

## Skin Infection Knowledge, Attitudes, and Practices Among Alaska Native People — Three Rural Alaska Communities, 2012

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26 March 2013

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## Request for CDC Assistance

- ❑ May 17, 2012: Medical Director from Yukon Kuskokwim Health Corporation contacted the Arctic Investigations Program (AIP)
- ❑ Anecdotal increase in skin and soft tissue clinical encounters in southwestern Alaska

## Water and Sanitation in Alaska

- ❑ 20% rural homes lack running water, flush toilets
- ❑ Alaska Natives suffer disproportionate burden of water and sanitation related diseases
- ❑ Significant challenges with providing water and sanitation services in remote areas
  - Material transport
  - Engineering challenges with extreme Arctic conditions
  - Cost-prohibitive

## Skin and Soft Tissue Infections

- ❑ Boil: an infection under the skin that causes a painful, pus-filled lump
  - Furuncle: deep infection of the hair follicle
  - Carbuncle: a collection of furuncles



## *Staphylococcus aureus*

- ❑ Common cause of skin infection
- ❑ Spread by direct contact
- ❑ Colonizes skin and nasal sinuses
  - 25-30% of US population
- ❑ Antibiotic resistance, emerging public health concern
  - MRSA: Methicillin-resistant *Staphylococcus aureus*
  - MSSA: Methicillin-sensitive *Staphylococcus aureus*



## Early Documentation of Boils in Alaska

- ❑ Historically high rates of skin, soft tissue infections
  - Documented as early as 1842 in the Yukon River Delta



### Investigation Links Steambaths to Boils

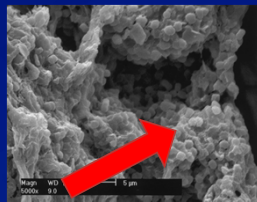
- ❑ **1996 Outbreak investigation**
  - ~25% of population reported having a boil during previous 12 months
- ❑ **Risk factors for boils:**
  - Traditional sauna or "Steam bath" use
  - Steam with more than 8 people
  - Not sitting on a protective barrier
  - Household member with boil

### Boil Outbreak Associated with Community Acquired MRSA

- ❑ **2000 Skin infection outbreak reported**
  - 10-fold increase in MRSA isolates
  - 75% of MRSA+ cultures: no classic risk factors
  - Nasal carriage: 40% MRSA; 33% MSSA
- ❑ **Risk factors identified:**
  - Antimicrobial drug use within previous 12 months
  - Crowded steambaths
  - Household member with boils
  - MRSA colonized steambaths

### MRSA Colonized Steambaths

- ❑ Surfaces contained a biofilm matrix with coccoid organisms consistent in size and shape with staphylococci
- ❑ Bacterial cultures of wood samples from steambath seating areas grew MRSA



### Public Health Response

- ❑ **Standardized treatment guidelines**
  - Emphasized incision and drainage
  - Adjusted antibiotic regimens
- ❑ **Educational messages developed:**
  - Disinfect steambaths with bleach after use
  - Use barriers while seated in steambaths
  - Limit crowding in steambaths
  - Avoid using steambath with skin infections
  - Avoid sharing towels

### Traditional Steambaths

- ❑ **Maqiaq: traditionally used for personal hygiene**
  - Extremely hot temperatures inside
  - Basin baths after steaming
  - "Scrub" to scour skin clean
- ❑ **Cultural, social significance**
  - Men steam first
  - Women, children second
  - Fun, enjoyable



### Traditional Steambaths



### Inside a Steambath

- Inside height ~1.25 meters

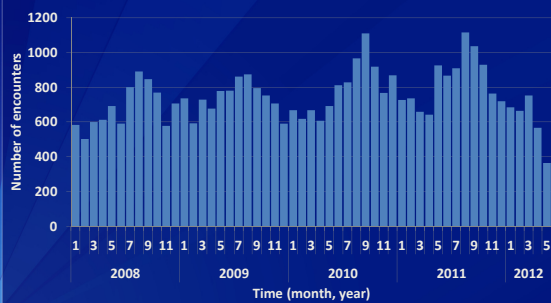


### Stakeholder Working Group

- Arctic Investigations Program
- Alaska State Health Department
- Yukon Kuskokwim Health Corporation
- Hospitalization for skin infections common
  - 6<sup>th</sup> most common reason in Southwest Alaska in 2005
  - 10<sup>th</sup> most common reason statewide in 2007

Descriptive  
Epidemiology

### ICD-9 Codes for Skin Infections — YK Health Corporation, January 2008 – May 2012



### ICD9 Coded Skin Infection Encounter Rates by Community, Year (per person-year)

Community	Average	2008	2009	2010	2011
Chefornak	1.95	1.65	1.83	2.11	2.23
Toksook Bay	1.15	1.04	1.17	1.41	1.00
Kwethluk	0.85	0.79	1.10	0.88	0.63
Kasigluk	0.62	0.61	0.67	0.61	0.60
Scammon Bay	0.61	0.81	0.76	0.61	0.29
Atmautluak	0.57	0.41	0.63	0.52	0.72
Kongiganak	0.52	0.74	0.38	0.44	0.52
Akiachak	0.51	0.22	0.39	0.60	0.80
Hooper Bay	0.48	0.23	0.44	0.57	0.66
Newtok	0.47	0.43	0.54	0.47	0.44
All Villages	0.37	0.33	0.36	0.38	0.39

### Plan of Action for Reducing Skin and Soft Tissue Infections in Rural Southwest Alaska



### Epi-Aid Investigation

- September 13, 2012 Epi-Aid requested
  - Evaluation of community knowledge, attitudes, and practices (KAP)
- Three member teams conducted interviews
- Three communities
  - Chefornak: Sep. 25–30, 2012
  - Toksook Bay: Sep. 30–Oct. 8, 2012
  - Kwethluk: Oct. 8–15, 2012

### KAP Survey Objectives

- ❑ Determine the knowledge of boil risk factors
- ❑ Identify current practices for prevention of boils
- ❑ Describe barriers to implementing previous recommendations
- ❑ Evaluate acceptability of potential interventions



### Methods

- ❑ **Cross-Sectional Mixed-Methods Approach**
  - Hospital surveillance
  - Quantitative: 40 fixed answer questions
  - Qualitative: 28 open-ended questions
  - Ethnographic observation
- ❑ **Survey administered in person**
  - ≥18 years of age
  - 2 persons per household
  - Interviews ~25 minutes each



### Methods

- ❑ **Villages Selection**
  - Highest rates of skin infection encounters
- ❑ **US Census information**



### Data Analysis

- ❑ **Quantitative data**
  - Double data entry
  - STATA v10
- ❑ **Qualitative data**
  - Double data entry
  - Analyzed for general themes: Health Belief Model
    - Susceptibility, Severity, Barriers, Benefits
  - Coded twice independently



### Survey Tool

- ❑ **Knowledge:**
  - Boil identification
  - Boil risk factors
- ❑ **Attitudes:**
  - Severity of boils
  - Boil treatment
- ❑ **Practices:**
  - Laundry
  - Personal hygiene
  - Steambath cleaning



## RESULTS

**Participant Demographics by Village**

	Chefornak	Toksook Bay	Kwethluk	Total
Population	418	590	721	1729
Population ≥18 yrs of Age	257	335	434	1026
Number of participants	102	181	209	492
Percent Eligible Participating	40%	54%	48%	48%
Mean Age of Participants	39.6	40.3	41.0	40.4
Percent Male	40%	48%	46%	46%

**Participant Household Demographics by Village**

	Chefornak	Toksook Bay	Kwethluk
Number of Households	89	128	172
Percent of Households Participating	67%	80%	81%
Mean Household Size	6.7	5.6	5.3
Households >1.5 People/Room	41%	33%	24%
Unemployed Population ≥16 yrs	25%	22%	17%
Households Receiving Supplemental Nutrition Assistance Program	55%	24%	29%

**KNOWLEDGE****What is a boil?**

- ❑ **Traditional understanding:**
  - "Aniinguaq; a little person in there with pus"
- ❑ **Infection:**
  - "Bacteria, it can have MRSA"
  - "Infection from being dirty"
- ❑ **Visual:**
  - "Large pimple"
- ❑ **Feeling:**
  - "A bad thing. They make me sick and depressed"

**How do you know if you have a boil?**

- ❑ **Visual:**
  - "a regular pimple that gets bigger"
- ❑ **Prior experience:**
  - "My son has them"
  - "I have had one before"
- ❑ **Sensation:**
  - "Painful, itching, irritating"

**Percent of People Endorsing Getting Boils**

	Chefornak	Toksook Bay	Kwethluk
By sharing clothes or towels	91%	84%	90%
By touching other people	42%	48%	48%
By touching other peoples' boils	87%	80%	88%

"Stay away from people with boils"  
 "Be clean, wear clean clothes, and use clean towel to sit on"  
 "Clean fingernails and hands, washing and [be] careful where scratching"



### How can a person get a boil?

- ❑ **Hygiene as a risk factor:**
  - "Not cleaning steam or house or clothes"
  - "Slimy sauna surfaces"
- ❑ **Steaming as a risk factor:**
  - "Contagious bacteria by passing in steamhouse"
  - "If I go to another person's steam I can probably get a boil"
- ❑ **Idiopathic responses uncommon:**
  - "I'm not sure, it seems like they just grow on people"

### Would you worry about steaming with a person that has a boil?

	Chefornak	Toksook Bay	Kwethluk
Percent Endorsing Worry	84%	65%	71%

*"They can spread [boils] with their leaking pus"*

*"Where they sit...it could spread. Should wash the steam if someone with a boil sat there"*

\*\*\*

*"You should not shun people with the illness because it will be more likely that it will come [to you]"*

## ATTITUDES

### How Serious Is It To Get a Boil?

	Chefornak	Toksook Bay	Kwethluk
Very serious	56%	55%	50%
Somewhat serious	40%	34%	41%
Not very serious	4%	11%	9%

*"it can enter tissue ... and it might go to the heart"*

*"It is going to spread ... usually 2 others will appear"*

*"It can get in your blood and you can die, my cousin died from Staph in the blood"*

### What Are the Best Ways to Cure Boils?

	Chefornak	Toksook Bay	Kwethluk
Lancing / Draining	50%	42%	49%
Frequent washing	21%	35%	28%
Drugs given by health center	32%	30%	22%
Bandage and ointment	24%	20%	31%
Traditional / Herbal remedies	13%	14%	8%

- ❑ **96% of people said that boils can be cured**

## PRACTICES

### Village Water Sources

#### ❑ Piped water service



### Village Water Sources

#### ❑ Self-haul Treated



### Village Water Sources

#### ❑ Self-haul Natural



### Village Water Sources

#### ❑ Self-haul Natural



### Village Water Sources

	Chefornak	Toksook Bay	Kwethluk
Piped Water (% households)	2%	70%	6%
Self-Haul Treated (% households)	82%	29%	29%
Self-Haul Natural (% households)	93%	27%	94%

### Strict Water Conservation Practices

- ❑ Water is difficult to collect
- ❑ High cost
- ❑ Difficult to transport
- ❑ Average Daily Use: 1–2 gallons (~3.75–7.6 liters)
  - SPHERE minimum: 7.5–15 liters per person per day



### Impacts of Water Conservation

- ❑ Laundry
- ❑ Hand washing
- ❑ Personal hygiene



### Laundry in Homes Without Running Water

- ❑ Most washers are portable, "Danby"
  - ~10 lb clothes
  - ~15 gallons of water
- ❑ Two separate parts:
  - "Washer" / agitator
  - "Spinner" / dryer
  - Drainage tube used to drain or recycle water



### Laundry Drying Practices



- ❑ Homes do not have dryers and often the dryers are not used in the washeteria due to cost (~\$7 per load)

### Where is Laundry Done?

	Chefornak	Toksook Bay	Kwethluk
Home	92%	77%	37%
Washeteria	0%	0%	63%
Family, friends	8%	24%	1%

- ❑ When public facilities are available, two-thirds of communities use this resource



### How Often is Laundry Done?

	Chefornak	Toksook Bay	Kwethluk
Average per Week	1.6	2.6	1.5

- ❑ Laundry is done more often when piped water is available ( $P < 0.001$ )

### Danby Water Recycling

- ❑ Concerns about unsafe water conservation practices noted early in investigation
  - Question added to determine water "recycling"





### How Many Loads Are Washed Before the Water is Changed?

	Chefornak	Toksook Bay	Kwethluk
Average Number of Loads per Change of Water	4.1	1.2	2.8

- Water is recycled more often in villages without running water ( $P < 0.001$ )

### Hand Washing: Plumbing but No Hookup



### Hand Washing Practices

	Chefornak		Toksook Bay		Kwethluk	
Mean Number of Household Sinks	2.0		1.9		2.0	
Mean Number of Household Sinks with Running Water	0.0		1.4		0.1	
Mean Number of Times Hands Washed per Day	M	F	M	F	M	F
	4.3	5.4	4.5	5.5	4.3	5

- Women hand wash more frequently ( $P < 0.001$ )
- Back of envelope : 10 hand washes per water change

### How often do you ...?

	Chefornak	Toksook Bay	Kwethluk
Shower (Average per Week)	0.3	1.1	0.8
Steam (Average per Week)	3.7	2.7	2.8
Always use an abrasive scrub during steambath	98%	97%	98%
Share scrub with others	25%	21%	25%
Always use a towel to dry off after steaming	100%	99%	98%
Share your towel with others	19%	10%	17%

### Frequency of Steambath Cleaning by Household

	Chefornak	Toksook Bay	Kwethluk
Less than 1x week	2%	9%	25%
1-2x week	35%	36%	41%
≥3x week	63%	55%	35%

- All respondents said they use either:
  - Diluted Clorox
  - Hexol
  - Pinesol

### Summary

- Knowledge**
  - No major misconceptions
  - Prior public health educational messages were understood and accepted
- Attitudes**
  - Communities believe boils are a problem
  - Motivated to prevent boils  
"because [boils] can cause sepsis and kill"

### Summary

- **Practices**
  - Identification of practices that can be improved
  - Hand washing
  - Laundry
  - Steamhouse cleaning
  - Sharing hygiene items

### Limitations

- **ICD9 data reflect encounters, not incidence of boils**
- **Under-reporting of boils likely**
  - Cultural preferences for care at home

*"[I use topical] alcohol wipes when the boil is starting, or Pinesol; [then] tobacco leaves to cover them; [then] hot pack; [then] open the boil and put gauze in the wound...if it doesn't go away...I go to the clinic"*
- **Self reported data from interviews**
  - Social desirability of answers

### Next Steps

- **Expand descriptive epidemiology**
  - Microbiological data
- **Develop educational materials for:**
  - Laundering practices
  - Hand washing
  - Steambath/Washeteria cleaning
- **Diminish barriers to implement practice**
  - Laundry service access (e.g., dryer tokens)
  - Hand sanitizer
  - Bleach / cleaning supplies

### Next Steps (2)

- **Role for environmental testing**
  - Laundry machines
  - Hand washing basins
  - Sinks
  - Public showers

