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# INVASIVE HAEMOPHILUS INFLUENZAE QUICKSHEET

Kentucky Public Health
Prevent. Promote. Protect.

## SYMPTOMS

*Haemophilus influenzae* can cause many different kinds of infections. Symptoms depend on the part of the body that is infected.

### PNEUMONIA

- Fever and chills
- Cough
- Shortness of breath or difficulty breathing
- Sweating
- Chest pain
- Headache
- Muscle pain or aches
- Excessive tiredness

### BLOODSTREAM INFECTION

- Fever and chills
- Excessive tiredness
- Pain in the belly
- Nausea with or without vomiting
- Diarrhea
- Anxiety
- Shortness of breath of difficulty breathing
- Altered mental status (confusion)

A bloodstream infection from H. influenzae can occur with or without pneumonia.

### MENINGITIS

Symptoms of meningitis typically include sudden onset of:

- Fever
- Headache
- Stiff neck
- Nausea with or without vomiting
- Photophobia (eyes being more sensitive to light)
- Altered mental status

Babies with meningitis may:

- Be irritable
- Vomit
- Feed poorly
- Appear to be slow or inactive
- Have abnormal reflexes

### ETIOLOGIC AGENT

*Aerobic gram-negative bacteria*
*Six different serotypes (a-f) of polysaccharide capsule*

### TRANSMISSION

- *Transmission occurs through direct contact with respiratory droplets from a nasopharyngeal carrier or case patient.*
- *Neonates can acquire infection by aspiration of amniotic fluid or contact with genital tract secretions containing the bacteria.*

### COMMUNICABILITY

- *Considered to be limited. However, close contact with a case (e.g., in a household, daycare center, or institutional setting), can lead to outbreaks of Hib or secondary transmission of the disease.*
- *Likely to be as long as H. influenzae is present in the upper respiratory tract.*

### Hib VACCINES

- Three conjugate vaccines
  - PRP-T (ActHIB)
  - PRP-T (Hiberix)
  - PRP-OMP (PedvaxHIB)
- Two combination vaccines containing Hib
  - DTaP-IPV/Hib (Pentacel)
  - DTaP-IPV-Hib-HepB (Vaxelis)

## KENTUCKY INVASIVE HAEMOPHILUS INFLUENZAE OCCURRENCE

| MMWR Year | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Confirmed Case Count | 19 | 36 | 45 | 27 | 58 | 57 | 87 | 116 | 111 | 37 | 29 | 56 |
| Probable Case Count | 0 | 1 | 1 | 11 | 2 | 1 | 0 | 1 | 3 | 1 | 7 | 8 |



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## CASE DEFINITIONS

### PROBABLE CASE

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

***Comment***: *Positive antigen detection test results from urine or serum samples are unreliable for diagnosis of invasive H. influenzae disease.*
*Positive antigen test results can occur from circulation of Hib antigen in urine or serum; this circulation can be caused by asymptomatic Hib carriage, recent vaccination, or fecal contamination of urine specimens. Cases identified exclusively by these methods should be considered suspect cases only.*

### CONFIRMED CASE

- 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

## SPECIMEN COLLECTION FOR LABORATORY TESTING

| Test Name | Specimens to take | Timing for specimen collection | Transport requirements |
|---|---|---|---|
| Culture<br>**Preferred specimen* | Blood/CSF | ASAP | Blood culture bottles w/broth<br>or<br>lysis-centrifugation tube<br><br>CSF: Sterile, screw-capped tube |
| PCR for identification and serotyping | Any normally sterile site | ASAP | Sent frozen on blue ice packs |
| Antigen detection | CSF | ASAP | Sent frozen on blue ice packs |

*Because of the need to make rapid decisions about chemoprophylaxis, serotype should be determined and reported for all H. influenzae isolates. It is particularly important that serotype be reported for cases in children younger than 5 years of age; the second highest priority is for cases among children 5 through 14 years of age. This information is also used to determine whether a case indicates a vaccine failure (i.e., a vaccinated person who gets the disease) or a failure to vaccinate.*

CDC| Best practices for use of polymerase chain reaction (PCR) for diagnosing *Haemophilus influenzae* and *Neisseria meningitidis* disease and public health importance of identifying serotype/serogroup. CDC's Bacterial Meningitis Laboratory Information.

1. Case notification should not be delayed because of incomplete information or lack of confirmation; data can be updated electronically as more information becomes available
2. Confirm that reported case meets case definition and/or is highly suspected
3. Collect the following information:
    a. Demographic information
    b. Reporting source
    c. Clinical information
    d. Outcome
    e. Laboratory
    f. Antibiotic susceptibility
    g. Vaccination Status
    h. Attendance in childcare

The *Haemophilus influenzae* Surveillance Worksheet (Expanded or Abbreviated version) can serve as a guide for data collection during investigation of reported cases.

## SURVEILLANCE AND PUBLIC HEALTH MANAGEMENT

The purpose of surveillance is to monitor the *H. influenzae* disease burden, to detect outbreaks of Hib disease, and assess the long-term efficacy of Hib vaccine

1. Ensure that case is receiving appropriate antibiotic treatment
2. Request serotyping of the isolate at the hospital, if feasible
3. Forward isolates associated with invasive disease to KDPH DLS
4. Determine whether case's household has un- or under vaccinated children <4 years of age or an immunocompromised child regardless of his/her immunization status (see chemoprophylaxis section).
5. When indicated, prophylaxis of contacts should be initiated as soon as possible given that most secondary cases in households occur during the first week after hospitalization of the index case. It is reasonable to initiate prophylaxis for at-risk contacts of an invasive *H. influenzae* case while serotyping is in process (before the case is known to be due to Hib)
6. Vaccinate children who are not up to date for Hib
7. Identify exposed un- or under vaccinated household, childcare, or preschool contacts of Hib cases who may have symptoms consistent with invasive Hib disease. Exposed children in whom a febrile illness occurs should receive prompt medical evaluation

## EXCLUSION

Children with a fever from any infectious cause should be excluded from school/daycare for at least 24 hours after fever has subsided without the use of fever suppressing medications. Do not exclude exposed asymptomatic children and staff as long as they have no other reasons for exclusion.

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## MANAGEMENT

## RECOMMENDED CASE MANAGEMENT

Initial therapy for children with meningitis possibly caused by Hib is cefotaxime or ceftriaxone. Treatment of other invasive *H. influenzae* infections is similar. Therapy is continued for 7 days by the IV route and longer in complicated infections.

Treatment with cefotaxime or ceftriaxone eradicates Hib colonization, eliminating the need for prophylaxis of the index patient. Patients who do not receive at least 1 dose of cefotaxime or ceftriaxone and who are younger than 2 years of age should receive rifampin prophylaxis at the end of therapy for invasive infection.

*For additional treatment recommendations, see the AAP Red Book.*

## ISOLATION OF PATIENTS WITH INVASIVE HIB DISEASE

Droplet precautions are recommended for 24 hours after initiation of appropriate antimicrobial therapy.

## CHEMOPROPHYLAXIS FOR CLOSE CONTACTS

| RIFAMPIN* CHEMOPROPHYLAXIS FOR CONTACTS OF INDEX CASES OF INVASIVE HIB DISEASE |
|---|
| **CHEMOPROPHYLAXIS RECOMMENDED** |
| • For all household contacts** in the following circumstances:<br>  ◦ Household with at least 1 child younger than 4 years of age who is unimmunized or incompletely immunized^<br>  ◦ Household with a child younger than 12 months of age who has not completed the primary Hib series<br>  ◦ Household with an immunocompromised child, regardless of that child's Hib immunization status<br>• For preschool and childcare center contacts when 2 or more cases of Hib invasive disease have occurred within 60 days, administer chemoprophylaxis to all contacts irrespective of age and vaccination status.<br>• For index patient, 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 at the end of therapy for invasive infection. |
| **CHEMOPROPHYLAXIS NOT RECOMMENDED** |
| • For occupants of households with no children younger than 4 years of age other than the index patient.<br>• For occupants of households when all household contacts are immunocompetent, all 12 through 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.<br>• For preschool and childcare contacts of 1 index case.<br>• For pregnant women. |
| *Rifampin should be given orally, once a day for 4 days (20 mg/kg; maximum dose, 600 mg). The dose for infants <1 month of age is not established; some experts recommend lowering the dose to 10 mg/kg. For adults, each dose is 600 mg.<br>**Defined as people residing with the index patient or nonresidents who spent 4 or more hours with the index patient for at least 5 of the 7 days preceding the day of hospital admission of the index case.<br>^Complete immunization is defined as having had at least 1 dose of conjugate vaccine at 15 months of age or older; 2 doses between 12 and 14 months of age; or the 2- or 3-dose primary series (depending on vaccine used) when younger than 12 months with a booster dose at 12 months of age or older. |



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