Medical history and clinical symptoms of endoscopy participants in a community-driven research project: Findings from the Aklavik *H. pylori* Project

- 10th National Gathering of Graduate Students, June 24, 2010
Overview

• Background
  • About *H. pylori*
  • Why northern Canada?
  • Addressing concerns: The CANHelp Working Group
  • The Aklavik *H. pylori* Project
• Findings from the Aklavik *H. pylori* Project
  • Overview of findings to date
    • Focus: Medical histories and current clinical symptoms
• Summary of findings
• Community conclusions
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* mostly get it in childhood
- Some people stay infected throughout their lives
About *H. pylori*

- Most chronically infected people have asymptomatic gastritis
- A small fraction of cases develop peptic ulcer disease, and, much more rarely, gastric cancer
- The best treatments require 3-4 drugs for 7-10 days
  - Under the best circumstances initial treatment cures ~80%
  - In high-prevalence populations, treatment failure is 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?

Prevalence

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 gastric cancer
  - Awareness of link between *H. pylori* and cancer
  - Frequent failure of *H. pylori* therapy in this region
  - Frequently voiced local concerns that *H. pylori* infection comes from drinking water sources
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
CANHelp Working Group Aims

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

2006 population: 590
90% Aboriginal: Inuvialuit (Inuit) or Gwich’in Dene (First Nation)
Aklavik *H. pylori* Project

- **Specific aims**
  - Investigate *H. pylori* infection in Aklavik
    - Screen residents for *H. pylori* infection, family history, symptoms & current awareness of *H. pylori* infection
    - Offer upper endoscopies to eligible Aklavik residents
    - Collect epidemiologic data on risk factors
    - Evaluate effectiveness of *H. pylori* therapies
    - Follow those treated long-term to identify factors associated with treatment failure & reinfection
Aklavik *H. pylori* Project

- **Project components**
  - Community surveys
  - *H. pylori* testing
  - Endoscopy
  - Treatment
  - Policy development
  - Knowledge exchange
# Aklavik *H. pylori* Project

## Timeline

<table>
<thead>
<tr>
<th>Year</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>Sept 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>Survey data collection</td>
</tr>
<tr>
<td></td>
<td>Breath testing</td>
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<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>
Overview of findings to date
321 people were tested for *H. pylori* with the breath test
- 58% were positive for *H. pylori*
- 95% confidence interval [52%-63%]
Prevalence of *H. pylori* infection by age among 316 Aklavik residents screened by UBT (with age data)
Prevalence of *H. pylori* infection by ethnicity among 293 UBT-screened Aklavik residents (with ethnicity data)
Endoscopy results

- 200 participants attempted endoscopy
  - Endoscopy procedure was completed by 196 participants
  - Biopsies were obtained from 194 individuals (42% male)
  - Participants were primary Inuvialuit or Gwich’in Dene
  - Ages ranged from 10-80 years
Endoscopy results

- Of the 194 persons with biopsies:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Gastric</th>
<th>Duodenal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparent inflammation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastritis</td>
<td>13.8%</td>
<td></td>
</tr>
<tr>
<td>Duodenitis</td>
<td>6.7%</td>
<td></td>
</tr>
<tr>
<td>Erosions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastric</td>
<td>6.2%</td>
<td></td>
</tr>
<tr>
<td>Duodenal</td>
<td>0.5%</td>
<td></td>
</tr>
<tr>
<td>Ulcer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastric</td>
<td>3.1%</td>
<td></td>
</tr>
<tr>
<td>Duodenal</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Cancer</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
Pathology results

- Of the 194 persons with biopsies:

<table>
<thead>
<tr>
<th>Inflammation</th>
<th>All H. pylori Positive (n=129)</th>
<th>All Participants (n=194)</th>
</tr>
</thead>
<tbody>
<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>
Treatment trial results

- 110 people were part of the treatment trial
  - Only 83 returned for a follow-up breath test to see if their treatment worked
  - Of those, only 71 were treatment naïve:
    - **Standard therapy** of 36, 24 tested negative after treatment
      - 67% effective
    - **Alternate therapy** of 35, 27 tested negative after treatment
      - 77% effective
- More data is still needed
Focus: Medical histories and current clinical symptoms of endoscopy participants
Recall specific aims

- Screen residents for *H. pylori* infection, family history, symptoms & current awareness of *H. pylori* infection
- Offer upper endoscopies to eligible Aklavik residents
Variables

**Family/medical history**
- Family member had *H. pylori*?
- Family member had stomach cancer?
- Tested for *H. pylori* before this project?
- Had a gastroscopy before this project?
- Heart or lung problems?
- Stomach or intestinal problems?
- On stomach or heartburn medications?

**Stomach problems**
- Difficulty swallowing food?
- Unexplained weight loss?
- Stomach pain?
- Stomach burning?
- Bloating?
- Nausea?
- Other stomach or digestive problems?
## Findings

<table>
<thead>
<tr>
<th></th>
<th>Endoscopy (n=196) Proportion (95% CI*)</th>
<th>No endoscopy (n=108) Proportion (95% CI*)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stomach problems</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>0.38 (0.31-0.45)</td>
<td>0.40 (0.31-0.50)</td>
</tr>
<tr>
<td>1</td>
<td>0.19 (0.14-0.26)</td>
<td>0.18 (0.11-0.26)</td>
</tr>
<tr>
<td>2+</td>
<td>0.43 (0.36-0.56)</td>
<td>0.43 (0.33-0.52)</td>
</tr>
<tr>
<td><strong>Family history</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>H. pylori</em> infection</td>
<td>0.25 (0.19-0.32)</td>
<td>0.19 (0.12-0.28)</td>
</tr>
<tr>
<td><em>Stomach cancer</em></td>
<td>0.31 (0.25-0.38)</td>
<td>0.24 (0.16-0.33)</td>
</tr>
<tr>
<td><strong>Medical history</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tested for <em>H. pylori</em></td>
<td>0.20 (0.15-0.27)</td>
<td>0.12 (0.07-0.20)</td>
</tr>
<tr>
<td>Had gastroscopy</td>
<td>0.20 (0.15-0.27)</td>
<td>0.15 (0.09-0.23)</td>
</tr>
<tr>
<td>History of heart, lung, stomach or intestinal disorders</td>
<td>0.23 (0.18-0.30)</td>
<td>0.24 (0.16-0.33)</td>
</tr>
<tr>
<td>On stomach medications</td>
<td><strong>0.27 (0.21-0.34)</strong></td>
<td><strong>0.19 (0.12-0.28)</strong></td>
</tr>
</tbody>
</table>

*95% Confidence Interval
## Findings

- **Sub-group analysis: Negative status known before endoscopy**

<table>
<thead>
<tr>
<th></th>
<th>Endoscopy (n=55)</th>
<th>No endoscopy (n=22)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Proportion (95% CI*)</td>
<td>Proportion (95% CI*)</td>
</tr>
<tr>
<td><strong>Stomach problems</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>0.51 (0.37-0.65)</td>
<td>0.55 (0.32-0.76)</td>
</tr>
<tr>
<td>1</td>
<td>0.07 (0.02-0.18)</td>
<td>0.32 (0.14-0.55)</td>
</tr>
<tr>
<td>2+</td>
<td>0.42 (0.29-0.56)</td>
<td>0.14 (0.03-0.35)</td>
</tr>
<tr>
<td><strong>Family history</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>H. pylori</em> infection</td>
<td>0.24 (0.13-0.37)</td>
<td>0.23 (0.08-0.45)</td>
</tr>
<tr>
<td>Stomach cancer</td>
<td>0.35 (0.22-0.49)</td>
<td>0.14 (0.03-0.35)</td>
</tr>
<tr>
<td><strong>Medical history</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tested for <em>H. pylori</em></td>
<td>0.35 (0.22-0.49)</td>
<td>0.05 (0.00-0.23)</td>
</tr>
<tr>
<td>Had gastroscopy</td>
<td>0.35 (0.22-0.49)</td>
<td>0.09 (0.01-0.29)</td>
</tr>
<tr>
<td>History of heart, lung, stomach or intestinal disorders</td>
<td>0.35 (0.22-0.49)</td>
<td>0.14 (0.03-0.35)</td>
</tr>
<tr>
<td>On stomach medications</td>
<td>0.29 (0.18-0.49)</td>
<td>0.09 (0.01-0.29)</td>
</tr>
</tbody>
</table>

*95% Confidence Interval*
## Findings

- Sub-group analysis: Positive status known before endoscopy

<table>
<thead>
<tr>
<th></th>
<th>Endoscopy (n=92) Proportion (95% CI*)</th>
<th>No endoscopy (n=21) Proportion (95% CI*)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stomach problems</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>0.33 (0.24-0.44)</td>
<td>0.48 (0.26-0.70)</td>
</tr>
<tr>
<td>1</td>
<td>0.27 (0.18-0.37)</td>
<td>0.14 (0.03-0.36)</td>
</tr>
<tr>
<td>2+</td>
<td>0.40 (0.30-0.51)</td>
<td>0.38 (0.18-0.62)</td>
</tr>
<tr>
<td><strong>Family history</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H. pylori infection</td>
<td>0.21 (0.13-0.30)</td>
<td>0.10 (0.01-0.30)</td>
</tr>
<tr>
<td>Stomach cancer</td>
<td>0.22 (0.14-0.32)</td>
<td>0.24 (0.08-0.47)</td>
</tr>
<tr>
<td><strong>Medical history</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tested for H. pylori</td>
<td>0.13 (0.07-0.22)</td>
<td>0.10 (0.01-0.30)</td>
</tr>
<tr>
<td>Had gastroscopy</td>
<td>0.10 (0.05-0.18)</td>
<td>0.10 (0.01-0.30)</td>
</tr>
<tr>
<td>History of heart, lung, stomach or intestinal disorders</td>
<td>0.13 (0.07-0.22)</td>
<td>0.29 (0.11-0.52)</td>
</tr>
<tr>
<td>On stomach medications</td>
<td>0.23 (0.15-0.33)</td>
<td>0.19 (0.05-0.42)</td>
</tr>
</tbody>
</table>

*95% Confidence Interval
Conclusions

- Endoscopic and histopathologic patterns consistent with an elevated risk of gastric cancer
- Community worries over cancer risks from *H. pylori* infection are well-placed
- Additional knowledge exchange strategies are currently being developed to aid understanding of:
  - *H. pylori* health risks
  - Currently available solutions
  - Unsolved challenges
Conclusions

• 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
- Canadian Association for Gastroenterology with Canadian Institutes for Health Research & Industry Partners
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- Public Health Agency of Canada
- Indian and Northern Affairs Canada (Northern Scientific Training Program)
- Canadian Circumpolar Institute
- Anisnawbe-Kekendazone (NEAHR-Ottawa)
- Nasivvik
- ArcticNet
Thank you!
Questions?

Aklavik, NWT
2:30 am, June 2, 2009
Aklavik Community Organizations
• Rachel Munday, Nurse in Charge, Aklavik Health Centre
• Aklavik Health Committee
• Billie Archie, Arctic Health Research Network, Aklavik Chapter

NWT Agencies
• Andre Corriveau, Chief Medical Officer, Health and Social Services, NWT
• John Morse, Medical Director, Stanton Territorial Health Authority
• Leah Seaman, Beaufort-Delta Regional Health and Social Services Authority
• Susan Chatwood, Director, Arctic Health Research Network

Alberta Health Services
• Robert Bailey, Director, Northern Health Services Network

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• Gastroenterology: Sander van Zanten, Justin Cheung, Amy Morse, Richard Fedorak
• Microbiology: Monika Keelan, Joanne-Simala Grant
• Pathology: Safwat Girgis
• Anthropology: Christopher Fletcher
• Health Policy: Carl Phillips