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

- November 9th, 2011 for the Inuit Public Health Task Group
Overview

- Background
  - About *H. pylori*
  - Why Northern Canada?
  - The CANHelp Working Group

- Current projects
  - The Aklavik *H. pylori* Project
  - The Old Crow *H. pylori* Project
  - The ISR *H. pylori* Project

- Still to come
About *Helicobacter pylori* (H. pylori)
About *H. pylori*

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

Photo from Blaser *Sci Am* Feb 1996, pp. 104-7
About *H. pylori*

- Infects half or more of the world population, in some communities more than in others
- People living in crowded conditions are more likely to have it
- Most people with *H. pylori* get it in childhood
- Some people stay infected throughout their lives
About *H. pylori*

- Most chronically infected people have asymptomatic gastritis
- Some with *H. pylori* 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
About *H. pylori*

- 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
About *H. pylori*

- The mode of transmission remains uncertain
- Likely spreads directly from person to person
  - Perhaps more readily during bouts of acute gastroenteritis with vomiting and/or diarrhea
- Research so far has been inclusive
- Public health control measures have not been developed
Why northern Canada?
Why northern Canada?

- Northern Population
- Canadian Population, non-northern

Location:
- Manitoba 1997 >20
- Nova Scotia 1994 18-72
- Greenland 2003 adults
- Nunavut 1999 all ages
- Northern Manitoba 2002 children
- Greenland 2005 adults
- Russia 1998 adults
- Alaska 2006 all ages
- Northern Manitoba 1999 adults
Why northern Canada?

- Communities in northern Canada were concerned about *H. pylori*
  - Awareness that many people in the community have *H. pylori* infection
  - Perceived high rates of stomach cancer
  - Awareness of link between *H. pylori* and stomach cancer
  - Frequent failure of *H. pylori* therapy in this region
Addressing concerns
CANHelp (Canadian North Helicobacter pylori) Working Group

- Multidisciplinary team
  - Community organizations
  - Regional health research networks
  - Local, regional, and territorial government health agencies
  - Alberta Health Services
  - University of Alberta
    - Epidemiology
    - Gastroenterology
    - Microbiology
    - Pathology
    - Health Policy
    - Anthropology
We use a collaborative and participatory approach in pursuit of the following goals:

• To obtain representative data from diverse Arctic communities for developing public health strategies for control of *H. pylori* infection in the circumpolar north

• To conduct policy analysis to identify cost-effective *H. pylori* management strategies that account for ethics, economics, and local cultural concerns for northern communities

• To develop knowledge exchange strategies that help northern communities understand *H. pylori* health risks, available solutions and unsolved challenges for reducing these risks
Community health goals

- 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
Community project aims

- To be modified according to each community’s goals
  - Investigate *H. pylori* infection
    - Screen residents for *H. pylori* infection, family history, & symptoms
    - Collect epidemiologic data on risk factors
    - Offer upper endoscopy
  - Evaluate effectiveness of *H. pylori* therapies
  - Follow those treated long-term to identify factors associated with treatment failure & re-infection
Community project components

- Established with guidance from community committees
  - *H. pylori* testing by urea breath test (UBT)
  - Community surveys
  - Endoscopy
  - Treatment
  - Policy development
  - Knowledge exchange
Current projects
Current projects

- The Aklavik *H. pylori* Project
- The Old Crow *H. pylori* Project
- The ISR *H. pylori* Project
The Aklavik

*H. pylori* Project
Hamlet of Aklavik, Northwest Territories, Canada

2006 population: 590
The Aklavik *H. pylori* Project

- The CANHelp Working Group’s pilot project – the Aklavik *H. pylori* Project

- Aklavik Project initiated because:
  - Community expressed concern regarding health risks from *H. pylori* infection and wanted research to help find answers
  - Enthusiasm for the research from local health authorities
The Aklavik *H. pylori* Project

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb 2007</td>
<td>Community approval obtained</td>
</tr>
<tr>
<td>May 2007</td>
<td>Community input workshops initiated</td>
</tr>
<tr>
<td>Sep 2007</td>
<td>NWT research license obtained</td>
</tr>
<tr>
<td>Nov 2007</td>
<td>Fieldwork initiated</td>
</tr>
<tr>
<td>Feb 2008</td>
<td>Endoscopy component completed; microbiology initiated</td>
</tr>
<tr>
<td>Apr 2008</td>
<td>Pathology results reported to participants</td>
</tr>
<tr>
<td>Nov 2008</td>
<td>Treatment trial initiated</td>
</tr>
<tr>
<td>Ongoing</td>
<td>Breath testing</td>
</tr>
<tr>
<td></td>
<td>Knowledge exchange (video documentary)</td>
</tr>
<tr>
<td></td>
<td>Data analysis and presentation</td>
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</tbody>
</table>
H. Pylori test results

- 333 people were tested for *H. pylori* with the breath test
  - 58% were positive for *H. pylori*
Endoscopy results

- 200 participants attempted endoscopy
  - Endoscopy procedure was completed by 196 participants
  - Biopsies were obtained from 194 individuals (42% male)
  - Ages ranged from 10-80 years
Endoscopy results

- Of the 194 persons with biopsies:

<table>
<thead>
<tr>
<th>Apparent Inflammation</th>
<th>Gastritis</th>
<th>13.8%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Duodenitis</td>
<td>6.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Erosions</th>
<th>Gastric</th>
<th>6.2%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Duodenal</td>
<td>0.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ulcer</th>
<th>Gastric</th>
<th>3.1%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Duodenal</td>
<td>0</td>
</tr>
</tbody>
</table>

| Cancer                 |             | 0     |
Endoscopy results

- 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>
Pathology results

- Of the 194 persons with biopsies:

<table>
<thead>
<tr>
<th></th>
<th>All H. pylori Positive (n=129)</th>
<th>All Participants (n=194)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflammation</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>Atrophy (%)</td>
<td>21</td>
<td>14</td>
</tr>
<tr>
<td>Intestinal Metaplasia (%)</td>
<td>11</td>
<td>8</td>
</tr>
</tbody>
</table>
Pathology results

- Of the 189 persons with biopsies & data on symptoms:

<table>
<thead>
<tr>
<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>
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Pathology results

- 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><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</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(low density)</td>
<td>30</td>
<td>30</td>
<td>60</td>
<td>10</td>
</tr>
<tr>
<td>(medium density)</td>
<td>48</td>
<td>40</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>(high density)</td>
<td>47</td>
<td>36</td>
<td>60</td>
<td>4</td>
</tr>
</tbody>
</table>
Treatment trial results

• 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
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 still needed
Treatment trial results

- Antibiotic resistance
  - Metronidazole: 33%
  - Clarithromycin: 13%
  - Both 4%
The Old Crow

*H. pylori* Project
Community of Old Crow, Yukon Territory, Canada

2006 population: 250
The Old Crow Project

- The Old Crow Project initiated because:
  - News of Aklavik project spread
  - In 2008, MLA Darius Elias asked CANHelp Working Group about bringing research to Old Crow
  - At 2008 Vuntut Gwitchin First Nation General Assembly, a resolution was passed by consensus to bring research to Old Crow
<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jul 2008</td>
<td>Presentation given at Biennial Gwitchin Gathering</td>
</tr>
<tr>
<td>Aug 2008</td>
<td>Resolution passed at VGFN GA by consensus</td>
</tr>
<tr>
<td>Aug 2009</td>
<td>Presentation given at VGFN GA to update community</td>
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<tr>
<td>Sep 2009</td>
<td>Local staff hired</td>
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<tr>
<td>May 2009</td>
<td>Planning workshops held with local committee</td>
</tr>
<tr>
<td>Sep 2010</td>
<td>Presentation by local committee at VGFN GA</td>
</tr>
<tr>
<td>Nov 2010</td>
<td>Breath tests and surveys initiated</td>
</tr>
<tr>
<td>Upcoming</td>
<td>Endoscopy and treatment</td>
</tr>
</tbody>
</table>
The Old Crow *H. pylori* Project

- 178 people were tested for *H. pylori* with the breath test
  - 70% were positive for *H. pylori*
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
The ISR *H. pylori* Project

- **Jan 2010** IRC requested expansion of research
- **Jan 2010 to Feb 2011** Development of Memorandum of Agreement between the IRC and University of Alberta
- **Feb 2011** Memorandum of Agreement finalized
- **Feb 2011** Pilot project work initiated in Tuktoyaktuk

**Upcoming** Additional breath tests and surveys
The ISR *H. pylori* Project

- 86 people were tested for *H. pylori* with the breath test
Still to come

- Expansion to other communities to obtain representative data for informing regional health policy aimed at reducing health risks from *H. pylori* infection
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?