**Haemophilus Influenzae, Invasive Disease Surveillance Protocol**

**Healthcare Provider Responsibilities**
1. Report all suspected cases of invasive *Haemophilus influenzae* disease **within 24 hours** to the local health department. Please be prepared to provide the Local Health Departments with information regarding the patients as it is needed.
2. Submit isolates from sterile site of *Haemophilus influenzae* to the Office of Laboratory Services (OLS) immediately for serotyping. OLS may be accessed as follows:
   - Phone: 304-558-3530
   - Mailing address: 167 11th Ave. South Charleston, WV 25303
3. Submit paper copies of laboratory reports to the local health department via fax.
   - The patient with invasive Hib disease must be placed on droplet precautions until 24 hours after initiation of effective antimicrobial therapy.
   - Provide prophylaxis for high risk contacts of invasive Hib disease:
     - All household contacts if there is at least one unimmunized or incompletely immunized household contact younger than 4 years of age.
     - All household contacts if there is an immunocompromised child in the household even if the child is older than 4 years of age and fully immunized.
     - All household contacts if there is a child in the household younger than 12 months of age who has not received the primary series of Hib conjugate vaccine.
   - Exposed children in whom febrile illness develops should receive prompt medical evaluation.

**Laboratory Responsibilities**
1. Immediately notify the physician and infection preventionist of a positive test result for invasive Hib.
2. Forward isolates cultured from normally sterile sites to WV OLS for serotyping. OLS may be accessed as follows:
   - Phone: 304-558-3530
January 2015

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- Mailing address: 167 11th Ave. South Charleston, WV 25303

3. Notify and fax a copy of a positive test result of invasive H. flu to your local health department **within 24 hours** of diagnosis for public health investigation. For reference labs, please fax and notify West Virginia Division of Infectious Disease Epidemiology (DIDE) at (phone) 304-558-5358 and (fax) 304-558-8736.

**Local Health Responsibilities**

1. Educate the public about invasive *Haemophilus influenzae* disease, especially its transmission.
2. Educate providers and laboratories to report confirmed and probable cases of invasive *Haemophilus influenzae* disease **within 24 hours** of diagnosis to the local health department.
3. Educate laboratories to submit all invasive *Haemophilus influenza* isolates cultured from normally sterile sites to the West Virginia Office of Laboratory Services for stereotyping.
4. Educate providers about prophylaxis for high risk contacts (close contacts) of invasive Hib.
5. Upon receiving a report of invasive H. flu disease:
   - Assure case is on respiratory droplet precautions until 24 hours after initiation of effective antimicrobial therapy.

6. Identify **close contacts** of index case for whom prophylaxis is recommended: **Household contacts in the following circumstances:**
   - All household contacts if there is at least one unimmunized or incompletely immunized household contact younger than 4 years of age.
   - All household contacts if there is an immunocompromised child in the household even if the child is older than 4 years of age and fully immunized.
   - All household contacts if there is a child in the household younger than 12 months of age who has not received the primary series of Hib conjugate vaccine.

**Child Care Center or Preschool Contacts:**
In addition to these recommendations for chemoprophylaxis, unimmunized or incompletely immunized children should receive a dose of vaccine and should be
scheduled for completion of the recommended age-specific immunization schedule.

- When 2 or more cases of Hib invasive disease have occurred within 60 days prophylaxis for all attendees and child care providers should be considered regardless of their age and vaccine status.
- When unimmunized or incompletely immunized children attend the child care facility or preschool prophylaxis for all attendees and child care providers should be considered regardless of their age and vaccine status.
- If the index case is younger than 2 years of age or has a household member who is a susceptible contact and the index case was treated with an antibiotic regimen other than cefotaxime or ceftriaxone, the index case should receive rifampin prophylaxis at the end of therapy for invasive infection.

7. Chemoprophylaxis is not recommended for the following:

- Occupants of households with no children younger than 4 years of age other than the index patient.
- Occupants of households when all household contacts 12 to 48 months of age have completed their Hib immunization series and when household contacts younger than 12 months of age have completed their primary series of Hib immunizations.
- Preschool or child care contacts of 1 index case.
- Pregnant women.
- For contacts of people with nontype b H influenza strains of invasive disease.
  o Do not withhold prophylaxis pending determination of serotype if that will result in significant delays.

State Health Responsibilities

1. Educate the public about invasive Haemophilus influenzae b disease, especially its transmission.
2. Educate providers and laboratories to report confirmed and probable cases of invasive Haemophilus influenzae disease within 24 hours of diagnosis to the local health department.
3. Educate laboratories to submit all invasive Haemophilus influenza isolates cultured from normally sterile sites to the West Virginia Office of Laboratory Services for stereotyping.
4. Educate providers about prophylaxis for high risk contacts (close contacts) of invasive Hib.
5. Provide consultation and guidance to Providers, Laboratories and Local Health Departments.
6. Provide assistance to the Local Health Departments in implementing control measures as needed.


<table>
<thead>
<tr>
<th>Age</th>
<th>Dose</th>
<th>Duration</th>
<th>Cautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1 month of age</td>
<td>10mg/kg orally once per day</td>
<td>4 days</td>
<td></td>
</tr>
<tr>
<td>≥ 1 month of age</td>
<td>20mg/kg orally once per day</td>
<td>4 days</td>
<td>Max daily dose of 600mg</td>
</tr>
<tr>
<td>Adults</td>
<td>600mg orally once per day</td>
<td>4 days</td>
<td>Can interfere with effectiveness of: oral contraceptives, some seizures, prevention medications, anticoagulant medications, May stain soft contact lenses</td>
</tr>
</tbody>
</table>

Do not withhold prophylaxis pending determination of serotype if that will result in significant delays. When indicated, prophylaxis should be initiated as soon as possible. Most secondary cases in households occur during the first week after hospitalization of the index case. Prophylaxis initiated seven or more days after hospitalization of the index patient still may be of some benefit.
**Haemophilus Influenzae, Invasive Disease Surveillance Protocol**


<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Primary Series</th>
<th>Booster Dose</th>
<th>Catch Up Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRP-T</td>
<td>Not Licensed</td>
<td>12 through 15 months of age</td>
<td>16 months through 4 years of age</td>
</tr>
<tr>
<td>PRP-OMP</td>
<td>2 and 4 months of age</td>
<td>12 through 15 months of age</td>
<td>16 months through 4 years of age</td>
</tr>
<tr>
<td>PRP-OMP-HepB (combination vaccine)</td>
<td>2 and 4 months of age</td>
<td>12 through 15 months of age</td>
<td>Not Licensed</td>
</tr>
<tr>
<td>DTaP-IPV/PRP-T</td>
<td>2, 4 and 6 months of age</td>
<td>12 through 15 months of age</td>
<td>16 months through 4 years of age</td>
</tr>
</tbody>
</table>

**Disease Control Objectives**
Reduce the risk of secondary cases by:
- Isolation of the index case until 24 hours after initiation of effective antimicrobial therapy.
- Provide prophylaxis when indicated to close contacts.

**Disease Prevention Objectives**
Prevent cases of disease by encouraging full immunization of all infants per the ACIP approved schedule.

**Disease Surveillance Objectives**
- To determine demographic characteristics and risk factors of infected persons with Haemophilus influenza invasive disease in West Virginia.
- To identify the types of infections associated with invasive *Haemophilus influenza* isolates.
- To distinguish failure of the *Haemophilus influenza* type b (Hib) vaccine from failure to vaccinate as the more significant risk factor for disease.

**Public Health Significance**
Before we had a Hib vaccine, the most common type of invasive Haemophilus influenzae disease was meningitis. The peak incidence of invasive Hib infections...
occurred between 6 and 18 months of age. In contrast, the peak age for epiglottis was 2 to 4 years of age.

Unimmunized children younger than 4 years of age are at increased risk of invasive Hib disease, especially if they are in prolonged close contact (such as in household setting) with a child with invasive Hib disease. Other factors that predispose to invasive disease include sickle cell disease, asplenia, human immunodeficiency virus (HIV) infection, certain immunodeficiency syndromes, and malignant neoplasms. Historically, invasive Hib was more common in boys; black, Alaska Native, Apache, and Navajo children; child care attendees; children living in crowded conditions; and children who were not breastfed.

Since the introduction of Hib conjugate vaccines in the United States, the incidence of invasive Hib disease has decreased by 99% to fewer than 2 cases per 100,000 children younger than 5 years of age. In the United States, invasive Hib disease occurs primarily in underimmunized children and among infants to young to have completed the primary immunization series. Nontypable Haemophilus influenza now causes the majority of invasive \textit{H influenza} disease in all age groups.

\section*{Clinical Description}

\subsection*{Signs and Symptoms}

\textit{Haemophilus influenza} can have many different manifestations including:

- Pneumonia
- Bacteremia
- Meningitis
- Epiglottitis
- Septic Arthritis
- Cellulitis
- Otitis Media
- Purulent Pericarditis
- And other less common infections

\subsection*{Etiologic Agent}

Haemophilus influenzae is a pleomorphic gram-negative coccobacillus. Encapsulated strains express 1 of 6 antigenically distinct capsular polysaccharides (a through f serotypes). Nonencapsulated strains lack capsule genes and are designated nontypable.
Reservoir

The natural habitat of the organism is the upper respiratory tract of humans.

Mode of transmission

Person to person by inhalation of respiratory tract droplets or by direct contact with respiratory tract secretions. In neonates, infection is acquired intrapartum by aspiration of amniotic fluid or by contact with genital tract secretions containing the organism. Asymptomatic colonization by H. influenza is common, especially with nontypable and non-type b capsular type strains. Most common portal of entry is the nasopharynx.

Incubation Period

Is unknown.

Infectious Period

As long as the organism is present. The patient should remain on droplet precautions until 24 hours after initiation of effective antimicrobial therapy.

Outbreak recognition

Increased rates of *Haemophilus influenzae* that may or may not be linked epidemiologically are considered an outbreak. Outbreaks of *H. influenzae* occur in propagated form. Propagated outbreaks are those that involve person-to-person transmission and result in two or more generations of cases. *Haemophilus influenzae* outbreaks of this nature are generally recognized after a larger than expected numbers of cases of *H. influenzae* are reported within a limited time period. Since the incubation period of *H. influenzae* is short, probably 2-4 days, and the infectious period can last until the patient is started on an effective antibiotic, the onset dates for cases with a common source are usually spread over several days to a week.
**Haemophilus Influenzae, Invasive Disease Surveillance Protocol**

**Case Definition**

2015 Case Definition  
CSTE Position Statement Number: 14-ID-05

**Clinical Criteria**

Invasive disease may manifest as pneumonia, bacteremia, meningitis, epiglottitis, septic arthritis, cellulitis, or purulent pericarditis; less common infections include endocarditis and osteomyelitis.

**Laboratory Criteria for Diagnosis**

- Detection of *Haemophilus influenzae* type b antigen in cerebrospinal fluid [CSF]
- Detection of *Haemophilus influenzae*-specific nucleic acid in a specimen obtained from a normally sterile body site (e.g., blood or CSF), using a validated polymerase chain reaction (PCR) assay; or
- Isolation of *Haemophilus influenzae* from a normally sterile body site (e.g., cerebrospinal fluid [CSF], blood, joint fluid, pleural fluid, pericardial fluid)

**Epidemiologic Linkage**

Not applicable for case classification.

**Case Classification**

**Probable**
- Meningitis WITH detection of *Haemophilus influenzae* type b antigen in cerebrospinal fluid [CSF]

**Confirmed**
- Isolation of *Haemophilus influenzae* from a normally sterile body site (e.g., cerebrospinal fluid [CSF], blood, joint fluid, pleural fluid, pericardial fluid) OR
- Detection of *Haemophilus influenzae*-specific nucleic acid in a specimen obtained from a normally sterile body site (e.g., cerebrospinal fluid [CSF], blood, joint fluid, pleural fluid, pericardial fluid), using a validated polymerase chain reaction (PCR) assay

**Case Classification Comment(s)**

Positive antigen test results from urine or serum samples are unreliable for diagnosis of *Haemophilus influenzae* disease and should not be used as a basis for case classification.

Isolates of *Haemophilus influenzae* are important for antimicrobial susceptibility testing.
Surveillance Indicators

- Proportion of *H. influenzae* cases reported with complete information (clinical, demographic, clinical case definition-species, specimen type; vaccine history; and serotype testing).
- Proportion of Hib cases among children younger than 5 years of age with complete vaccination history.
- Proportion of Hib cases among children younger than 5 years of age with serotyped isolate.
- Proportion of cases reported to public health within the required timeframe.
Haemophilus Influenzae, Invasive Disease
Surveillance Protocol

References