HAEMOPHILUS INFLUENZAE SURVEILLANCE PROTOCOL

Public Health Action

1. Educate providers and laboratories to report cases of *Haemophilus influenzae* to the local health department in the patient's county of residence within 24 hours of diagnosis.

2. Educate laboratories to send isolates to the office of laboratory services (OLS) for serotyping; to determine whether the case is vaccine-preventable (type b) and if prophylaxis of contacts is indicated.

3. When a case is reported:
   a. Assure case is on respiratory droplet precautions.
   b. Complete the front part of the Reportable Disease Case Report (Yellow Card), the CDC meningitis and bacteremia case report form and attach copies of laboratory reports.
   c. Assure that isolate is sent to OLS.

4. Identify contacts of index case for whom prophylaxis is recommended.
   a. All suitable household contacts, including adults, when the household contains a contact that is younger than 48 months (four years) of age whose immunization status with conjugate vaccine is incomplete. *A household contact is defined as a person residing with the index patient or a non resident who spent four or more hours with the index case for at least five of the seven days preceding the day of hospital admission of the index case.*
   b. All members of a household with a child younger than 12 months of age, even if the primary series has been given.
   c. All occupants of a household with an immunocompromised child, irrespective of the child's Hib immunization status.
   d. Nursery and child care contacts, irrespective of age, when two or more cases of invasive disease have occurred within 60 days.
   e. Index case, if treated with regimes other than cefotaxime or ceftriaxone, should receive chemoprophylaxis before discharge
   f. Chemoprophylaxis is <u>*not*</u> recommended for the following:
      i. Occupants of household with no children younger than four years of age other than the index patient.
      ii Occupants of households when all household contacts younger than 48 months of age have completed their Hib immunization series.
      iii Nursery and child care center contacts of one index case, especially those older than two years of age.
      iv Pregnant women

5. Prophylax contacts of invasive *Haemophilus influenza* as follows:

Rifampin Prophylaxis against Hib

Age Group	Dosage/ Schedule
Infants< 1 month of age	10 mg/kg once daily for 4 days
Children	20 mg/kg orally once daily for 4 days (maximum 600mg/dose)
Adults	600 mg orally once daily for 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 occur in the first week after hospitalization. Prophylaxis initiated seven or more days after hospitalization of the index patient is not optimal, but may still be of benefit.

6. Bring unvaccinated or undervaccinated infants/toddlers up to date with their immunization.

Disease Control Objectives

To prevent secondary cases by:

a. Isolation of the case until 24 hours after the start of appropriate chemoprophylaxis**.**
b. Appropriate prophylaxis of contacts.

Disease Prevention Objectives

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

Surveillance Objectives

1. To identify demographic characteristics and risk factors of infected persons with *Haemophilus influenza* invasive disease.

2. To identify the types of infections associated with invasive *Haemophilus influenza* isolates.

3. 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 the introduction of effective vaccines, *Haemophilus influenzae* type b (Hib) was the leading cause of bacterial meningitis and other invasive bacterial disease among children <5 years of age. Approximately one in 200 children developed invasive Hib disease before the age of 5 years. Two-thirds of cases were among children <18 months of age.

Since 1988 when Hib conjugate vaccines were introduced, the incidence of invasive Hib disease in infants and young children has declined by 99%. There is evidence that Hib vaccines decrease the rate of carriage of Hib among vaccinated children, therefore decreasing the chance that unvaccinated children will be exposed.

Signs and Symptoms

Haemophilus influenza can have many manifestations including:

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

Epiglottis:
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 meningitis, epiglottitis, pneumonia, septic arthritis, cellulitis, pericarditis, empyema, osteomyelitis. Serotype a and c-f rarely cause meningitis.

Reservoir

Humans are the only know reservoir of this organism.

Mode of transmission

Droplet infection and discharge from the upper respiratory tract during the infectious period. Most common portal of entry is the nasopharynx.

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 number 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.

Case Definition for *Haemophilus influenzae*

Clinical case definition:

Invasive disease caused by *H. 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 CSF or, less commonly, joint, pleural, or pericardial fluid.)

Case classification:

Confirmed: a clinically compatible case that is laboratory confirmed.

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

Comment: Positive antigen testing 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, CSF, 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 diagnose invasive *H. influenzae* type b cases as the antibodies are not induced in young children and not reliably induced in older individuals.

Surveillance Indicators

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