health questionnaires. The project staff created a phone list and map of the community to track coverage of households. Regular radio announcements on CBQM were used to encourage participation throughout the recruitment and data collection processes and to respond to commonly asked questions.

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.

September 2012: Breath Test Results Reporting

Laura McAlpine returned to Fort McPherson in September 2012 to report breath test results and continue project enrollment. She continued recruitment efforts primarily through radio announcements and speaking to the public during the Community Health Representative's weekly radio program. She also recruited participants through information stands at the local radio station, flyers posted around the community, and door-to-door visits.

In mid-September 2012, Ruby Koe joined the project team as a Community Research Assistant. Ruby continued to offer breath testing and interviews in Fort McPherson until the endoscopy* and treatment components of the project in March 2013.

March 2013: Endoscopy* and Treatment Trial

The endoscopy* and treatment phases of the Fort McPherson *H. pylori* Project took place during Monday, March 18 through Thursday, March 21, 2013. Endoscopy participants were recruited through the local radio station, CBQM, and phone calls to project participants who had expressed an interest in having a scope test on the health questionnaire.

For the endoscopy* component of the project, gastroenterologists* Dr. Amy Morse, Dr. Adriana Lazarescu, and Dr. Sander van Zanten travelled to Fort McPherson to perform upper gastrointestinal endoscopies at the William Firth 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 and Old Crow *H. pylori* Projects were adapted for use in Fort McPherson.

Study participants 15+ years of age who wished to undergo endoscopy* were eligible, as were children whose parents requested that they be included, at the gastroenterologist's discretion. During 4 days, the team completed 58 endoscopies; 1 participant was not able to complete the procedure, and biopsies* for culture*

and histopathology* were obtained from 53 participants. No adverse effects occurred during the endoscopy procedures.

During this time, for participants who consented to treatment, gastroenterologists* Drs. Morse, Lazarescu, and 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 50 participants and 49 received medications 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, 87 participants have consented to treatment and 71 have participated in the trial.

For the treatment phase of the project, the three gastroenterologists* 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 51 participants and 47 received medications, 41 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, 83 participants have consented to treatment and 68 have participated in the trial.

Lead Gastroenterologist* Dr. Sander van Zanten and Community Projects Lead Laura McAlpine coordinated treatment follow-up activities from the William Firth Health Centre and, later, from the project offices in Edmonton. This included phone reminders to participants during the course of treatment as well as collection of bubble packs to count unused medication and administration of a post-therapy questionnaire.

May 2013: Pathology* Results Reporting

Dr. Safwat Girgis, team Pathologist*, completed pathologic assessment of the gastric* tissue biopsies* in May 2013. Later that month, Dr. van Zanten, Laura McAlpine, and Data Dissemination Lead and PhD student Emily Hastings contacted endoscopy* participants individually to report pathology* findings. William Firth Health Centre staff assisted Dr. van Zanten in making arrangements for any participants who required a follow-up endoscopy.

July 2013: Treatment Follow-up

Laura McAlpine and summer student Kristina Lea visited Fort McPherson during July 8-20, 2013 to collect remaining bubble packs and administer additional post-therapy questionnaires. They offered follow-up breath testing to 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 1 week before the visit, community members were informed of the upcoming trip through flyers and radio announcements on the local radio station, CBQM. Additional trips were made throughout 2013 to evaluate participants' post-treatment *H. pylori** using the urea breath test, and to develop and implement additional knowledge exchange activities to inform community members of study progress and findings.

2.3 Years 2014 and 2015

June to November 2014: Chart Reviews – General and Antibiotic Use

MSc student Kate Williams travelled to Fort McPherson 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.

Several team members, including Community Projects Lead Laura McAlpine, Lab Manager Richelle Redekop, and summer students Melissa Power and Emelie Gustafson, travelled to Fort McPherson in late June 2014 to carry out chart reviews at the William Firth Health Center. The chart reviews 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 Fort McPherson.

Richelle Redekop travelled to Fort McPherson again in November 2014 to complete chart reviews to extract information on utilization of *H. pylori**-associated health care from participants of the Fort McPherson *H. pylori* Project. The information will be used for CAN*Help** Working Group's policy analysis in the near future.

December 2015: Knowledge Exchange Activity

Managing Director Janis Geary designed a knowledge exchange activity in December 2015 to bring community members to Edmonton, including from Fort McPherson, to learn about CAN*Help** Working Group's research and then share what they learnt with their respective communities. She solicited applications from community partners interested in co-authoring an abstract with academic team members and co-presenting at the Transforming Health Care in Remote Communities conference to be held April 28-30, 2016. She received five applications from which she selected three, one each from Aklavik, Fort McPherson, and Ulukhaktok.

2.4 Year 2016

January 2016: Knowledge Exchange Activity

In January 2016, Qualitative Research Lead and Postdoctoral Fellow Megan Highet designed a Photovoice Project that used photography as a research tool to explore the perspectives of Fort McPherson youth on health, and *H. pylori** infection. The project introduced an innovative knowledge exchange tool, while building capacity

with respect to research skills among youth residing in Fort McPherson. In preparation for the Photovoice Project, Megan prepared a one-page project description for the Fort McPherson *H. pylori* Project planning committee to review. The planning committee members expressed interest in the project after reviewing the description.

February 2016: Dissemination and Knowledge Exchange Activities

Megan Highet travelled with Northern Health Research Consultant Kathy Gilmore to Fort McPherson in early February 2016, to host an information booth at the Community Healthy Living Fair. The CAN*Help** Working Group partnered with the Government of the Northwest Territories (GNWT) Department of Health and Social Services (DHSS), to participate in the Community Healthy Living Fair. It was part of a larger initiative by the GNWT to bring Healthy Living Fairs to all communities in the Territory in 2016. The purpose of CANH*elp* Working Group's participation was to introduce the work being done by the group, and also to gauge interest in the project from community members, for possible future involvement. The CAN*Help* Working Group was one of approximately 10 other booths that covered various health topics. The team members received positive feedback from the fair attendees. Many attendees mentioned the CAN*Help* Working Group booth as their favourite part of the fair in the evaluation conducted by the GNWT.

Later in February 2016, Megan Highet also met with Winnie Greenland, the Fort McPherson Community Health Representative, and Shirley Snowshoe, principal of Chief Julius School, to discuss the community's expectations for the Photovoice Project and finalized the project. At the Chief Julius School, Megan delivered a series of educational workshops to engage students from grades 8-12, and trained them for the Photovoice Project. The training included background information about *H. pylori** infection, and introduction to basic digital photography skills, photo literacy, photo analysis, and ethnographic research methods.

April 2016: Dissemination Activities

Winnie Greenland, along with representatives from Aklavik and Ulukhaktok, visited Edmonton to meet with Edmonton-based team members in April 2016. They were joined by the Yukon Community Partnership Coordinator Reanna Mohamed, and Kathy Gilmore. During their visit, they toured the CAN*Help** Working Group's offices and labs to learn about research activities carried out in Edmonton, including the analysis of the breath test samples and laboratory testing of *H. pylori**. Additionally, the ongoing and upcoming research activities were discussed, as well as input on the updated research agreement template was obtained. Having northern-based team members and community representatives visit CAN*Help* Working Group in Edmonton strengthened the relationships and served as a knowledge exchange opportunity for enhancing the quality of the research activities. Global News Edmonton featured this event on their 6:00 PM evening news. They filmed meetings between Edmonton-based academic staff and the Northwest Territories community partners, and interviewed Managing Director Janis Geary about the project.

October to November 2016: Knowledge Exchange Activities and Key Informant Interviews

Three Fort McPherson youths who participated in the Photovoice Project visited Edmonton from October 31 to November 5, 2016. The objective of the Photovoice Project was to describe the views of Fort McPherson youth on *H. pylori** and health. Guided by Qualitative Research Lead and Postdoctoral Fellow Megan Highet, and Knowledge Translation Lead Amy Colquhoun, the youths created a poster on the

process and findings of the Photovoice Project, and how they experienced participating in the Photovoice Project. On November 2, 2016, the youths presented their poster at the "Engagement for Transformational Change: Research Showcase" held in Edmonton. During their visit, the youths attended campus tours of the University of Alberta, MacEwan University, and Northern Alberta Institute of Technology (NAIT). They also participated in microbiology* lab activities at the University of Alberta, and an endoscopy* simulator activity at the University of Alberta Hospital.

Data Dissemination Lead and PhD student Emily Walker travelled to Fort McPherson in November 2016 to recruit participants for her dissertation project. 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. She collected hair samples for laboratory measurement of mercury levels and administered fish-focused food frequency questionnaires with 20 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
CAN*Help*	Canadian North *Helicobacter pylori*
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 *H. pylori* organisms are visible
H. pylori	*Helicobacter pylori*
Long-term follow-up	Includes both breath tests and endoscopy. It is done few years after treatment to estimate the incidence rate of *H. pylori* 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 *H. pylori*	Have the *H. pylori* 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