Community-driven research on *Helicobacter pylori* infection in Arctic Canada:
Update from the Canadian North *Helicobacter pylori* Working Group

*Helicobacter pylori*

- **What is *Helicobacter pylori***?
  - A type of bacteria that can live in the stomach
  - Many people around the world have *H. pylori* infection
- **How is *H. pylori* spread?**
  - Most often during childhood
  - Most likely from an *H. pylori*-infected person who is sick with vomiting or diarrhea
Helicobacter pylori

- What happens to people who get *H. pylori* infection?
  - Most do not get sick; they only get mild gastritis (irritation of the stomach lining) without any symptoms
  - Some with chronic *H. pylori* infection get chronic stomach upset, but there are many other things that can cause this
  - A small fraction of cases develop peptic ulcer disease, and, much more rarely, stomach cancer
Most who get a serious disease from *H. pylori* do so after being infected for many, many years.

The best treatments require 3-4 drugs for 7-10 days.

- Under the best circumstances initial treatment cures ~80%.
- In populations where *H. pylori* is common, treatment failure is also common.
CANHelp (Canadian North Helicobacter pylori) Working Group

- Initial group of collaborators came together in 2006 to respond to:
  - Community concerns about health risks from *H. pylori* infection
  - Health authorities seeking information to improve clinical management of *H. pylori* infection
  - Members of government wanting evidence to inform public health policy related to *H. pylori* infection
Organizational Structure

Scientific Advisors

Academic Research Team
- Lead Investigator
- Investigators
- Researchers in Training

Non-academic Partners
- Health Care Providers & Decision Makers
- Community Governance & Planning Committees
- Health Research Networks

Management Team & Research Staff
- Management Leads
- Lab Director
- Lab Manager
- Lab Technologies
- Community Partnership Coordinators
- Research Assistants
- Admin Assistant
- Fieldwork Staff
Project components

- Adapted with guidance from a project planning committee in each community
  - *H. pylori* testing by urea breath test (UBT)
  - Community surveys
  - Endoscopy
  - Treatment
  - Longitudinal follow-up
  - Policy development
  - Knowledge exchange
Participating communities
Participating communities

- Tuktoyaktuk, NT
- Aklavik, NT
- Fort McPherson, NT
- Old Crow, YT
Project Participation

Participants Recruited 921
13C-UBTs Completed 859
Health Surveys Completed 749
Participant Surveys Completed 656
Household Surveys Completed 412
Endoscopies Completed 329
Assigned Treatment in Trial 267
## Findings to Date

**H. pylori Prevalence**

<table>
<thead>
<tr>
<th>Community project</th>
<th>H. pylori prevalence by UBT</th>
<th>% positive</th>
<th>Number with results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aklavik, NT</td>
<td></td>
<td>58</td>
<td>332</td>
</tr>
<tr>
<td>Old Crow, YT</td>
<td></td>
<td>68</td>
<td>189</td>
</tr>
<tr>
<td>Tuktoyaktuk, NT</td>
<td></td>
<td>57</td>
<td>102</td>
</tr>
<tr>
<td>Ft. McPherson, NT</td>
<td></td>
<td>59</td>
<td>209</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>60</strong></td>
<td><strong>832</strong></td>
</tr>
</tbody>
</table>
## Findings to Date

### Histopathology

By community among participants with gastric biopsies

<table>
<thead>
<tr>
<th></th>
<th>Aklavik (n=129)</th>
<th>Old Crow (n=57)</th>
<th>Tuktoyaktuk (n=8)</th>
<th>Ft McPherson (n=37)</th>
<th>TOTAL (n=231)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chronic Gastritis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild</td>
<td>9</td>
<td>4</td>
<td>25</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Moderate</td>
<td>47</td>
<td>32</td>
<td>38</td>
<td>54</td>
<td>44</td>
</tr>
<tr>
<td>Severe</td>
<td>43</td>
<td>65</td>
<td>38</td>
<td>38</td>
<td>48</td>
</tr>
<tr>
<td><strong>Atrophy</strong></td>
<td>21</td>
<td>74</td>
<td>63</td>
<td>70</td>
<td>43</td>
</tr>
<tr>
<td><strong>Intestinal Metaplasia</strong></td>
<td>11</td>
<td>35</td>
<td>38</td>
<td>14</td>
<td>18</td>
</tr>
</tbody>
</table>
## Findings to Date

### Antibiotic Resistance

#### Multiple-drug resistance by community (& year) among participants with H. pylori isolated from gastric biopsies

<table>
<thead>
<tr>
<th>Community (n of tested isolates, year of biopsy)</th>
<th>% of Participants with <em>H. pylori</em> Isolates (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To any 1 antibiotic</td>
</tr>
<tr>
<td>Aklavik, NT (n=120, 2008)</td>
<td>25 (18-34)</td>
</tr>
<tr>
<td>Old Crow, YT (n=53, 2012)</td>
<td>30 (18-44)</td>
</tr>
<tr>
<td>Tuktoyaktuk &amp; Ft. McPherson, NT (n=32, 2013)</td>
<td>53 (35-71)</td>
</tr>
<tr>
<td><strong>TOTAL (n=205)</strong></td>
<td>31 (25-38)</td>
</tr>
</tbody>
</table>

CI, confidence interval; *One-sided 95% CI

**Note:** differences across communities could reflect time trends
Findings to Date
Treatment Success

By regimen

<table>
<thead>
<tr>
<th></th>
<th>% Successfully Treated (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (number treated)</td>
</tr>
<tr>
<td></td>
<td>Triple</td>
</tr>
<tr>
<td><strong>All participants</strong></td>
<td>62 (48-74)</td>
</tr>
<tr>
<td>n=58</td>
<td>n=99</td>
</tr>
<tr>
<td><strong>Participants in</strong></td>
<td>62 (46-75)</td>
</tr>
<tr>
<td><strong>treatment trial</strong></td>
<td>n=47</td>
</tr>
<tr>
<td><em>(randomized to regimen)</em></td>
<td></td>
</tr>
</tbody>
</table>

CI, confidence interval

*Treatment success confirmed by UBT >10 weeks post treatment*
## Continuing Research

<table>
<thead>
<tr>
<th>Community project</th>
<th>Recent research activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aklavik, NT</td>
<td>• Water-as-reservoir study</td>
</tr>
<tr>
<td></td>
<td>• Traditional medicine project</td>
</tr>
<tr>
<td>Old Crow, YT</td>
<td>• Evaluation of Old Crow Project</td>
</tr>
<tr>
<td></td>
<td>• Longitudinal follow-up</td>
</tr>
<tr>
<td>Tuktoyaktuk, NT</td>
<td>• Knowledge dissemination event</td>
</tr>
<tr>
<td></td>
<td>• Chart reviews</td>
</tr>
<tr>
<td>Ft. McPherson, NT</td>
<td>• Treatment follow-up</td>
</tr>
<tr>
<td></td>
<td>• Chart reviews</td>
</tr>
</tbody>
</table>
Summary

• High frequencies of *H. pylori*-associated stomach disorders observed in northern Canadian communities

• Community concerns about health risks from *H. pylori* infection are well-placed

• The CANHelp Working Group aims to identify strategies for reducing health risks from *H. pylori* infection

• The research is expanding to other communities to obtain additional representative data
Acknowledgements

- Alberta Innovates – Health Solutions (AIHS)
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    - Anisabe Kekendazone, Ottawa
    - Nasivvik
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- Aboriginal Affairs and Northern Development Canada
- Canadian Circumpolar Institute