Community-driven research on *Helicobacter pylori* infection in Northern Canada

Emily V. Hastings, Laura Aplin, Karen J. Goodman and The CANHelp Working Group

Department of Public Health Sciences
Department of Medicine (Gastroenterology)
University of Alberta
Outline

- **Background**
  - About *H. pylori*
  - Motivation for Research
  - The CANHelp Working Group

- **Current Projects**
  - The Aklavik *H. pylori* Project
  - The Old Crow *H. pylori* Project
  - The ISR *H. pylori* Project
About *Helicobacter pylori*

Helical, flagellar, gram-negative bacterium that inhabits the lining of the stomach and/or duodenum
About *Helicobacter pylori*

- Infects half or more of the world population
- Most chronically infected people have asymptomatic gastritis
- Some individuals with *H. pylori* experience chronic dyspepsia
- A small fraction of cases develop peptic ulcer disease and in rare cases, gastric cancer
About *Helicobacter pylori*

- Treatment requires 3-4 drugs for 7-10 days
  - Under the best circumstances initial treatment cures ~80%
- The mode of transmission remains uncertain
  - Likely spreads directly from person to person
  - Likely spreads more readily during acute gastroenteritis with vomiting and/or diarrhea
- Public health control measures have not been developed
Motivation for Research

- Communities in northern Canada were concerned about *H. pylori*
  - Awareness that many people in the community have *H. pylori* infection
  - Perceived high rates of gastric cancer
  - Awareness of link between *H. pylori* and gastric cancer
  - Frequent failure of *H. pylori* therapy in this region
To address community concerns about health risks from *H. pylori* infection

- To recommend *H. pylori* management strategies to health authorities

- To reduce health risks from *H. pylori* infection
The CANHelp Team

Community Organizations
Aklavik Health Committee
Vuntut Gwitchin First Nation General Assembly, Old Crow
Inuvialuit Regional Corporation

NWT Agencies
Rachel Munday, Nurse in Charge, Aklavik Health Center
Leah Seaman, Public Health Physician, Beaufort-Delta Regional Health Authority
Kami Kandola, Chief Public Health Officer, NWT Health and Social Services
John Morse, Former Medical Director, Stanton Territorial Health Authority
Susan Chatwood, Director, Institute for Circumpolar Health Research

Yukon Agencies
Brendan Hanley, Yukon Medical Officer of Health
Jodi Butler Walker, Arctic Health Research Network Yukon
Nurse in Charge, Old Crow Health Centre
Darius Elias, MLA, Yukon Legislature

Alberta Health Services
Robert Bailey, Director, Northern Health Services Network
CANHelp Investigators

University of Alberta:
- Epidemiology: Karen Goodman
- Global Health: Janis Geary
- Anthropology: Christopher Fletcher
- Gastroenterology: Sander van Zanten, Richard Fedorak
- Microbiology: Monika Keelan
- Pathology: Safwat Girgis
- Biostatistics: Yutaka Yasui

External:
- Health Policy: Carl Phillips
- Arctic Investigations: Michael Bruce
- Cancer Investigations: David Forman

Researchers in Training:
- Public Health Sciences: Amy Colquhoun, Ashley Wynne, Emily Hastings, Hsiu-Ju Chang, Katharine Fagan-Garcia, Laura Aplin, Megan Lefebvre
- Anthropology: Sally Carraher
- Gastroenterology: Justin Cheung, Amy Morse
- Microbiology: Maysoon Mahmood, Megan Burletetz
Community Projects

The Aklavik *H. pylori* Project

The Old Crow *H. pylori* Project

The Inuvialuit Settlement Region *H. pylori* Project
Community Project Components

- *H. pylori* screening by urea breath test (UBT)
- Clinical and epidemiological questionnaires
- Endoscopy
- Treatment
- Knowledge Exchange
- Policy Development
Aims of Disease Investigating Components

- Screen participants for *H. pylori* infection
- Collect clinical data on history and symptoms
- Collect epidemiologic data on risk factors
- Offer upper endoscopy and obtain biopsies to:
  - Characterize histopathology in relation to *H. pylori* infection
  - Estimate prevalence of strains with antibiotic resistance and virulence factors
- Evaluate effectiveness of anti-*H. pylori* therapies
The Aklavik *H. pylori* Project

Aklavik *H. pylori* Project
- 2006 Population: 590
- 90% Inuvialuit (Inuit) or Gwitch’in Dene (First Nation)
- Accessed by air, water or winter ice-road
Aklavik *H. pylori* Project: Participation (n=379)

- Clinical questionnaires completed: 345
- Epidemiology questionnaires completed:
  - Household: 165 & Individual: 286
- Individuals with breath test results: 333
- Participants consenting to endoscopy: 200
- Biopsies obtained from: 194
- Treatment trial participants: 111
Aklavik *H. pylori* Project: 
Urea Breath Test

333 people were tested for *H. pylori* by UBT

313 had a positive or negative result

58% were positive
Of the 194 persons with biopsies:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparent inflammation</td>
<td>Gastritis</td>
<td>13.8%</td>
</tr>
<tr>
<td></td>
<td>Duodenitis</td>
<td>6.7%</td>
</tr>
<tr>
<td>Erosions</td>
<td>Gastric</td>
<td>6.2%</td>
</tr>
<tr>
<td></td>
<td>Duodenal</td>
<td>0.5%</td>
</tr>
<tr>
<td>Ulcer</td>
<td>Gastric</td>
<td>3.1%</td>
</tr>
<tr>
<td></td>
<td>Duodenal</td>
<td>0</td>
</tr>
<tr>
<td>Cancer</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>
Of the 189 persons with biopsies & data on symptoms:

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>No symptoms (%)</th>
<th>Mild/moderate symptoms</th>
<th>Severe symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>No gastritis</td>
<td>164</td>
<td>37</td>
<td>52</td>
<td>10</td>
</tr>
<tr>
<td>Gastritis</td>
<td>25</td>
<td>44</td>
<td>36</td>
<td>20</td>
</tr>
<tr>
<td>Gastric erosions</td>
<td>12</td>
<td>33</td>
<td>50</td>
<td>17</td>
</tr>
<tr>
<td>Gastric ulcer</td>
<td>6</td>
<td>50</td>
<td>33</td>
<td>17</td>
</tr>
</tbody>
</table>
## Aklavik *H. pylori* Project: Pathology Results

Of the 194 persons with biopsies:

<table>
<thead>
<tr>
<th></th>
<th>All <em>H. pylori</em> Positive (n=129)</th>
<th>All Participants (n=194)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inflammation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild (%)</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Moderate (%)</td>
<td>47</td>
<td>31</td>
</tr>
<tr>
<td>Severe (%)</td>
<td>43</td>
<td>29</td>
</tr>
<tr>
<td><strong>Atrophy (%)</strong></td>
<td>21</td>
<td>14</td>
</tr>
<tr>
<td><strong>Intestinal Metaplasia (%)</strong></td>
<td>11</td>
<td>8</td>
</tr>
</tbody>
</table>
### Aklavik *H. pylori* Project: Pathology Results

Of the 189 persons with biopsies & data on symptoms:

<table>
<thead>
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<th>Condition</th>
<th>n</th>
<th>No symptoms (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate/severe chronic inflammation</td>
<td>115</td>
<td>37</td>
</tr>
<tr>
<td>Atrophy (%)</td>
<td>27</td>
<td>37</td>
</tr>
<tr>
<td>Intestinal Metaplasia (%)</td>
<td>16</td>
<td>38</td>
</tr>
</tbody>
</table>
### Aklavik *H. pylori* Project: Pathology Results

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>No symptoms (%)</th>
<th>Mild/moderate symptoms (%)</th>
<th>Severe symptoms (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>H. pylori</em> negative</td>
<td>64</td>
<td>42</td>
<td>39</td>
<td>19</td>
</tr>
<tr>
<td><em>H. pylori</em> positive (low density)</td>
<td>30</td>
<td>30</td>
<td>60</td>
<td>10</td>
</tr>
<tr>
<td><em>H. pylori</em> positive (medium density)</td>
<td>48</td>
<td>40</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td><em>H. pylori</em> positive (high density)</td>
<td>47</td>
<td>36</td>
<td>60</td>
<td>4</td>
</tr>
</tbody>
</table>
Aklavik *H. pylori* Project:

Treatment Trial

- Standard treatment:
  - PPI with clarithromycin and amoxicillin/metronidazole for 10 days
- Alternate treatment:
  - PPI and amoxicillin for days 1-5
  - PPI with metronidazole and clarithromycin for days 6-10
Aklavik *H. pylori* Project:
Treatment Trial Results

- **111** people were part of the treatment trial
  - Only **87** had follow-up breath test
- Standard treatment: **60%** effective (29/48)
- Alternate treatment: **74%** effective (29/39)
- More data is needed
Aklavik *H. pylori* Project:

Treatment Trial Results

- Antibiotic resistance
  - Metronidazole: 33%
  - Clarithromycin: 13%
  - Both 4%
The Aklavik *H. pylori* Project started in 2006 in response to long-term concerns of community members and health care professionals relating to *H. pylori* infection and stomach cancer.

The documentary aims to describe how the research project was carried out, what the results are, and what the results mean to Aklavik community members.

Running Time: 19 minutes  Colour  4:3 letterboxed

Presented by the
Canadian North *Helicobacter pylori* Working Group
The Old Crow *H. pylori* Project
Old Crow, Yukon Territory

- 2006 Population: 250
- 90% First Nation (Vuntut Gwitch’in)
- Accessed only by air
Old Crow *H. pylori* Project: Participation (n=179)

- Clinical questionnaires completed: **134**
- Epidemiology questionnaires completed:
  - Household: **83** & Individual: **125**
- Individuals who completed a breath test: **178**
Old Crow H. pylori Project: Urea Breath Test

178 people were tested for H. pylori by UBT
157 had a positive or negative result
70% were positive
Old Crow *H. pylori* Project:  
Next Steps

- Endoscopy is scheduled for January 2012
- Treatment phase will begin immediately following endoscopy
The ISR *H. pylori* Project
The ISR *H. pylori* Project

- The ISR Project includes:
  - Tuktoyaktuk, Sachs Harbour, Paulatuk, Ulukhaktok, and continuing work in Aklavik
- ISR Project initiated because
  - Positive impressions from the Aklavik Project generated interest in the region
  - Inuvialuit Regional Corporation requested an expansion to other communities in the ISR
Tuktoyaktuk, Northwest Territories

- 2006 Population: 870
- 84% Inuvialuit, First Nation or Metis
- Accessed by air, water or winter ice-road
ISR *H. pylori* Project (Tuktoyaktuk):
Pilot Project Participation (n=93)

• Clinical questionnaires piloted with: **35**
• Epidemiology questionnaires piloted with: **23**
• Individuals who completed a breath test: **86**
ISR *H. pylori* Project:

Next Steps

- The ISR planning committee will meet in January to discuss next steps
- Further data collection in Tuktoyaktuk is tentatively set to begin in early spring, 2012
- Expansion to other communities to obtain representative data for informing regional health policy aimed at reducing health risks from *H. pylori* infection
- High prevalence of *H. pylori* infection has been observed in Aklavik and Old Crow
- High frequencies of *H. pylori*-attributed 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.
Acknowledgements

- Alberta Heritage Foundation for Medical Research (AIHS)
- Canadian Institutes for Health Research (CIHR)
  - Institute of Aboriginal People’s Health
  - Network Environment for Aboriginal Health Research (NEAHR
    - Anisabe Kekendazone, Ottawa
    - Nasivvik, Universite Laval
  - w/ Canadian Association for Gastroenterology & Industry Partners
- ArcticNet Network of Centres of Excellence of Canada
- Aboriginal Affairs and Northern Development Canada
- Canadian Circumpolar Institute
Thank You! Questions?