

# Response to a Cluster of *Haemophilus influenzae* Serotype A Cases in a Small Alaska Community, 2018

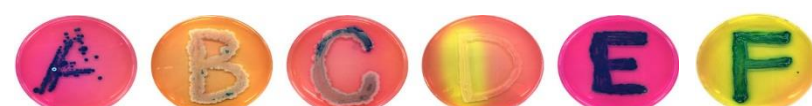
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## Background

*Haemophilus influenzae* is a pleomorphic gram-negative coccobacillus with encapsulated and non-encapsulated strains

The encapsulated are divided into 6 serotypes



Alaska has observed an increase in invasive disease caused by *H. influenzae* serotype a (Hia) in recent years.

- The first identified case of invasive Hia (iHia) in Alaska occurred in 2002
- Since that time, iHia has increased in Alaska
- The severity of disease from Hia is similar to that historically seen with *H. influenzae* serotype b (Hib)
- The American Academy of Pediatrics Red Book added permissive language for prophylaxis after a case of iHia in 2018

“Clinicians may consider prophylaxis of contacts of index cases of invasive Hia disease”

Between May and July 2018, four invasive cases of Hia occurred in a remote Alaska community of 700 people.

- This was the first time a cluster of cases was detected in one community
- Public health officials were concerned that further cases would occur

The outbreak response was led by three organizations:



State of Alaska’s Department of Health and Social Services, Division of Public Health



The Centers for Disease Control and Prevention’s Arctic Investigation Program



The Yukon-Kuskokwim Health Corporation

## Goal 1: Prevent Additional Cases

Method: Prophylactic rifampin was distributed during two visits to people in the community thought to be at highest risk: contacts and children

### Contacts



- Defined as individuals who spent ≥4 hours with the iHia patient for ≥ 5 of seven days preceding that patient’s hospitalization
- 22 people in close contact with the iHia patients were given rifampin during the response; 18 had been prophylaxed earlier by their health providers
- 66% of identified contacts were given prophylaxis

### Children



- The team considered children <10 years old to be at highest risk of iHia, therefore these children were offered rifampin prophylaxis
- 110 Community children <10 years of age, representing 89% of children <10 years in village

No additional cases of iHia have occurred in this village since the response

## Goal 2: Investigate why so many cases occurred in one small village

Method: Oropharyngeal swabs were collected and tested for all *H. influenzae* serotypes by culture and PCR

Figure 1: *Haemophilus influenzae* carriage prior to antimicrobial treatment

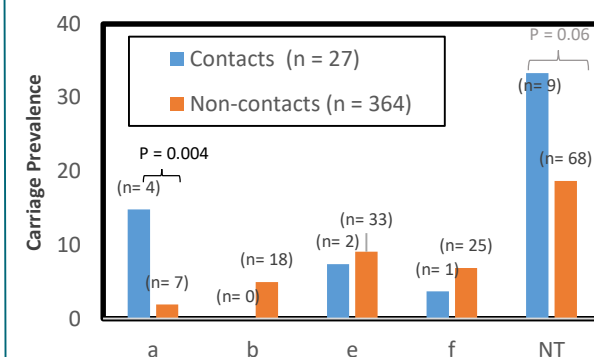
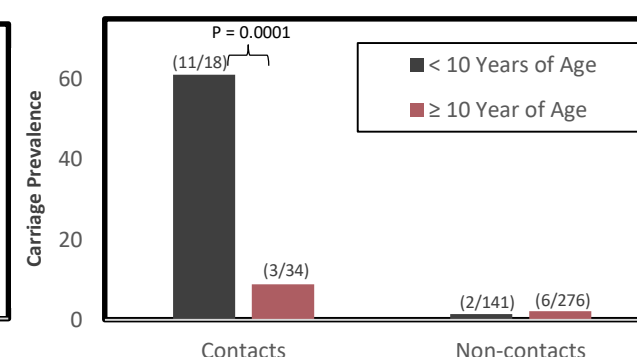


Figure 2: Individuals who carried of Hia at any time, divided by age and contact status



- Samples were collected from 403 people, 62% of the community
- Hia was carried at a significantly higher frequency in contacts < 10 years old than in older contacts or community members
  - This was only true for Hia, all other *H. influenzae* serotypes were evenly distributed irrespective of contact status
- People who carried Hia were clustered in a small number of households
  - People who lived in the same household as iHia patient were the most likely to be positive
    - 60% of people within the patient households carried Hia

## Goal 3: Evaluate the impact of prophylaxis on Hia carriage

Method: Oropharyngeal swabs were collected both immediately after prophylaxis (1 day post medication completion) and 8 weeks after prophylaxis. Samples were tested for all *H. influenzae* serotypes by culture and PCR

Figure 3: Carriage of Hia pre, and 8 weeks post, treatment divided by contact status

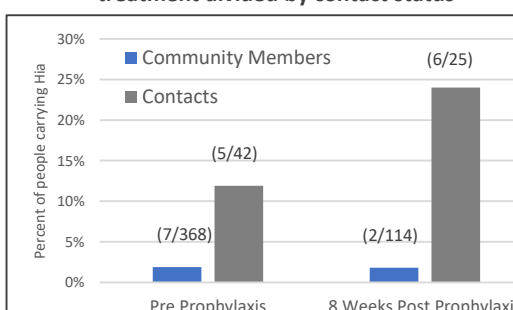
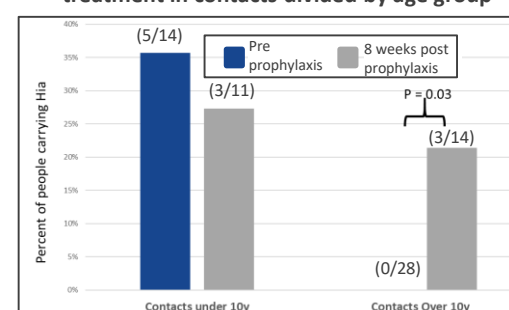


Figure 4: Carriage of Hia pre, and 8 weeks post, treatment in contacts divided by age group



- 3 out of 4 people were cleared of Hia immediately after prophylaxis
  - It was unclear if the remaining person received the medication
- 8 Weeks after rifampin distribution, Hia continued to be carried at high rates in the contacts
  - Adult contacts had a significant increase in Hia carriage at 8 weeks post treatment

## Conclusions

- No additional cases of invasive Hia occurred in this village after the public health intervention
- Contacts under 10 years old were found to have a significantly higher rate of Hia carriage than others in the community
- In a small sample, prophylaxis eliminated Hia carriage in the short term
- Eight weeks after rifampin distribution, contacts continued to carry Hia at significantly higher rates

## Recommendations and Future Actions

- This response found that prophylaxis of non-contacts is unlikely to be useful as Hia carriage is not common in the general community
- It is unclear why Hia carriage did not change in the long term
  - We hypothesize Hia bacteria may have moved between individuals who were prophylaxed at different times. We would like to evaluate if synchronized prophylaxis is more successful at eliminating carriage in a population
- Further investigation is needed to understand why such a high proportion of contacts carry Hia at for an extended period of time

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