



# ***Haemophilus influenzae*, Invasive Disease (including Type B)**

1. **Agent:** *Haemophilus influenzae*, a small Gram-negative rod. Numerous serotypes and non-typeable strains exist; immunization or prophylaxis prevents only serotype b (Hib) infection.

2. **Identification:**

a. **Symptoms:** Vary depending on the type of invasive illness. Onset of meningitis is usually sudden; symptoms include fever, vomiting, lethargy and meningeal irritation consisting of bulging fontanelle in infants or stiff neck and back in older children. Otitis media or sinusitis may be a precursor. *H. influenzae* may also cause septicemia, pneumonia, epiglottitis, cellulitis, pericarditis, peritonitis, or septic arthritis.

b. **Differential Diagnosis:** Other bacterial or viral agents of meningitis, sepsis, or pneumonia. Other *H. influenzae* serotypes (a, c-f) and non-typeable strains cause identical clinical picture.

c. **Diagnosis:** Isolation of organisms from cerebrospinal fluid, blood, joint aspirate or other normally sterile site. Diagnosis can also be made by several rapid methods for capsular antigen detection.

3. **Incubation:** Short, within 2-4 days.

4. **Reservoir:** Human.

5. **Source:** Nose and throat secretions of case and/or carriers.

6. **Transmission:** Person-to-person through infected droplets of respiratory secretions, often from asymptomatic carrier.

7. **Communicability:** As long as organisms are present in nose and throat. Ampicillin and chloramphenicol reduce communicability within hours following initiation and throughout treatment, but do not eliminate carriage.

8. **Specific Treatment:**

a. **Case:** Therapy with chloramphenicol or an effective third-generation cephalosporin (cefotaxime or ceftriaxone) should be begun immediately. Ampicillin-resistant strains are now common throughout the USA; thus, patients with life-threatening illness in which *H. influenzae* may be the etiologic agent should not receive ampicillin as initial therapy. Treatment course is usually 10-14 days.

Rifampin should be given to all persons with Hib prior to discharge to eradicate the nasal carrier state if they will be returning to a school or child care center with children under age 4 years.

b. **Contacts:** See below and the reverse of the Hib Report Form PM401 (10/05) for details of prophylaxis. If chemoprophylaxis is suggested:

**Rifampin:** Adults and children > 1 month old: 20 mg/kg per dose once daily (maximum daily dose 600 mg) for 4 days.

Neonates ≤ 1 month: 10 mg/kg once daily for 4 days (suggested but not established).

Package insert has instructions for making one-percent syrup suspension for those too young to take capsules. Contents of capsule can also be mixed with applesauce.

**NOTE:** Rifampin is not approved for use in pregnant women, and no alternative medication for this indication has been studied. Persons on rifampin should be advised that the medication stains contact lenses and turns urine red.

**NOTE:** Serotypes other than type b are now the most common organisms found in invasive *Haemophilus* disease. Only type b (i.e., Hib) demands prophylaxis. If serotyping is pending or has not been done, start prophylaxis on the contacts if the suspect case is under four years of age



and not completely immunized against Hib, or if the suspect is under one year of age and appropriately immunized for age but has not yet completed a primary series for Hib vaccine. In these instances, the suspect case is not completely protected against Hib, which increases the probability that his/her disease may be due to Hib.

9. **Immunity:** Immunity is age-dependent and associated with the presence of circulating bacterial antibody. Vaccination with any of the polysaccharide Hib vaccines is highly effective in preventing invasive infections.

### REPORTING PROCEDURES

1. **Reportable (with all serotypes).** (Title 17, Section 2500, *California Code of Regulations*). Report within 1 working day of identification of case or suspected case by mail, telephone, fax, or electronic transmission. **Only suspected cases under 15 years of age are to be investigated.**
2. **Report Form: INVASIVE HAEMOPHILUS INFLU-ENZAE DISEASE CASE REPORT (PM 401, 10/05 fillable).**
3. **Epidemiologic Data:**
  - a. Source of specimen.
  - b. Serotype of isolate.
  - c. Type of infection.

Hib immunization history only for cases under age ten years and known to be due to serotype b, including manufacturer and lot number of each vaccine dose.

### CONTROL OF CASE, CONTACTS & CARRIERS

Investigate cases of invasive Hib disease on the day of report. Non-invasive cases including conjunctivitis and positive sputum culture without pneumonia or epiglottitis, and cases confirmed not to be serotype b do not require investigation.

#### CASE:

**Precautions:** Respiratory secretion precautions should be taken until 24 hours after initiation of appropriate treatment.

#### CONTACTS:

See reverse of **Case Report Form (PM 401, 10/05)**. In summary:

1. **Household:** In any household in which a case of Hib disease has occurred, the following guidelines should be followed to determine if rifampin chemoprophylaxis is indicated.
  - a. If an infant who is less than 1 year of age resides in the home (regardless of Hib vaccination status), all household contacts should receive rifampin chemoprophylaxis.
  - b. If a child aged 1 through 3 years who is inadequately immunized for Hib resides in the home, all household contacts should receive rifampin chemoprophylaxis.
  - c. Rifampin chemoprophylaxis is no longer indicated if all contacts in the home aged 1 through 3 years are adequately vaccinated against Hib disease. A child is considered fully immunized against Hib disease following: 1) at least one dose of conjugate vaccine at  $\geq 15$  months of age, or 2) two doses of conjugate vaccine at 12-14 months of age, or 3) two or more doses of conjugate vaccine at  $< 12$  months of age, followed by a booster dose at  $\geq 12$  months of age.
  - d. Members of households with a fully vaccinated but immunocompromised child should receive rifampin because of concern that the vaccination may have been ineffective.
2. **Family Day care (Baby-sitting) groups:** Rifampin prophylaxis should be given to all the children in a family day care group and to all the members of the babysitter's household if the case attended a group with other susceptible children (e.g., children less than one year of age or inadequately immunized children 1 through 3 years of age) for 25 hours or more during the week before onset of illness.
3. **Child Care Centers:** Each child care situation should be evaluated on an individual basis by the Area Medical Director. The following are general guidelines for follow-up of child care center contacts:



In child care centers attended by children less than 2 years of age, the occurrence of one case of Hib justifies written notification to all parents that their children are at slightly increased risk. The notice should list the symptoms and recommend prompt medical attention if symptoms occur. Chemoprophylaxis is not recommended in instances when there is only a single case.

However, when 2 or more cases occur within 60 days of each other, administration of rifampin prophylaxis to all children and staff in the classroom may be recommended. If prophylaxis is recommended, it must be done promptly. The benefit decreases if more than 14 days have passed since exposure to the index case. Do not recommend prophylaxis unless at least 75% compliance is achievable.

**NOTE:** Contacts with history of Hib immunization should still receive prophylaxis as indicated.

#### **CARRIER:**

Nasopharyngeal carriage studies should not be used as a guide for implementation of chemoprophylaxis. Carriage of the disease has not been proven to correlate with risk of the disease. Furthermore, performing such a study would delay implementation of chemoprophylaxis.

#### **PREVENTION-EDUCATION**

1. Concurrent disinfection of fomites contaminated with nose and throat discharges. Assure the separation and ventilation of living and sleeping quarters.
2. Currently four Hib vaccines are licensed for infants beginning at 2 months of age. Follow the recommended vaccine schedule for series and booster doses.
3. Un-immunized or incompletely immunized children, under the age of 24 months who develop invasive Hib disease should complete the recommended vaccine schedule beginning 1-2 months after acute illness.

#### **DIAGNOSTIC PROCEDURES**

Few laboratories in LAC perform serotyping of *H. influenzae* isolates any more. Request

laboratories to forward all sterile-site isolates from patients under 30 years of age to the Public Health Laboratory for serotyping.