

# Updates on Community-Driven *H. pylori* Projects in Arctic Canada



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*GI Research Rounds – May 15, 2018*

**CAN Help**  
WORKING GROUP

# Presentation overview

- Ali:  
Overview of the Research Program
- Taylor:  
Social Inequity, Gender and *H. pylori* Infection in Arctic Canada
- Amrit:  
The Impact of Free-Living Amoebae on the Prevalence of *Helicobacter pylori* Infection in Northern Indigenous Canadian Communities

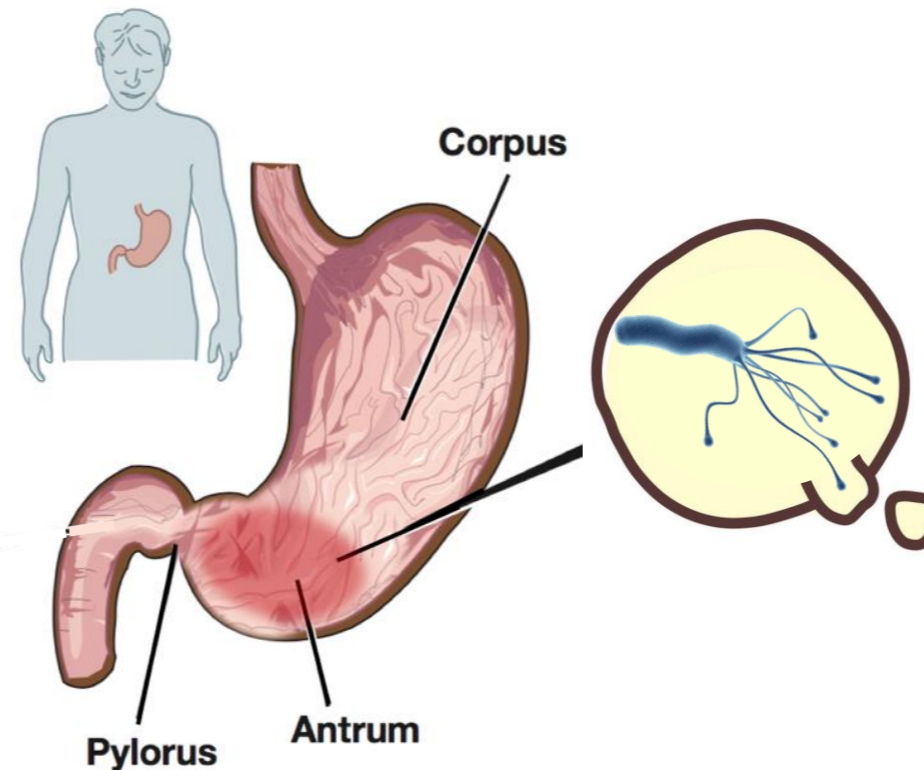


# *Helicobacter pylori*

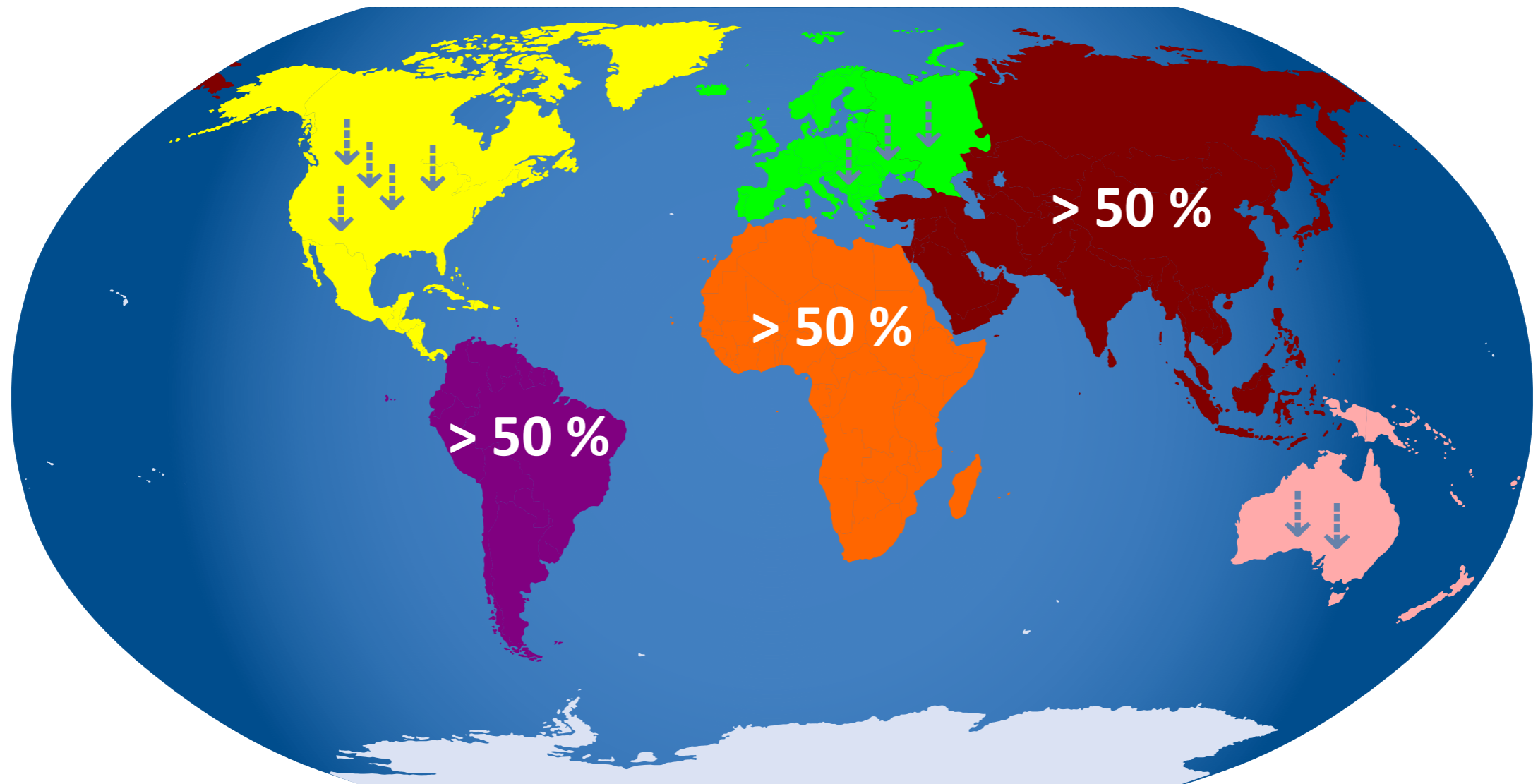
Stomach Cancer

Peptic Ulcer

Chronic Stomach  
Inflammation



# *H. pylori* Prevalence



# *H. pylori* in Canada

- Indigenous peoples residing in northern Canada have an elevated prevalence of *H. pylori* infection relative to southern Canadian populations.





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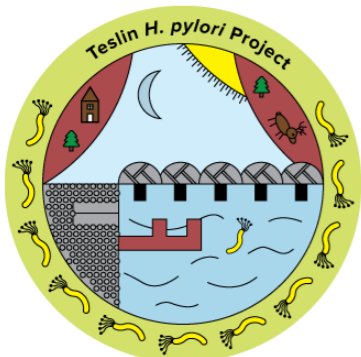
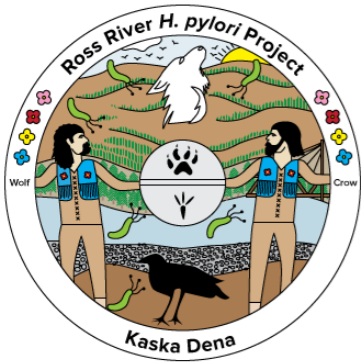
2006-2008







Aklavik H. pylori Project



# Projects Components





# Participation in Community Projects

Participants Recruited	1397
Info on <i>H. pylori</i> status	1333
Health Surveys Completed	1222
Participant Surveys Completed	920
Endoscopies Completed	405
Assigned Treatment in Trial	294

# *H. pylori* Infection Prevalence

## in CANHelp Community Projects Participants

Community	Launch Year	<i>H. pylori</i> prevalence (by UBT)	
		Number with results	% positive
<i>Northwest Territories</i>			
Aklavik	2007	341	58
Tuktoyaktuk	2011	103	57
Ft McPherson	2012	210	59
Inuvik	2017	122	25
<i>Yukon</i>			
Old Crow	2010	193	66
Ross River	2016	102	45
Teslin	2016	120	38
Pelly Crossing	2017	56	47
Carmacks	2017	62	45



# Key findings

- High prevalence of the infection
- High prevalence severe disease associated with the infection
- Re-infection following successful treatment is infrequent
- Better treatment regimens have increased treatment success from 60% to >90%
- Most participants who were successfully treated remained free of *H. pylori* infection for several years after treatment.
- Decreased acute and chronic gastritis severity after treatment



# Social Inequity, Gender and *H. pylori* Infection in Arctic Canada



Taylor Cromarty



- ***H. pylori* prevalence increases as socioeconomic status decreases**

How to measure socioeconomic status?

Research participants reluctant or unable to report income

- **Canadian Deprivation Index**

Developed by Doug Dover at Alberta Health

Quantifies Deprivation without using INCOME data;

Instead, it uses:

Education	Home Ownership	Food Security
0 – University	0 – Owner	0 – Always Secure
1 – High School	1 – Renter	1 – Sometimes Insecure
2 – < High School		2 – Always Insecure

Raw Score	CDI Score	Interpretation
0	1	Least Deprived
1	2	
2	3	
3	4	
4, 5	5	Most Deprived

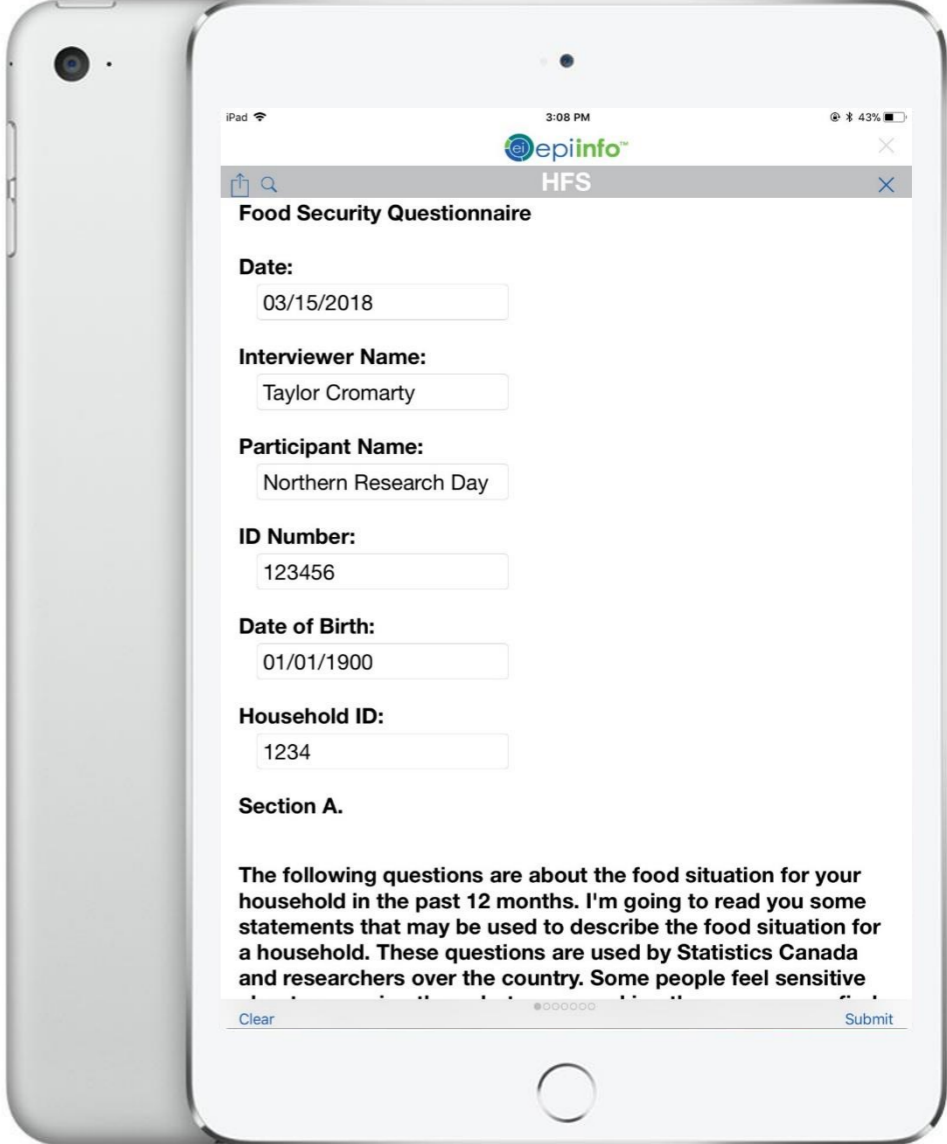
# Purpose

- 1. Estimate the frequency of *H. pylori*-associated disease in:**
  - Women relative to men
  - Households led by non-partnered women relative to other households
- 2. Estimate the effect of the CDI and deprivation indicators on the frequency of *H. pylori*-associated disease in women and children.**
- 3. Assess the validity of the CDI as a deprivation indicator for Arctic communities.**



# Methods

- **Adapted Household Food Security Module**
  - Appropriate for Arctic contexts
  - Considers traditional foods, resources
  - Low refusal rates
- **Piloted Spring 2017**
  - 4-6 Questions
  - 3 Communities
- **Data Collection Fall 2017 – Spring 2018**
  - 39 Questions
  - 8 Communities
- **EpilInfo iOS Companion**
  - Paperless data collection
  - Built-in analyses tools
  - Large, easy-to-read text



The image shows a screenshot of the EpilInfo iOS Companion app on an iPad. The app is titled "Food Security Questionnaire" and is part of the "epiinfo" suite. The form contains several input fields for data collection:

- Date:** 03/15/2018
- Interviewer Name:** Taylor Cromarty
- Participant Name:** Northern Research Day
- ID Number:** 123456
- Date of Birth:** 01/01/1900
- Household ID:** 1234

Below the form, there is a section titled "Section A." followed by a paragraph of text: "The following questions are about the food situation for your household in the past 12 months. I'm going to read you some statements that may be used to describe the food situation for a household. These questions are used by Statistics Canada and researchers over the country. Some people feel sensitive". At the bottom of the screen, there are "Clear" and "Submit" buttons.

# Results

- **Pilot Data Collection**

Inuvik, Teslin, Ross River

292 Households, 324 Participants

- **Data Collection Results:**



Aklavik H. pylori Project

Aklavik

27



Fort McPherson

27



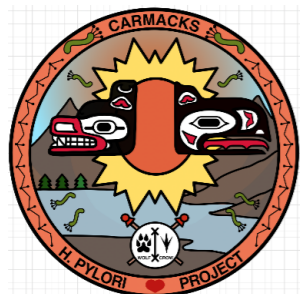
Old Crow

18



Inuvik

14



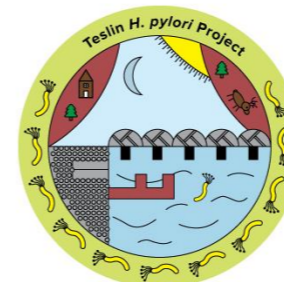
Carmacks

33



Ross River

21



Teslin

18



Pelly Crossing

42

# Pilot Data Analysis

- ***H. pylori* Prevalence by Canadian Deprivation Index (CDI) Level**  
264 with complete data for CDI score
- ***H. pylori* Prevalence by Degree of Food Insecurity**  
270 with Food Security data, classified as
  - Always secure
  - Sometimes insecure
  - Often insecure

- **The CDI asks:**

*“You and other household members worried that food would run out before you got money to buy more. Was that **often true**, **sometimes true**, or **never true** in the past 12 months?”*

- Odds Ratios and 95% Confidence Intervals for the Estimated Effects of Deprivation Index and Food Insecurity on *H. pylori* Prevalence



# Pilot Data Analysis: CDI Score

- 1 is least deprived, 5 is most deprived

CDI Score	All Households		Households Led by Unpartnered Women	
	n	%	n	%
1	47	18%	6	9%
2	78	30%	28	40%
3	61	23%	17	24%
4	56	21%	11	16%
5	22	8%	8	12%
<b>TOTAL</b>	<b>264</b>		<b>70</b>	

# Pilot Data Analysis: CDI Score

***H. pylori* prevalence is higher at higher deprivation levels**

- Effect strongest in households headed by unpartnered women, though estimates are imprecise due to small numbers

CDI Score	All Households				Households Led by Unpartnered Women			
	n	Hp+ (%)	OR	95% CI	n	Hp+ (%)	OR	95% CI
1	47	32	2.0	0.90, 4.5	6	33	4.2	0.50, 33
2	78	19	1.0	--	28	10	1.0	--
3	61	46	3.6	1.7, 7.6	17	65	15	3.2, 73
4	56	50	4.2	1.9, 9.1	11	64	15	2.6, 81
5	22	45	3.5	1.3, 9.6	8	50	8.3	1.3, 52
TOTAL	264	36			70			

# Pilot Data Analysis: Food Security

Food Security	All Households		Households Led by Unpartnered Women	
	n	%	n	%
Never insecure	227	84%	57	81%
Sometimes insecure	32	12%	8	11%
Often insecure	11	4%	5	7%
TOTAL	270		70	



# Pilot Data Analysis: Food Security

## Very strong association between Severe Food Insecurity and *H. pylori* Prevalence

- Association strong in women (OR: 10, [1.2, 90])
- Also strong in households led by unpartnered women, though estimates are imprecise due to small numbers

Food Security	All Households				Households Led by Unpartnered Women			
	n	Hp+ (%)	OR	95% CI	n	Hp+ (%)	OR	95% CI
Always Secure	227	34	1.0	--	57	20	1.0	--
Sometimes Insecure	32	38	1.2	0.50, 2.6	8	38	1.1	0.20, 5
Often Insecure	11	91	20	2.5, 158	5	80	7.4	0.80, 71

# Future Directions

- At least 200 households to be added to dataset
- Data analysis, with adjustment for confounding
- Consult planning committees for interpretation of results
- Results dissemination





# The Impact of Free-Living Amoebae on the Prevalence of *Helicobacter pylori* Infection in Northern Indigenous Canadian Communities



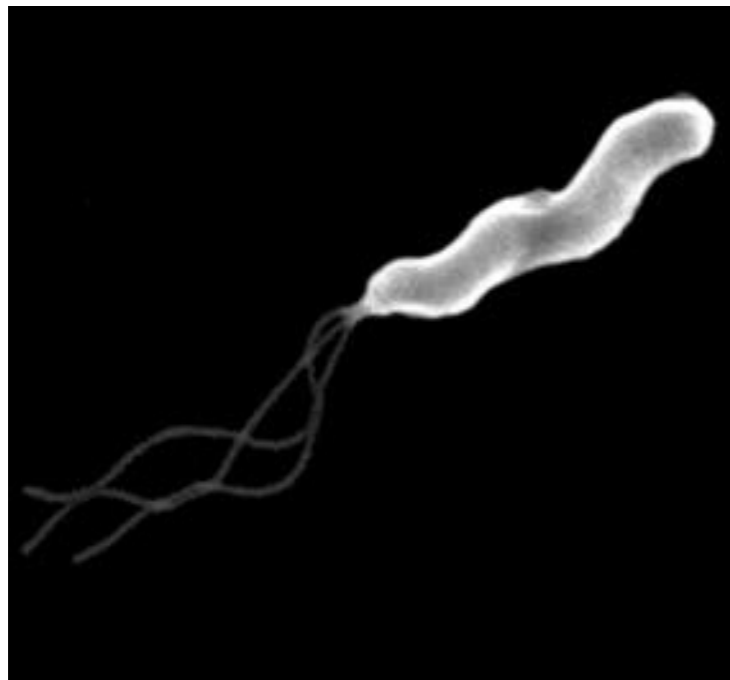
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**Amrit Passi**



# *H. pylori* and water

- Can people get *H. pylori* infection from drinking water?

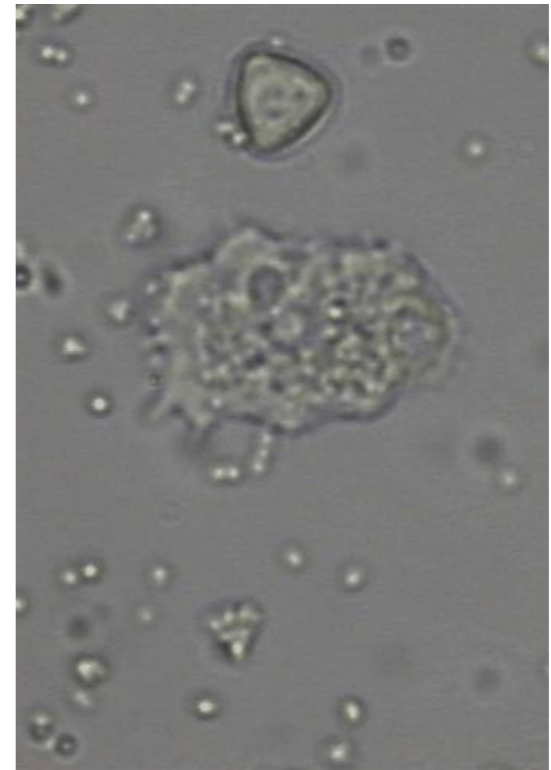


Credit: Dr. Amieva, Stanford University



# *H. pylori* and Free Living Amoebae

- What are free-living amoebae (FLA)?
- Why do FLA matter?

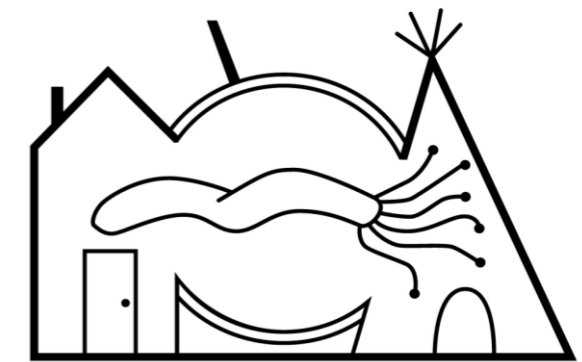


Credit: Prazeres JM et al.

# Methods

# Sample Collection Activities

Community *H. pylori* Projects  
that Participated in Water Collection Activities



Aklavik *H. pylori* Project





# Methods

## Sample Collection Activities

- Where did we collect samples from?



# Methods

## Sample Collection Activities


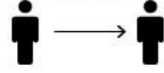
- How did we engage participants?



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The Fort McPherson *H. pylori* Project

### Water Collection Activities

**How do people get *H. pylori* Infection?**  
Most research around the world supports the theory that most people who have *H. pylori* infection got infected during childhood, usually through direct contact with digestive fluids from a person who has the infection.

**What about water?**  
Research has not ruled out the possibility that people may get *H. pylori* infection from water on occasion, but it is unlikely that this is the usual way people get infected, especially if the water has been treated to make it safe for drinking.



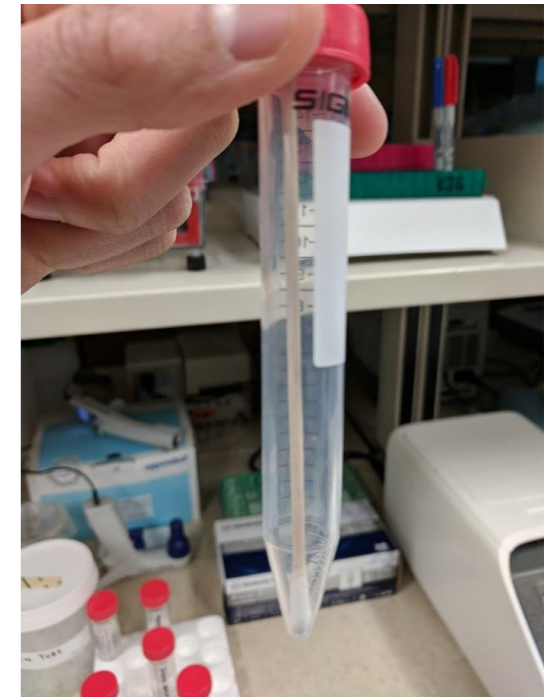
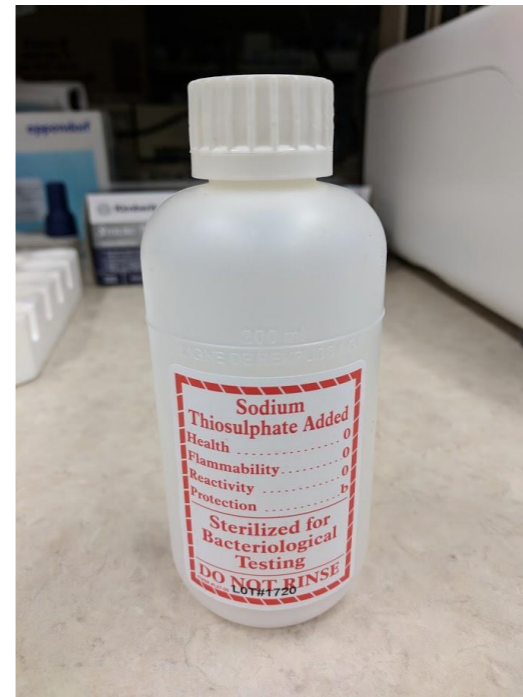




# Methods

## Household Sample Collection

- In households, we collected samples from:





# Household Sample Collection Form

- We asked participants about their plumbing using a structured questionnaire

CAN Help WORKING GROUP		Water Collection Form
Date	Day ___ Month ___ Year _____	Community: _____
Address/Location	_____	Sample Collector Name _____
Participant Name (if applicable)	_____	GPS Coordinates _____
Place of Sample Collection		ID number _____
<input type="checkbox"/> Household	<input type="checkbox"/> Community Facility	<input type="checkbox"/> Environmental source
<input type="checkbox"/> Other; specify: _____		
Collected Samples		
Number of 200mL B1000TE/L27 containers	_____	
Number of 2L Filtered Samples	_____	
Number of Biofilm swab(s)	_____	
<i>Add pages for multiple samples:</i>		
Sample # _____	(type and source): _____	

# Methods

## Environmental Water Collection

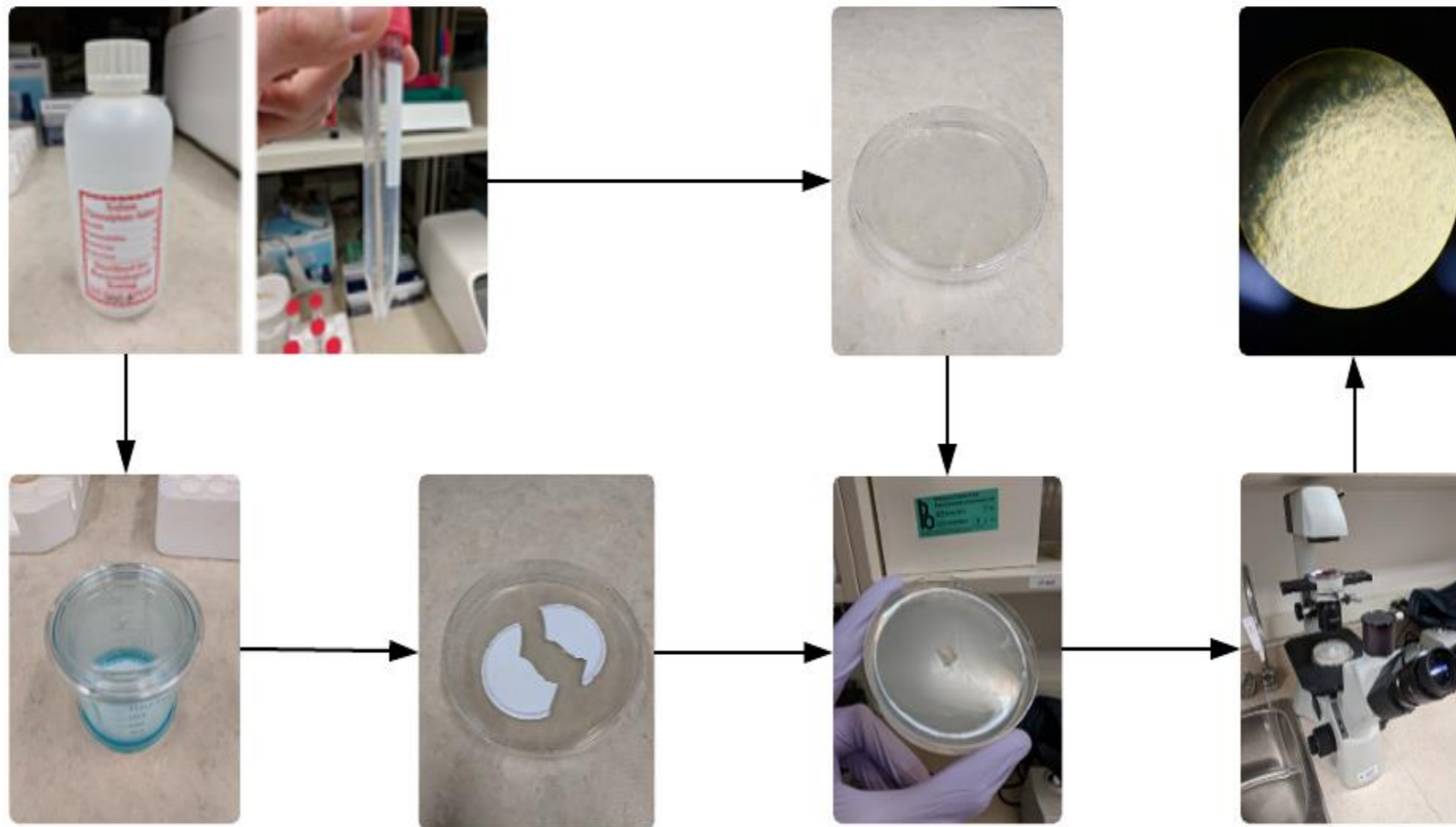
- From each environmental location, I collected three 200mL water samples





# Methods

## Walk-out Plating Method





# Results

## Number of Collection Sites by Community

Location	Community					Total
	Yukon			Northwest Territories		
	Ross River (2017)	Teslin (2017)	Old Crow (2018)	Aklavik (2018)	Fort McPherson (2018)	
Households	2	5	10	3	16	36
Community facilities	1	2	1	1	1	6
Environmental sites	11	7	0	0	0	18

# Results

## Findings to Date: 7 Teslin & Ross River Households

Sample type	Detection of FLA*	
	n	Positive for FLA
Kitchen Tap†	6	2
Shower/Bathtub	7	2
Toilet Tank	7	7
Toilet Tank Swab	7	5

\*Presence of FLA trophozoites/cysts confirmed by light microscopy and growth on plate

†Only collected from 6 households

# Ongoing Research

- Isolate and classify FLA from all collected samples
  - Walk-out plating method
  - Molecular methods
- Investigate whether households colonized by FLA capable of harboring *H. pylori* have an elevated prevalence of *H. pylori* infection
  - Previously collected data



# Special Thanks to

- *CANHelp* Working Group
- Nicholas Ashbolt & the Ashbolt lab
- Brendan Hanley, YT Chief Medical Officer of Health, and government partners in YT and NT
  
- Planning committees and participants in Ross River, Teslin, Fort McPherson, Aklavik, and Old Crow
  - Daylce Huot (Teslin)
  - Theresa Tom (Ross River)
  - Winnie Greenland (Fort McPherson)

# Thank you – Questions?

# Acknowledgements



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- ArcticNet Network of Centres of Excellence of Canada
- Aboriginal Affairs and Northern Development Canada
- Canadian Circumpolar Institute



Inuvialuit Regional Corporation

