

immunocompromised hosts. Treatment of other invasive *H influenzae* infections is similar. Therapy is continued for 7 to 10 days by the intravenous route and longer in complicated infections.

- Dexamethasone is beneficial for treatment of infants and children with Hib meningitis to diminish the risk of hearing loss, if administered before or concurrently with the first dose of antimicrobial agent(s).
- Epiglottitis is a medical emergency. An airway must be established promptly via controlled intubation.
- Infected pleural or pericardial fluid should be drained.
- For empiric treatment of acute otitis media in children younger than 2 years or in children 2 years or older with severe disease, oral amoxicillin (see details in Pneumococcal Infections, p 639, and Appropriate Use of Antimicrobial Agents, p 906) is recommended, unless the child has a prior history of amoxicillin therapy within the past 30 days.¹ For those younger than 2 years, the duration of therapy is 10 days. A 7-day course is considered for children 2 through 5 years of age, and a 5-day course may be used for older children. In the United States, approximately 30% to 40% of *H influenzae* isolates produce beta-lactamase, so amoxicillin may fail, necessitating use of a beta-lactamase-resistant agent, such as amoxicillin-clavulanate; an oral cephalosporin, such as cefdinir, cefuroxime, or cefpodoxime; or azithromycin for children with beta-lactam antibiotic allergy. In vitro susceptibility testing of isolates from middle-ear fluid specimens helps guide therapy in complicated or persistent cases.

ISOLATION OF THE HOSPITALIZED PATIENT: In addition to standard precautions, in patients with invasive Hib disease, droplet precautions are recommended for 24 hours after initiation of effective antimicrobial therapy.

CONTROL MEASURES (FOR INVASIVE HIB DISEASE):

Care of Exposed People. Secondary cases of Hib disease have occurred in unimmunized or incompletely immunized children exposed in a child care or household setting to invasive Hib disease. Such children should be observed carefully for fever or other signs/symptoms of disease. Exposed young children in whom febrile illness develops should receive prompt medical evaluation.

Chemoprophylaxis.² The risk of invasive Hib disease is increased among unimmunized household contacts younger than 4 years. Rifampin eradicates Hib from the pharynx in approximately 95% of carriers and decreases the risk of secondary invasive illness in exposed household contacts. Child care center contacts also may be at increased risk of secondary disease, but secondary disease in child care contacts is rare when all contacts are older than 2 years. Indications and guidelines for chemoprophylaxis in different circumstances are summarized in Table 3.11.

¹Lieberthal AS, Carroll AE, Chonmaitree T, et al; American Academy of Pediatrics, Subcommittee on Diagnosis and Management of Acute Otitis Media. Clinical practice guideline: the diagnosis and management of acute otitis media. *Pediatrics*. 2013;131(3):e964–e999

²Centers for Disease Control and Prevention. Prevention and control of *Haemophilus influenzae* type b disease: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep*. 2014;63(RR-1):1–14

Table 3.11. Indications and Guidelines for Rifampin Chemoprophylaxis for Contacts of Index Cases of Invasive *Haemophilus influenzae* Type b (Hib) Disease

Chemoprophylaxis Recommended

- For all household contacts* in the following circumstances:
 - ◆ Household with at least 1 contact younger than 4 years who is unimmunized or incompletely immunized^b
 - ◆ Household with a child younger than 12 months who has not completed the primary Hib series
 - ◆ Household with a contact who is an immunocompromised child, regardless of that child's Hib immunization status or age
- For preschool and child care center contacts when 2 or more cases of Hib invasive disease have occurred within 60 days (see text)
- For index patient, if younger than 2 years or member of a household with a susceptible contact and treated with a regimen other than cefotaxime or ceftriaxone, chemoprophylaxis at the end of therapy for invasive infection

Chemoprophylaxis Not Recommended

- For occupants of households with no children younger than 4 years other than the index patient
- For occupants of households when all household contacts are immunocompetent, all household contacts 12 through 48 months of age have completed their Hib immunization series, and when household contacts younger than 12 months have completed their primary series of Hib immunizations
- For preschool and child care contacts of 1 index case
- For pregnant women

*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.

^bComplete 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 when younger than 12 months with a booster dose at 12 months of age or older.

Clinicians may consider prophylaxis of contacts of index cases of invasive Hia disease, using the same criteria as that recommended in Table 3.11 and below for Hib disease. Chemoprophylaxis generally is not recommended for contacts of people with invasive disease caused by non-type b, non-type a, or nontypable *H influenzae* strains, because secondary disease is rare.

- **Household.** In households with a person with invasive Hib disease and at least 1 household member who is younger than 48 months and unimmunized or incompletely immunized against Hib, rifampin prophylaxis is recommended for all household contacts, regardless of age. In households with an immunocompromised child, even if the child is older than 48 months and fully immunized, all members of the household should receive rifampin because of the possibility that immunization may not have been effective. Similarly, in households with a contact younger than 12 months who has not received the 2- or 3-dose primary series of Hib conjugate vaccine, depending on vaccine product, all household members should receive rifampin prophylaxis. Given that most secondary cases in households occur during the first week after hospitalization of the index case, when indicated, prophylaxis (see Table 3.11) should

be initiated as soon as possible. Because some secondary cases occur later, initiation of prophylaxis 7 days or more after hospitalization of the index patient still may be of some benefit.

- **Child care and preschool.** When 2 or more cases of invasive Hib disease have occurred within 60 days and unimmunized or incompletely immunized children attend the child care facility or preschool, rifampin prophylaxis for all attendees (irrespective of their age and vaccine status) and child care providers should be considered. In addition to these recommendations for chemoprophylaxis, unimmunized or incompletely immunized children should receive a dose of vaccine and should be scheduled for completion of the recommended age-specific immunization schedule (https://redbook.solutions.aap.org/SS/Immunization_Schedules.aspx). Data are insufficient on the risk of secondary transmission to recommend chemoprophylaxis for attendees and child care providers when a single case of invasive Hib disease occurs; the decision to provide chemoprophylaxis in this situation is at the discretion of the local health department.
- **Index case.** Treatment of Hib disease 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 should receive rifampin prophylaxis at the end of therapy for invasive infection.
- **Dosage.** For prophylaxis, rifampin should be administered orally, once a day for 4 days (20 mg/kg; maximum dose, 600 mg). The dose for infants younger than 1 month is not established; some experts recommend lowering the dose to 10 mg/kg. For adults, each dose is 600 mg.

Immunization.¹ Three single-antigen (monovalent) Hib conjugate vaccine products and 1 combination vaccine product that contain Hib conjugate are available in the United States (see Table 3.12). The Hib conjugate vaccine consists of the Hib capsular polysaccharide (polyribosylribitol phosphate [PRP]) covalently linked to a carrier protein. Protective antibodies are directed against PRP.

Depending on the vaccine, the recommended primary series consists of 3 doses administered at 2, 4, and 6 months of age or of 2 doses administered at 2 and 4 months of age (see Recommendations for Immunization, p 373, and Table 3.13). The regimens in Table 3.13 likely are to be equivalent in protection after completion of the recommended primary series. For American Indian/Alaska Native children, optimal immune protection is achieved by administration of PRP-OMP (outer membrane protein complex) Hib vaccine (see American Indian/Alaska Native Children and Adolescents, *Haemophilus influenzae* type b, p 93). Information on immunogenicity after dose 1 of new Hib-containing vaccines is important for assessing their suitability for use in AI/AN children.

Combination Vaccine. There is one combination vaccine that contains Hib licensed in the United States: DTaP-IPV/Hib (DTaP-IPV/PRP-T [see Table 3.12]), licensed for children 6 weeks through 4 years of age, administered as a 4-dose series at 2, 4, 6, and 15 through 18 months of age.

Vaccine Interchangeability. Hib conjugate vaccines licensed within the age range for the

¹Centers for Disease Control and Prevention. Prevention and control of *Haemophilus influenzae* type b disease: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep*. 2014;63(RR-1):1-14