

INVASIVE *HAEMOPHILUS INFLUENZAE* DISEASE SURVEILLANCE PROTOCOL

Healthcare Provider Responsibilities

1. Report all suspected cases of invasive *Haemophilus influenzae* disease within 24 hours to the local health department.
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:
 - a) Phone: 304-558-3530
 - b) Web: <http://www.wvdhhr.org/labservices/labs/micro/index.cfm>
 - c) 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 infection preventionist immediately and institute control measures for invasive H. flu disease immediately upon recognition, as follows (American Academy of Pediatrics, 2009 Report of the Committee on Infectious Diseases, Red Book®, 28th Edition):
 - a) The patient with invasive Hib disease must be placed under droplet precautions until 24 hours after initiation of parenteral antimicrobial therapy.
 - b) Provide prophylaxis for high risk contacts of invasive Hib disease, unimmunized or incompletely immunized household contacts younger than 4 years of age. If local health department assistance is needed with prophylaxes notify your local health department immediately.
 - c) Exposed children in whom febrile illness develops should receive prompt medical evaluation.
5. Complete the provider section of the WVEDSS form for invasive H. flu disease:
<http://www.wvidep.org/Portals/31/PDFs/invasivebacterialiseaseGrpB.pdf>

Laboratory Responsibilities

1. Immediately notify the physician and infection preventionist of a positive test result for invasive Hib.

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2. Forward isolates cultured from normally sterile sites to WV OLS for serotyping. OLS may be accessed as follows:
 - a. Phone: 304-558-3530
 - b. Web: <http://www.wvdhhr.org/labservices/labs/micro/index.cfm>
 - c. 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 304-558-5358 (phone) and fax 304-558-8736.

Public 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 of invasive Hib (close contact).
5. Upon receiving a report of invasive H. flu disease:
 - Assure case is on respiratory droplet precautions.
 - Investigate and report the case to WVEDSS by using WVEDSS invasive *Haemophilus influenzae* form:
<http://www.wvidep.org/Portals/31/PDFs/invasivebacterialiseaseGrpB.pdf>
 - Complete CDC's *Haemophilus influenzae* type b Vaccine and Extended Information Worksheet:
http://www.wvidep.org/Portals/31/PDFs/IDEP/h_influenzae/H%20flu%20Extended%20Information%20Worksheet.pdf for all cases of Hib in children <15 years who had received a primary Hib vaccine series.
6. Identify close contacts of index case for whom prophylaxis is recommended.

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- For all household contacts in the following circumstances:
 - Household with at least one contact younger than 4 years of age who is unimmunized or incompletely immunized
 - Household with a child younger than 12 months of age who has not received the primary series
 - Household with a contact who is an immunocompromised child, regardless of that child's Hib immunization status
- For nursery school and child care center contacts when 2 or more cases of Hib invasive disease have occurred within 60 days
- For index case, if younger than 2 years of age or member of a household with a susceptible contact and treated with a regimen other than cefotaxime or ceftriaxone, chemoprophylaxis usually is provided just before discharge from hospital
- 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
 - Nursery school and child care contacts of 1 index case, especially those older than 2 years of age
 - Pregnant women

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Recommended Chemoprophylaxis Regimens for Contacts of invasive *Haemophilus influenzae* case as follows: (Source: American Academy of Pediatrics Red Book, 28th Edition, 2009)

Infants, Children, and Adults	Dose	Duration	Cautions
Rifampin* <1 month	10 mg/kg body weight, orally, every 24 hrs	4 days	Can interfere with efficacy of oral contraceptives and some seizures prevention and anticoagulant medications; may stain soft contact lenses
≥1 month	20 mg/kg body weight (maximum 600 mg), orally every 24 hrs	4 days,	
Adults	600 mg every 24 hours	4 days	

When indicated, prophylaxis should be initiated as soon as possible. Do not withhold prophylaxis pending determination of serotype if that will result in significant delays. 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.

In addition to chemoprophylaxis, unimmunized or incompletely immunized children should receive a dose of Hib vaccine and should be scheduled for completion of the recommended age-specific immunization schedule.

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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, 28th Edition, 2009)

Vaccine Product at Initiation	No. of Doses to be Administered	Recommended Regimen
HbOC (diphtheria CRM197 or PRP-T (tetanus toxoid conjugate)	4	3 doses at 2-month intervals initially; fourth dose at 12 to 15 month of age; any conjugate vaccine for dose 4
PRP-OMP	3	2 doses 2 months apart; third dose at 12-15 month of age; any conjugate vaccine for dose 3

Disease Prevention Objectives

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

Disease Control Objectives

Reduce the risk of secondary cases by isolation of the case until 24 hours after the start of appropriate chemoprophylaxis and prophylaxis of close contacts to index case.

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.

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Public Health Significance

Before introduction of effective Hib conjugate vaccines, Hib was the most common cause of bacterial meningitis in children in the United States. The peak incidence of invasive Hib infections 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 1987, when Hib conjugate vaccines were introduced in the United States for children 18 months of age and older (1990 for children 6 weeks of age and older), the incidence of invasive Hib disease has decreased by 99% to fewer than 1 case per 100,000 children younger than 5 years of age. The incidence of invasive infections caused by all other encapsulated and nontypable strains combined also is low. In the United States, invasive Hib disease occurs primarily in underimmunized children and among infants too young to have completed the primary immunization series. Hib remains an important pathogen in resource-limited countries where vaccines are not available routinely. Nontypable *H influenzae* causes 30% to 52% of episodes of acute otitis media and sinusitis in children. These infections are twice as frequent in boys and peak in the late fall.

Clinical Description

Signs and Symptoms

Haemophilus influenzae can have many manifestations including:

Meningitis:

Signs and symptoms include fever, headache, nausea, vomiting, stiff neck, sensitivity to light (photophobia), nuchal rigidity, seizures, and coma; and in infants, poor feeding and a bulging fontanelle.

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Epiglottitis:

Signs and symptoms include sudden onset of sore throat, fever, and shortness of breath, progressing rapidly to difficulty swallowing and pooling and drooling of saliva due to the obstructed airway.

Pneumonia:

Signs and symptoms include severe shortness of breath, rapid heart rate, fever, cough and evidence of pneumonia by chest radiograph.

Septic Arthritis:

Signs and symptoms of swelling, warmth, pain with movement and decreased mobility of a single large weight-bearing joint.

Etiologic Agent

Haemophilus influenzae serotype a-f with serotype b (Hib) is the most common.

This organism causes pneumonia, occult febrile bacteremia, meningitis, epiglottitis, septic arthritis, cellulitis, otitis media, purulent pericarditis, and other less common infections, such as endocarditis, endophthalmitis, osteomyelitis and peritonitis. Serotype a and c-f rarely cause meningitis but occasionally cause invasive disease similar to type b infections.

Nontypable strains more commonly cause infections of the respiratory tract (eg, conjunctivitis, otitis media, sinusitis, pneumonia) and, less often, bacteremia, meningitis, chorioamnionitis, and neonatal septicemia.

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.

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Incubation Period

Unknown, probably short, 2-4 days.

Infectious Period

As long as the organism is present, even in the absence of nasal discharge. This could be for prolonged periods of time. Noninfectious within 24 to 48 hours after the start of effective antibiotics.

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.

1997 Case Definition

Clinical description

Invasive disease caused by *Haemophilus influenzae* may produce any of several clinical syndromes, including meningitis, bacteremia, epiglottitis, or pneumonia.

Laboratory criteria for diagnosis

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

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Case classification

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

Confirmed: a clinically compatible case that is laboratory confirmed

Comment

Positive antigen test results from urine or serum samples are unreliable for diagnosis of *H. influenzae* disease.

Laboratory Diagnosis

Isolation of *H. Influenzae* in a culture from blood, CFS, or any other normally sterile bodily fluid (e.g., blood or CSF or, less commonly, joint pleural, or pericardial fluid.) A fluid specimen collected from a normally sterile site should have a Gram's stain that will show small gram-negative, nonmotile, nonspore-forming coccobacillus. For suspected *H. influenzae* chocolate agar should be used. Serology is not used to diagnosed invasive H. reliably induced in older individuals.

Surveillance Indicators

- I. Proportion of cases with complete demographic information
- II. Proportion of cases with type of infection and specimen source reported.
- III. Proportion of cases with vaccine history reported.
- IV. Median number of days between date of onset of clinical symptoms and date of report to public health authorities.
- V. Proportion of cases with known serotype.

References

Haemophilus influenzae infections, Red Book-28th Edition – 2009 Report of the Committee on Infectious Diseases, American Academy of Pediatrics.