Haemophilus Influenzae Type b

Disease Plan

Quick Links:

✓ WHY IS HAEMOPHILUS INFLUENZAE IMPORTANT TO PUBLIC HEALTH? ........2
✓ DISEASE AND EPIDEMIOLOGY .........................................................3
✓ PUBLIC HEALTH CONTROL MEASURES ........................................6
✓ CASE INVESTIGATION .................................................................12
✓ REFERENCES .............................................................................15
✓ VERSION CONTROL ....................................................................15
✓ UT-NEDSS Minimum/Required Fields by Tab .................................16

Last updated: June 18, 2015, by Jeffrey Eason

Questions about this disease plan?

Contact the Utah Department of Health Bureau of Epidemiology at 801-538-6191.
WHY IS HAEMOPHILUS INFLUENZAE IMPORTANT TO PUBLIC HEALTH?

*Haemophilus influenzae* (*H. influenzae*) is a cause of bacterial infection that is often severe, particularly among infants. Up until the creation of effective vaccines, *H. influenzae* type b (Hib) was the leading cause of bacterial meningitis and other invasive bacterial disease among children younger than 5 years of age. Approximately one in 200 children in this age group developed invasive Hib disease, the equivalent of nearly 25,000 cases of acquired invasive Hib annually in the United States. Nearly all Hib infections occurred among children younger than 5 years of age, and approximately two-thirds of all cases occurred among children younger than 18 months of age. Despite availability of an effective vaccine, the global burden of Hib disease is still substantial; worldwide, Hib caused about 8.13 million serious illnesses in 2000, with 371,000 deaths.

Figure 1: Incidence of Hib Disease in Relation to Licensing of Hib Vaccines
DISEASE AND EPIDEMIOLOGY

Clinical Description

Invasive disease due to *H. influenzae* may produce various clinical syndromes including meningitis, bacteremia or sepsis, epiglottitis, pneumonia, septic arthritis, empyema, cellulitis, or pericarditis; less common infections include endocarditis and osteomyelitis. Mucosal infections, such as bronchitis, sinusitis and conjunctivitis, and otitis media, can also be caused by *H. influenzae*, but they are considered to be noninvasive disease.

Causative Agent

*H. influenzae* is a small gram-negative coccobacillus that may be either encapsulated (types a–f) or unencapsulated (non-typeable). Non-typeable strains are thought to be less virulent than encapsulated strains. *H. influenzae* type b (Hib) is the serotype that requires control measures.

Beta-lactamase-negative, ampicillin-resistant (BLNAR) *H. influenzae* is an emerging pathogen. The prevalence of BLNAR *H. influenzae* strains have increased in some countries (Japan and Spain), although their prevalence in the United States and elsewhere remains low (approximately 3%). Possible explanations for this observation include inadequate vaccination against *H. influenzae* type b in some regions, increasingly frequent use of cephalosporins, and underdosing of oral ampicillin. There are no significant differences in clinical presentation of pneumonia due to BLNAR *H. influenzae* compared to pneumonia due to ampicillin-susceptible *H. influenzae* strains. These pathogens appear to have in vitro susceptibility to ceftriaxone. Depending on local susceptibility findings, ceftriaxone may be an appropriate choice for treatment of clinical infections due to BLNAR *H. influenzae* pending further study of clinical infections with this pathogen.

Differential Diagnosis

Invasive *H. influenzae* can cause pneumonia, bacteremia, or meningitis. The presentation of these diseases is similar to other invasive bacterial diseases such as *Streptococcal pneumoniae* or *Streptococcal pyogenes*. As with other causes of bacterial meningitis, characteristic symptoms of Hib meningitis are fever, decreased mental status, and stiff neck.

Laboratory Identification

Microscopy of gram stained infected body fluid may identify gram-negative coccobacilli. *H. influenzae* is identified via culture of infected body fluid, such as CSF, blood, pleural fluid, joint fluid, and middle ear aspirates. All isolates are required to be sent to the Utah Public Health Laboratory (UPHL) for serotyping. Laboratories occasionally use antigen detection methods, but these are not considered confirmatory in the absence of culture positivity. Primary Children’s Medical Center (PCMC) can test for type b. However, the test done by PCMC is a send out performed by ARUP that is an IgG antibody test. The isolate is still required to be sent to UPHL for serotyping.

UPHL: The UPHL serotypes all isolates of *H. influenzae* from clinical laboratories.
Treatment

Typical treatment regimens for Hib include cephalosporins and quinolones. Once identified, the patient should be isolated until 24 hours after initiating appropriate antimicrobial treatment that eliminates carriage. Currently, only cefotaxime and ceftriaxone are known to eradicate Hib from the nasopharynx when they are used to treat active infection. Therefore, if the patient is treated with ampicillin or chloramphenicol instead, he/she must receive rifampin prophylaxis. The treatment course is usually 10 days. Also, note that Hib disease does not necessarily confer immunity to subsequent disease.

Immunize as follows:

a. Children with invasive Hib disease at <24 months of age: Immunize according to the age-appropriate schedule for unvaccinated children and as if they had received no prior doses, as disease in this age group does not reliably result in a protective immune response. Begin one month after onset of disease or as soon as possible thereafter.

b. Children with invasive Hib disease at ≥24 months of age: No Hib immunization is necessary, regardless of previous immunization status, because the disease probably induces a protective immune response and second episodes in children this age are rare. However, Hib vaccination is not contraindicated and can be given as a single antigen or as part of a combination vaccine.

Morbidity/Mortality

Invasive infections due to H. influenzae are serious and can be rapidly fatal. Hearing impairment or other neurologic sequelae occur in 15-30% of Hib meningitis survivors, and the case-fatality rate is 3-6%, despite appropriate antimicrobial therapy.

Reservoir

Humans (asymptomatic carriers) are the only known host as the bacterium does not survive in the environment on inanimate surfaces.

Transmission

H. influenzae infection is transmitted from person-to-person by droplet or direct contact with nasopharyngeal secretions of an infected person. The most common portal of entry is the nasopharynx. Newborns can become infected by inhaling amniotic fluid or genital tract secretions containing the organism.

Susceptibility

The vaccine only confers immunity to one strain: type b. Disease before the age of two years does not confer immunity; vaccine is still required. The genetic constitution of the host may be important in susceptibility to infection with Hib. Risk for Hib disease has been associated with a number of genetic markers, but the mechanism of these associations is unknown. No single genetic
relationship regulating susceptibility or immune responses to polysaccharide antigens has yet been convincingly demonstrated.

**Incubation Period**

The incubation period is unknown, but for invasive disease, may be as short as 2–4 days.

**Period of Communicability**

If the person is not on antibiotic therapy, disease is communicable as long as organisms are present in the upper respiratory tract, which may be for a prolonged period, even without nasal discharge. If the person is on antibiotic therapy, disease is non-communicable within 24-48 hours after starting effective antibiotic therapy.

The contagious potential of invasive *H. influenzae* disease is considered to be limited. However, certain circumstances, particularly close contact with a case (e.g., in a household, childcare center, or institutional setting), can lead to outbreaks of Hib or direct secondary transmission of the disease. Asymptomatic carriage is known to occur.

**Epidemiology**

*H. influenzae* type b (Hib) is the only type for which there is a vaccine and for which control measures are considered necessary.

Before the widespread use of Hib conjugate vaccines, Hib was a leading cause of bacterial meningitis in the United States among children younger than five years of age and a major cause of other life-threatening invasive bacterial disease in this age group. The introduction of Hib vaccine in 1988 resulted in a 99% decrease in invasive Hib disease in children younger than five years of age. During 2010-2011, 33% of children younger than five years of age with confirmed invasive Hib disease were younger than six months of age and too young to have completed a three-dose primary vaccination series. Of these age-eligible children, 64% were either unvaccinated, incompletely vaccinated (received fewer than three doses), or their vaccination status was unknown.

Since the introduction of Hib vaccine, the incidence of all infection due to the encapsulated and non-typeable strains of *H. influenza* combined have decreased. However, *H. influenzae* type f has become the most common serotype causing invasive infections in the United States. With the reduction of invasive disease due to Hib, the remaining disease is now distributed among age groups. In Utah, invasive disease due to non-typeable strains predominates, and is seen in all age groups.

Unimmunized children, particularly those younger than four years of age, who are in prolonged close contact (such as in a household setting) with a child with invasive Hib disease, are at increased risk for invasive Hib disease. Other factors causing predisposition to invasive disease include sickle cell disease, asplenia, HIV infection, certain immunodeficiency syndromes, and malignant neoplasms. In adults, underlying conditions such as chronic pulmonary disease, smoking, HIV, alcoholism, pregnancy, and older age increase the risk of *H. influenzae* disease.
Risk factors for Hib disease include exposure factors and host factors that increase the likelihood of exposure to Hib, including household crowding, large household size, childcare attendance, low socioeconomic status, low parental education levels, and school-aged siblings. Historically, invasive Hib was more common in boys; African American, Alaska Native, Apache and Navajo children; childcare attendees; children living in crowded conditions; and children who were not breastfed.

✓ PUBLIC HEALTH CONTROL MEASURES

Public Health Responsibility

- Investigate all suspect cases of disease; complete and submit appropriate disease investigation forms.
- Ensure isolate submission to UPHL for serotyping.
- Provide education to the general public, clinicians, and first responders regarding disease transmission and prevention.
- Identify clusters or outbreaks of this disease.
- Identify sources of exposure to minimize further transmission.
- Ensure surveillance is maintained to identify the emergence of other *H. influenzae* types as causes of invasive disease, and to monitor Hib vaccine effectiveness and assess progress toward disease elimination.

Prevention

Routine childhood vaccination is the best preventive measure against Hib disease. Good personal hygiene (proper hand washing, disposal of used tissues, not sharing eating utensils, etc.) is also important.

Chemoprophylaxis

Chemoprophylaxis is ONLY indicated for contacts to *H. influenzae* type b (Hib) disease.
### Indications and Guidelines for Rifampin Chemoprophylaxis for Contacts of Index Cases of Invasive *Haemophilus influenzae* type b (Hib) Disease

**Chemoprophylaxis Recommended**

Chemoprophylaxis may be indicated for household (or close) contacts of a child with invasive Hib disease, childcare or preschool contacts, and the index patient, depending upon individual circumstances as described below.

#### Chemoprophylaxis for index patient

If the index patient was treated with an agent other than cefotaxime or ceftriaxone, antimicrobial therapy to eradicate nasopharyngeal carriage is recommended if either of the following also is true for the index patient:

- Is younger than two years of age, or
- Lives in a household with a child younger than four years of age who has not received an age-appropriate number of doses of Hib conjugate vaccine or an immunocompromised child.

#### Chemoprophylaxis for household contacts

Chemoprophylaxis is recommended for all household contacts (including the index case) in the following circumstances:

- Household with at least one contact younger than four years who has not received an age-appropriate number of doses of Hib conjugate vaccine.

  The susceptible child(ren) should receive a dose of Hib conjugate vaccine and be scheduled for completion of Hib immunization if additional doses are necessary to complete immunization.

- Household with a contact who is an immunocompromised child, regardless of that child’s Hib immunization status

In addition to receiving antimicrobial prophylaxis, exposed unimmunized or incompletely immunized children who are household contacts of patients with invasive Hib disease must be carefully observed for signs of illness. Exposed children in whom febrile illness develops should receive prompt medical attention.
Chemoprophylaxis for childcare or preschool contacts

Chemoprophylaxis is recommended for childcare or preschool contacts when unimmunized or incompletely immunized children attend the facility and two or more cases of Hib invasive disease have occurred among attendees within 60 days.\textsuperscript{3,4}

Exposed unimmunized or incompletely immunized children who are child care or preschool contacts of patients with invasive Hib disease must be carefully observed for signs of illness. Exposed children in whom febrile illness develops should receive prompt medical attention.

Recommended regimen

Prophylaxis should be initiated as soon as possible in contacts. In the index case, it should be initiated within two weeks of the onset of disease, and may be initiated in conjunction with treatment.

- **Rifampin** is the drug of choice for chemoprophylaxis. The regimen is as follows – Rifampin 20mg/kg (maximum dose 600 mg) once per day for four days.
- The dose of rifampin for infants younger than one month of age has not been established. Some experts recommend lowering the dose to 10mg/kg.
- Consultation with an expert in infectious disease is recommended for contacts in whom rifampin is contraindicated.

Chemoprophylaxis not recommended

- Chemoprophylaxis is not indicated for contacts of people with invasive disease caused by nontype b strains of *H. influenzae*.
- Occupants of households with no children younger than four 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\textsuperscript{5} and when all household contacts younger than 12 months of age have completed their primary series of Hib immunizations.
- For nursery school and child care contacts of one index case, especially people older than two years of age.
- For pregnant women.

\textsuperscript{1}Close contact – Close (household) contact is defined as a person who resides with the index patient or who spent \( \geq 4 \) hours with the index patient for at least five of the seven days before the day of hospital admission of the index case.
The primary series of Hib conjugate vaccine consists of 2-3 doses, depending on the Hib vaccine formulation. See the Table 2 for more details.

Only children who are age-appropriately immunized and on rifampin should be permitted to enter the childcare group during the time prophylaxis is given. Children enrolling in a childcare center or other setting during the time prophylaxis is given should also receive rifampin, as should supervisory personnel.

When a single case has occurred, the advisability of rifampin prophylaxis in exposed childcare groups with unimmunized or incompletely immunized children is controversial, but many experts recommend no prophylaxis.

Complete immunization is defined as having had ≥1 dose of conjugate vaccine at ≥15 months of age; 2 doses between 12 and 14 months of age; or a 2- or 3-dose primary series (number of doses required depends on vaccine type and age at initiation) when <12 months with a booster dose at ≥12 months of age.

**Vaccine**

Table 1 lists the Hib conjugate vaccines that are currently available in the United States. The combination vaccines that include the Hib conjugate vaccine have been licensed by the FDA following immunogenicity and safety studies. These combination vaccines decrease the number of injections needed for protection against vaccine-preventable diseases. HbOC (HibTiter) is no longer available in the United States.

### Table 1: ACIP-Recommended Hib Routine Vaccine Schedule

<table>
<thead>
<tr>
<th>Type</th>
<th>Vaccine (Trade name)</th>
<th>Available Combination (Manufacturer)</th>
<th>2 months</th>
<th>4 months</th>
<th>6 months</th>
<th>12-15 months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ActHIB</td>
<td>(Sanofi Pasteur)</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
<td>X</td>
</tr>
<tr>
<td>PRP-T</td>
<td>Pentacel*</td>
<td>+DTaP+IPV (Sanofi Pasteur)</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Hiberix†</td>
<td>(GlaxoSmithKline)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>MenHibrix§</td>
<td>MenCY/PRP-T (GlaxoSmithKline)</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
<td>X</td>
</tr>
<tr>
<td>PRP-OMP</td>
<td>PedvaxHIB</td>
<td>(Merck &amp; Co., Inc)</td>
<td>1st</td>
<td>2nd</td>
<td>-</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>COMVAX</td>
<td>+HepB (Merck &amp; Co., Inc)</td>
<td>1st</td>
<td>2nd</td>
<td>-</td>
<td>X</td>
</tr>
</tbody>
</table>

*The recommended age for the 4th dose of the Pentacel is 15-18 months, but it can be given as early as 12 months, provided at least 6 months have elapsed since the 3rd dose.†Hiberix is approved only for the last dose of the Hib series among children 12 months of age and older. The recommended age is 15 months, but to facilitate timely booster vaccination it may be given as early as 12 months.

§The recommended age for the 4th dose of MenHibrix is 12-18 months.

### Hib Conjugate Vaccine Schedules (see Table 2 below)

In the United States, the primary series of Hib conjugate vaccine, which is administered before seven months of age, requires two or three doses, depending upon the vaccine preparation. The minimum age for the first dose is six weeks. Hib conjugate vaccines can be administered at the same visit as other routine immunizations.
It is ideal to use the same Hib conjugate vaccine to complete the primary series. However, if it is unknown which vaccine was previously administered, or if the same vaccine is not available, the vaccines can be interchanged. If two different preparations are used, a three-dose primary series is required.

In the United States, a booster dose is required at 12-15 months of age (or as soon thereafter as possible); 12 months is the minimum age for the final dose. Any of the Hib conjugate vaccines may be used for the booster dose; the vaccine need not be the same as the one used for the primary series.

**Hib Conjugate Vaccine Recommendations for Children Not Up-To-Date**

“Catch-up Schedule” The catch up schedule for Hib conjugate vaccine depends upon the age at which the series is initiated and the number of doses previously received:

- Children younger than six months of age at initiation of vaccination should receive three doses of the Hib conjugate vaccine at four to eight week intervals and a booster (single dose) eight weeks from the last dose for child 12 to 15 months of age.
- Children who are 7-11 months of age at initiation of vaccination should receive two doses of Hib conjugate vaccine at four to eight week intervals up to 12 months of age, and a booster (single dose) eight weeks from the last dose for children 12 months of age to five years.
- Children who have received ≤1 dose of Hib conjugate vaccine before one year of age and are now 12-14 months of age should receive two doses of Hib conjugate vaccine eight weeks apart, up to five years of age.
- Children with an incomplete series of Hib conjugate vaccination who are now 15-59 months old should receive a single dose of Hib conjugate vaccine.

### Table 2: *Haemophilus influenzae* type b Vaccine Detailed Schedule for Unvaccinated Children

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Age at 1st Dose (months)</th>
<th>Primary series</th>
<th>Booster</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRP-T*</td>
<td>2-6</td>
<td>3 doses, 8 weeks apart</td>
<td>12-15 months</td>
</tr>
<tr>
<td></td>
<td>7-11</td>
<td>2 doses, 4 weeks apart</td>
<td>12-15 months</td>
</tr>
<tr>
<td></td>
<td>12-14</td>
<td>1 dose</td>
<td>2 months later</td>
</tr>
<tr>
<td></td>
<td>15-59†</td>
<td>1 dose</td>
<td>--</td>
</tr>
<tr>
<td>PRP-OMP</td>
<td>2-6</td>
<td>2 doses, 8 weeks apart</td>
<td>12-15 months</td>
</tr>
<tr>
<td></td>
<td>7-11</td>
<td>2 doses, 4 weeks apart</td>
<td>12-15 months</td>
</tr>
<tr>
<td></td>
<td>12-14</td>
<td>1 dose</td>
<td>2 months later</td>
</tr>
<tr>
<td></td>
<td>15-59</td>
<td>1 dose</td>
<td>--</td>
</tr>
</tbody>
</table>

*Hiberix brand PRP-T vaccine is approved only for the last dose of the Hib series among children 12 months of age and older.

†MenHibrix brand PRP-T vaccine is not recommended for children 19 months of age or older.
Impaired Host Defense

Certain children may be at increased risk of invasive Hib disease because of immune deficiency, or other host defense abnormalities (e.g., sickle cell disease, functional or anatomic asplenia). These children should receive Hib conjugate vaccine as recommended for all infants. Any children younger than 59 months of age with these risk factors who have an incomplete vaccination history should be vaccinated according to the catch-up schedule. For unimmunized children at increased risk of Hib disease who are older than 59 months of age, the following is recommended:

- Unimmunized children older than 59 months who have sickle cell disease or asplenia should receive a single dose of Hib conjugate vaccine.
- Unimmunized children older than 59 months who have human immunodeficiency virus, IgG2 subclass deficiency, bone marrow transplant, or malignancy should receive two doses of Hib conjugate vaccine, separated by four to eight weeks.

Please consult the chapter on *H. influenzae* in the *Red Book* of the American Academy of Pediatrics (AAP) for a full discussion of vaccines, immunization schedules, and special circumstances. For example, children, including those older than five years of age, with underlying conditions predisposing them to Hib disease may need additional doses.

Isolation and Quarantine Requirements

**Isolation:** Cases of invasive *H. influenzae* type B disease should be isolated until 24 hours after initiating appropriate antimicrobial treatment.

**Hospital:** Standard body substance precautions.

**Quarantine:** Personal surveillance and prophylaxis with an appropriate antimicrobial when indicated by clinical situation of the contact, or potential for future transmission. Otherwise, there are no restrictions.
CASE INVESTIGATION

Reporting

All cases of *H. influenzae* recovered from a sterile site should be reported to public health.

CSTE Reporting Swimlanes

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical Evidence</strong></td>
<td></td>
</tr>
<tr>
<td>Meningitis</td>
<td>N</td>
</tr>
<tr>
<td>Epiglottitis</td>
<td>S</td>
</tr>
<tr>
<td>Healthcare record indicates a diagnosis of disease caused by <em>H. influenzae</em></td>
<td>S</td>
</tr>
<tr>
<td>Death certificate indicates disease caused by <em>H. influenzae</em> as a cause of death or a significant condition contributing to death.</td>
<td>S</td>
</tr>
<tr>
<td><strong>Laboratory Evidence</strong></td>
<td></td>
</tr>
<tr>
<td>Isolation of <em>H. influenzae</em> (any type) from a normally sterile site</td>
<td>S</td>
</tr>
<tr>
<td>Detection of <em>H. influenzae</em>-specific nucleic acid in a normally sterile body site using a validated polymerase chain reaction (PCR) assay</td>
<td>S</td>
</tr>
<tr>
<td>Detection of <em>H. influenzae</em> type b (Hib) antigen in CSF</td>
<td>N</td>
</tr>
</tbody>
</table>

Notes:

S = This criterion alone is sufficient to identify a case for reporting.

N = All "N" criteria in the same column are necessary to identify a case for reporting.

Case Definition

**Haemophilus influenzae (2015)**

The following case definition for invasive *H. influenzae* disease has been approved by the Council of State and Territorial Epidemiologists (CSTE) and was published in 2015.

*Probable*: A clinically compatible case with detection of *H. influenzae* type b antigen in cerebrospinal fluid (CSF).

*Confirmed*:

- Isolation of *H. influenzae* from a normally sterile body site (e.g., cerebrospinal fluid [CSF], blood, joint fluid, pleural fluid, pericardial fluid).
Detection of *H. 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.

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

Isolates of *H. influenzae* are important for antimicrobial susceptibility testing.

**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**

- Detection of *H. influenzae* type b antigen in cerebrospinal fluid (CSF)
- Detection of *H. 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 *H. 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.

**CSTE Case Classification Swimlanes**

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Case Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical Evidence</strong></td>
<td></td>
</tr>
<tr>
<td>Meningitis</td>
<td>Probable</td>
</tr>
<tr>
<td><strong>Laboratory Evidence</strong></td>
<td></td>
</tr>
<tr>
<td>Isolation of <em>H. influenzae</em> (any type) from a normally sterile site</td>
<td></td>
</tr>
<tr>
<td>Detection of <em>H. influenzae</em>-specific nucleic acid in a normally sterile body site using a validated polymerase chain reaction (PCR) assay</td>
<td></td>
</tr>
<tr>
<td>Detection of <em>H. influenzae</em> type b (Hib) antigen in CSF</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
S = This criterion alone is sufficient to classify a case
N = All "N" criteria in the same column are necessary to classify a case
Case Investigation Process

- Public health should immediately determine whether the reported case is due to serotype b. To do this, public health should:
  - Identify the laboratory where the initial testing occurred, and
  - Call them to ensure that the isolate is immediately sent to UPHL for serotyping, and
  - Call UPHL to notify them that an *H. influenzae* strain is coming and that serotyping needs to occur as soon as possible.

- Cases due to *H. influenzae* type b should be immediately investigated:
  - Identify all close contacts (view chemoprophylaxis section for details).
  - Assure that they are provided chemoprophylaxis and vaccine within SEVEN days of hospitalization of the index case.

Outbreaks

An outbreak will be defined as more than one case of Hib in a 60-day period.

Identifying Case Contacts

See [Chemoprophylaxis](#) for definition of case contacts.

Case Contact Management (Hib only)

- Assure that contacts receive chemoprophylaxis. See [Chemoprophylaxis](#) for specifics.
- Ensure appropriate immunization of contacts. The number of doses required is determined by the current age of the child and the number, timing, and type of Hib vaccine doses previously received.
  - Unvaccinated and incompletely vaccinated children younger than five years of age should be scheduled for completion of the recommended age-specific immunization schedule.
  - Infants should be placed on an accelerated schedule using minimum intervals between doses.
  - Unvaccinated high-risk individuals older than five years of age should receive one dose.
- Conduct surveillance. Careful observation of exposed contacts, especially children younger than four years of age, is essential. Those in whom a febrile illness develops should receive prompt medical attention, regardless of Hib vaccination status.
 REFERENCES


ARUP Labs; Physician’s Guide to Laboratory Test Selection and Interpretation.

Centers for Disease Control, Case Definitions for Infectious Conditions Under Public Health Surveillance. MMWR 46 (RR-10), 1997.


Johns Hopkins Point of Care Information Technology.


 VERSION CONTROL

**UT-NEDSS Minimum/Required Fields by Tab**

### Demographic
- First Name
- Birth Gender
- Race
- Ethnicity
- State
- County
- Date of Birth

### Clinical
- Disease
- Date Diagnosed
- Imported From
- Onset Date
- Syndrome:
  - Please specify:
- Syndrome:
- Died
- Date of Death
- List dose number, date, manufacturer and lot number of all doses given:

### Laboratory
- Organism
- Specimen Source
- Test Result
- Test Status
- Test Type
- Organism Serotype

### Epidemiological
- Day Care Assoc

### Reporting
- Date first reported to public health

### Administrative
- Outbreak name
- State case Status
- Outbreak Associated