

***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
 - Web: <http://www.wvdhhr.org/labservices/labs/micro/index.cfm>
 - Mailing address: 167 11th Ave. South Charleston, WV 25303
3. Submit paper copies of laboratory reports to the local health department via fax.
4. Notify the infection preventionist immediately and institute control measures for invasive

H. flu disease immediately upon recognition, as follows (American Academy of Pediatrics, 2012 Report of the Committee on Infectious Diseases, Red Book®, 29th Edition):

- 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

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350 Capitol Street, Room 125, Charleston, WV 25301-3715
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- Web: <http://www.wvdhhr.org/labservices/labs/micro/index.cfm>
 - 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* 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 influenzae* 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.
 - Investigate and report the case to WVEDSS by using WVEDSS invasive *Haemophilus influenzae* form:
<http://www.dhhr.wv.gov/oeps/disease/WVEDSS/Documents/H%20flu.pdf>
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

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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 influenzae strains of invasive disease*.
 - 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 influenzae* isolates cultured from normally sterile sites to the West Virginia Office of Laboratory Services for stereotyping.

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Surveillance Protocol

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.

Recommended Chemoprophylaxis Regimens for Contacts of invasive *Haemophilus influenzae* case as follows: (Source: American Academy of Pediatrics Red Book, 29th Edition, 2012)

Rifampin

Age	Dose	Duration	Cautions
< 1 month of age	10mg/kg orally once per day	4 days	
≥ 1 month of age	20mg/kg orally once per day	4 days	Max daily dose of 600mg
Adults	600mg orally once per day	4 days	Can interfere with effectiveness of: -oral contraceptives -some seizures prevention medications - anticoagulant medications May stain soft contact lenses

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.

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Recommended Regimens for Routine *Haemophilus influenzae* b Conjugate Immunization for Children immunized beginning at 2 to 6 Months of Age (Source: American Academy of Pediatrics Red Book, 29th Edition, 2012)

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

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 influenzae* invasive disease in West Virginia.
- To identify the types of infections associated with invasive *Haemophilus influenzae* isolates.
- To distinguish failure of the *Haemophilus influenzae* 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

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occurred between 6 and 18 months of age. In contrast, the peak age for epiglottitis 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 influenzae* now causes the majority of invasive *H influenzae* disease in all age groups.

Clinical Description

Signs and Symptoms

Haemophilus influenzae can have many different manifestations including:

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

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.

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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. influenzae* 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.

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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.

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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.

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References

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