Invasive *Haemophilus influenzae* Infections Among New Mexico Residents—2004–2011

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Background

- Formerly called Pfieffer’s bacillus
  - Described during influenza pandemic in 1892

- In 1930, two major categories of *H. influenzae*:
  - Un-encapsulated strains (non-typeable)
  - Encapsulated strains (types a-f)
  - Capsule allows bacteria to resist phagocytosis and complement-mediated lysis in the non-immune host

- Mistakenly considered to be the cause of influenza until 1933
**Haemophilus influenzae Transmission**

- Person-to-person transmission by inhalation of respiratory droplets
  - People can become colonized with bacteria
  - Invasive infection can develop if respiratory mucosa compromised

- Direct contact with nose and throat discharge during the infectious period
Haemophilus influenzae Epidemiology in the U.S.

- Causes disease and death in children and adults with underlying conditions, including compromised immune systems
  - Mean annual incidence 1.6/100,000

- Rates of invasive disease are highest among infants (9.5/100,000) and those aged ≥65 years (6.3/100,000)

- Vaccine for serotype B (Hib) introduced in 1985
  - Resulted in dramatic decline in incidence of Hib-related disease

- Rates of invasive disease higher among American Indians and Alaska Natives

- New Mexico: 2.1/100,000
- U.S. Estimate: 1.6/100,000

Person becomes ill → Person seeks medical care → Sample is taken, bacteria grow

Bacteria ID at State Lab → Report to Health Department → Medical Record Review and Data Collection

CDC
Selected Variables for *Haemophilus influenzae* Cases, New Mexico, 2004–2011 (n=328)

<table>
<thead>
<tr>
<th>Syndrome:</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteremia</td>
<td>101 (31%)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>157 (48%)</td>
</tr>
<tr>
<td>Meningitis</td>
<td>38 (12%)</td>
</tr>
</tbody>
</table>

| Sex (Male)    | 165 (50%)   |

Case-Fatality Ratio: 46 (14%)
### Haemophilus influenzae Mortality by Age Group, New Mexico, 2004–2011

<table>
<thead>
<tr>
<th>Age group</th>
<th>No. cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 &lt; 1</td>
<td>20</td>
</tr>
<tr>
<td>1-4</td>
<td>40</td>
</tr>
<tr>
<td>5-19</td>
<td>60</td>
</tr>
<tr>
<td>20-39</td>
<td>80</td>
</tr>
<tr>
<td>40-59</td>
<td>100</td>
</tr>
<tr>
<td>60-64</td>
<td>120</td>
</tr>
<tr>
<td>65+</td>
<td>140</td>
</tr>
</tbody>
</table>

- **Died**
- **Survived**
Rate of *Haemophilus influenzae* by race/ethnicity, New Mexico, 2004–2011

![Graph showing rates of *Haemophilus influenzae* by race/ethnicity in New Mexico from 2004 to 2011. The graph includes bars for American Indian, Asian/Pacific Islander, Black, Hispanic, and White populations, with American Indian having the highest rate and Asian/Pacific Islander having the lowest rate.](image-url)
Cases by Month of Culture, New Mexico, 2004–2011 (n=328)
Haemophilus influenzae Serotypes Among New Mexico Residents, 2004–2011
Cluster of *Haemophilus influenzae*, type A (Hia), New Mexico, 2009–2010
Cluster of *Haemophilus influenzae*, type A (Hia), New Mexico, 2009–2010

- September–March
  - 11 reports of invasive Hia disease
  - 2–5 Hia reports expected per season
- American Indians (AI)
- Children aged <5 years
- Invasive Hia reportable
Epidemiologic Investigation Objectives

- Characterize cases through epidemiologic and laboratory methods
- Identify secondary cases
- Quantify apparent increase in cases
Case Definition

- Hia isolate from sterile site
  - Blood
  - Cerebrospinal fluid (CSF)
  - Joint fluid
- Children aged <5 years
- Cultured in New Mexico (NM)
Methods

- Interviewed caretakers of cases
- Reviewed medical charts
- Compared isolates by pulsed-field gel electrophoresis (PFGE)
Results

- No epidemiologic links between cases
- No secondary cases
## Data Summary

### Demographics

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Value</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, median (range)</td>
<td>13 mos</td>
<td>(3 mos–25mos)</td>
</tr>
<tr>
<td>Male, no. (%)</td>
<td>5</td>
<td>(45%)</td>
</tr>
<tr>
<td>Race / Ethnicity, no. (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian</td>
<td>8</td>
<td>(73%)</td>
</tr>
<tr>
<td>White, Hispanic</td>
<td>2</td>
<td>(18%)</td>
</tr>
<tr>
<td>White, Non-Hispanic</td>
<td>1</td>
<td>(9%)</td>
</tr>
<tr>
<td>Death</td>
<td>2</td>
<td>(18%)</td>
</tr>
</tbody>
</table>
Hia Cases by Month of Culture
September 2009–March 2010 (n=11)
Pulsed-field gel electrophoresis (PFGE)

Hia 1  Hia 2  Hia 3  Hia 4

County: Bernalillo  San Juan  San Juan and McKinley
Hia Cases by Year, New Mexico, 2004–2011

- Year
- No. of Cases
Discussion

- Epidemiology of *Haemophilus influenzae* changed since introduction of vaccine against serotype B
- Other serotypes still cause invasive disease
- AI children aged <5 years are at higher risk for invasive disease than other populations
- Further study of changing epidemiology of other serotypes, including type a
QUESTIONS?

From: www.nmeip.org