

# PUBLIC HEALTH REFERENCE SHEET

## *Haemophilus influenzae*, Invasive



<b>Name</b>	<i>Haemophilus influenzae</i>
<b>Reservoir &amp; Transmission</b>	Humans Droplet transmission from discharges of nose and throat
<b>Incubation Period</b>	Unknown; likely 2–4 days
<b>Common Symptoms</b>	Clinical syndromes including pneumonia, bacteremia, meningitis, epiglottitis, septic arthritis, cellulitis, or purulent pericarditis, and less often endocarditis or osteomyelitis
<b>Gold Standard Diagnostic Test</b>	Culture or PCR
<b>Risk Groups</b>	Universal
<b>Geographic Significance</b>	Worldwide

### What is Invasive *H. influenzae*?

*Haemophilus influenzae* (*H. influenzae*) is a pleomorphic gram-negative coccobacillus that may be either encapsulated (typeable) or unencapsulated (non-typeable). There are six encapsulated serotypes (designated a through f) that have distinct capsular polysaccharides. These bacteria do not cause influenza (the "flu"), which is a virus.

- *Haemophilus influenzae* type b (Hib) is the most common serotype. Invasive disease is when the bacteria enter the spinal fluid or blood, is usually severe, and can be fatal. The most common types of disease caused by Hib include pneumonia, bacteremia, otitis media, meningitis, epiglottitis, cellulitis, septic arthritis, or purulent pericarditis. Less common infections include endocarditis and osteomyelitis.
- Typeable *H. influenzae*, that is not serotype b, (i.e., a, c, d, e, and f), is referred to as non-b *H. influenzae* and can cause disease similar to Hib infections.
- Nontypeable *H. influenzae* commonly causes ear infections in children and bronchitis in adults but can also cause invasive disease.

### What is the occurrence of *H. influenzae* infection?

In the U.S., Hib disease is not common. It occurs primarily in under immunized children and in infants too young to have completed the primary vaccination series. Nontypeable *H. influenzae* now cause the majority of invasive *H. influenzae* disease in all age groups. Nontypeable *H. influenzae* cause 30% to 52% of episodes of acute otitis media and sinusitis in children and can be a common cause of recurrent otitis media.

### How is *H. influenzae* transmitted?

*Haemophilus influenzae* bacteria, including Hib, are spread person-to-person 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. The bacteria can spread through the blood, causing serious infection.

### Who is at risk for *H. influenzae* infection?

Groups at increased risk of Hib disease:

- Unimmunized children younger than 5 years of age
- Household contacts of a person with Hib disease
- Daycare classmates of a person with Hib disease

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Groups at increased risk of *H. influenzae* disease (caused any serotype or non-typeable bacteria):

- Children younger than 5 years of age
- Adults 65 years or older
- American Indian and Alaska Native people
- People with any of the following medical conditions:
  - Sickle cell disease
  - Asplenia
  - HIV
  - Immunoglobulin and complement component deficiencies
  - Malignant neoplasms requiring hematopoietic stem cell transplant, chemotherapy, or radiation therapy

### What are the signs and symptoms of *H. influenzae* infection?

Invasive *H. influenzae* diseases include clinical syndromes of meningitis, bacteremia or sepsis, epiglottitis, pneumonia, septic arthritis, pericarditis, and cellulitis. Less common infection manifestations include endocarditis and osteomyelitis. In contrast, syndromes of mucosal infections such as bronchitis, sinusitis, and otitis media are considered noninvasive disease and are not reportable.

### What are potential complications of *H. influenzae* infection?

Between 3% to 6% of Hib cases in children are fatal. People  $\geq 65$  years of age with invasive *H. influenzae* disease (Hib, non-b, and nontypeable) have higher case-fatality ratios than children. Up to 20% of patients who survive Hib meningitis have permanent hearing loss or other long-term neurological sequelae.

### How is *H. influenzae* infection diagnosed?

Culture is the gold standard laboratory test for identification of *H. influenzae* disease; however, can it be difficult to grow in the lab. Culture has poor sensitivity in specimens that are not handled properly and in specimens from persons who have received antibiotics. PCR is a rapid test with high sensitivity and specificity to use when a patient has been treated with antibiotics before a clinical specimen is obtained for culture. Specimens for testing include normally sterile body sites (CSF, blood, joint fluid, pleural fluid, pericardial fluid).

<https://www.cdc.gov/meningococcal/laboratory/pcr-guidance-mening-hflu.html>

### How is *H. influenzae* infection treated?

*Haemophilus influenzae* disease, including Hib disease, is treated with antibiotics. Most cases of invasive disease require hospitalization. Even with antibiotic treatment, 3%–6% of all children with Hib meningitis die from the disease. Rifampin chemoprophylaxis is recommended for index case-patients, unless treated with cefotaxime or ceftriaxone.

### How can *H. influenzae* infection be prevented?

In the U.S., vaccines licensed by the Federal Drug Administration are available to prevent Hib disease, but not the other serotypes of *H. influenzae* bacteria. There are two licensed combination vaccines that contain Hib vaccine. The Hib vaccine is recommended for all children younger than 5 years of age in the U.S. and scheduled to be given to infants starting at 2 months of age. For household contacts of a person with invasive Hib disease, rifampin chemoprophylaxis **is not** indicated if all persons are 48 months of age or older, or if children younger than 48 months of age are fully vaccinated. Rifampin chemoprophylaxis **is**

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recommended for all household contacts with members less than 4 years of age who are not fully vaccinated or members less than 18 years of age who are immunocompromised, regardless of their vaccination status.

### What are some public health considerations?

- Reporting of *H. influenzae* varies by state. The noninvasive syndromes are not nationally notifiable. Reporting excludes conjunctivitis.
- Note the patient's *H. influenzae* immunization history.
- Collect vaccine failure information for case-patients who received all required doses of vaccines but still contracted Hib.
- The CDC *Haemophilus influenzae* Surveillance Worksheet (Appendix 4-3) may be used as a guide for collecting case investigation information.  
<https://www.cdc.gov/vaccines/pubs/surv-manual/appendix.html>

### References

Defense Health Agency. 2022. *Armed Forces Reportable Medical Events: Guidelines and Case Definitions*.

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Heymann, David L. ed. 2022. *Control of Communicable Diseases Manual*. 21st Edition. Washington, DC: APHA Press.

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