Haemophilus influenzae type b Invasive Disease

CLINICAL CASE DEFINITION

Invasive disease caused by *Haemophilus influenzae* , manifested as pneumonia, bacteremia, meningitis, epiglottitis, septic arthritis, cellulitis, or purulent pericarditis; less common infections include endocarditis and osteomyelitis.

Note:
Invasive *H.influenzae* disease involves isolation of the organism (or detection of *H. influeanzae*-specific nucleic acid) from normally-sterile anatomic sites, such as blood, cerebro-spinal (CSF) fluid, or joint, pleural, or pericardial fluid.

Isolation of the organism **from non-sterile sites** (e.g. upper respiratory tract) and in connection with non-invasive illnesses (e.g. otitis media, sinusitis) **are not reportable**.

When *H. influenzae* is recovered from normally-sterile sites in persons <15 years of age, it is important to assure serotyping of the isolate; see LABORATORY SPECIMENS: PROCEDURES AND CONSIDERATIONS, below.

CASE CLASSIFICATION

- **Probable**: A clinically compatible case of meningitis with detection of *H. influenzae* type b antigen in cerebrospinal fluid (CSF).

- **Confirmed**: Isolation of *Haemophilus influenza*, or detection of *H. influeanzae*-specific nucleic acid, from a normally sterile body site (e.g., blood or CSF, or, less commonly, joint, pleural, or pericardial fluid)

Comment: Positive antigen test results from urine or serum samples are unreliable for diagnosis of *H. influenzae* disease.

Note: False positive results may occur from asymptomatic nasopharyngeal carriage of Hib, recent Hib vaccination, or contamination of urine specimens by cross-reacting fecal organisms. Cases identified exclusively by these methods should not be reported.

TRANSMISSION

The mode of transmission is person-to-person by inhalation of respiratory droplets or by direct contact with respiratory secretions.

INCUBATION PERIOD

Unknown, probably short, 2-4 days. See *Hib* Timeline, below.

PERIOD OF COMMUNICABILITY

As long as organisms are present, which may be for a prolonged period even without nasal discharge; non-communicable within 24-48 hours of starting appropriate antimicrobial therapy.

REPORTING/INVESTIGATION

Health care providers should immediately report cases/suspect cases of invasive *H. influenzae* disease to the local health department serving the residence of the case.

Local health department responsibilities:

- Contact case/guardian and health care provider.

- Determine if case meets clinical case definition.
- If definition met (probable or confirmed cases), investigate using control guidelines below.
- Assist with specimen collection and/or coordination if public health lab resources (MDHHS, CDC, etc) are used.
- Report/ensure reporting of case to the Michigan Disease Surveillance System (MDSS). CDC *H. influenzae* surveillance worksheet may be helpful in field investigation to collect and capture data.
- Obtain immunization history information from provider record or MI Care Improvement Registry (MCIR – Michigan's state immunization registry).
- Update the MDSS record in a timely manner with new or additional info as it becomes available. Finalize MDSS record when case investigation is complete.
- In the event of death, obtain and send copies of hospital discharge summary, death certificate, and autopsy report to MDHHS Immunization Division.

LABORATORY CONFIRMATION

- Isolation of *H. influenzae* from a normally sterile site (e.g., blood or cerebrospinal fluid [CSF] or, less commonly, joint, pleural, or pericardial fluid).
- All isolates of *H. influenzae* from sterile sites in persons under 15 years of age should be serotyped. If the laboratory that cultured the *H. influenzae* organism does not perform serotyping, arrangements should be made to send the isolate to MDHHS Laboratory for serotyping.

See LABORATORY SPECIMENS: PROCEDURES AND CONSIDERATIONS, below, for additional information.

IMMUNITY/SUSCEPTIBILITY

- Susceptibility is universal; protection results from prior infection or immunization.
- Invasive disease due to *H. influenzae* type b is uncommon in persons over 5 years of age. Prior to routine childhood immunization, approximately one in 200 children developed invasive Hib disease by age 5.
- Persons over age 5 who are at increased risk include:
  - immunocompromised persons such as those receiving immunosuppressive therapy or infected with HIV;
  - persons who have functional or anatomic asplenia (e.g., sickle cell disease, post-splenectomy).

CONTROL MEASURES

- Reports of *H. influenzae* invasive disease in children <5 should be investigated immediately.

- Identify all exposed contacts < 5 years of age. Household and day care contacts should be considered close contacts.

- Provide information about *H. influenzae* invasive disease to persons at risk and/or the general public. A Question-&-Answer *Hib* information sheet in **.PDF** format is available from the Immunization Action Coalition (www.immunize.org/catg.d/p4206.pdf)

Chemoprophylaxis of close contacts recommended as follows:

- For all household contacts* in the following circumstances:
  - Household with at least 1 contact (i.e. person other than the case) younger than 4 years of age who is unimmunized or incompletely immunized**.
  - Household with a child younger than 12 months of age who has not received the primary series
  - Household with a contact who is an immunocompromised child (under age 18 years), regardless of that contact's Hib immunization status.

*Household contacts - 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.
** 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 a 2- or 3-dose primary series when younger than 12 months with a booster dose at 12 months of age or older (source: AAP Red Book, 2012)

- For nursery school and child care center contacts, regardless of age, **when 2 or more cases of Hib invasive disease have occurred within 60 days, and unimmunized or incompletely immunized children attend the facility** (when a single case has occurred, the advisability of rifampin prophylaxis in exposed child care groups with unimmunized or incompletely immunized children is controversial; it may be considered)

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- For the index case patient (unless treated with cefotaxime or ceftriaxone); these patients often receive rifampin chemoprophylaxis before discharge from hospital.

Prophylactic Therapy / Dosage:
Rifampin is recommended for chemo-prophylaxis; the recommended dosage is 20 mg/kg (maximal daily dose 600 mg) orally as a single daily dose for four days. The dose for infants <1 month of age is not established; some experts recommend lowering the dose to 10 mg/kg. The adult dose is 600 mg.

When prophylaxis is indicated under these guidelines, it should be given both to children who have and who do not have a history of previous Hib immunization. (Source: Red Book)

In addition to chemoprophylaxis, unvaccinated or incompletely vaccinated children should receive a dose of vaccine and be scheduled for the completion of the recommended age-specific immunization schedule. (Source: Red Book)

Chemoprophylaxis Not Recommended:

- When the serotype of *H. influenzae* is known and is not type b (this includes isolates determined to be nontypeable).
- For occupants of households with no children younger than 4 years of age other than the index patient.
- For occupants of households when all household contacts 12 to 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.
- For nursery school and child care contacts of one index case, especially those older than

2 years of age.
- For pregnant women.
- For hospital personnel exposed to a child with invasive Hib disease.

Additional considerations in childcare settings:
In childcare settings where one or more cases of Hib disease have occurred, it is advisable to restrict new entrants to the program to children who are age-appropriately immunized for a period of 2 months after the onset of the case(s).

LABORATORY PROCEDURES AND CONSIDERATIONS

- Confirmation of a case of *H. influenzae* type b invasive disease requires culture and isolation of the organism from a normally sterile body site, such as

  - cerebrospinal fluid (CSF)
  - blood
  - joint fluid
  - pleural effusion
  - pericardial effusion
  - peritoneal fluid
  - subcutaneous tissue fluid
  - placenta
  - amniotic fluid

- Most hospitals and commercial microbiologic laboratories have the capability to isolate *H. influenzae* from cultured specimens, but many do not perform organism serotyping.

- Serotyping of *H. influenzae* isolates is essential for complete and effective surveillance; arrangements should be made to serotype all isolates, especially from patients under 15 years of age.

- The Michigan Department of Health & Human Services Laboratory performs serotyping. To make arrangements call the MDHHS VPD Surveillance Coordinator at 517-335-8159 or MDHHS Microbiology Laboratory at 517-335-8067.

NOTE: The isolate must be growing well on a chocolate agar slant before it is transported.

Complete MDHHS Microbiology/Virology Test Requisition, form DCH-0583, indicating “H. flu serotyping” in the “Other Test” area.

Send the isolate to:

Michigan Department of Health and Human Services
Bureau of Laboratories
3350 N. Martin Luther King Blvd.
Building 44, Room 155
Lansing, MI 48909

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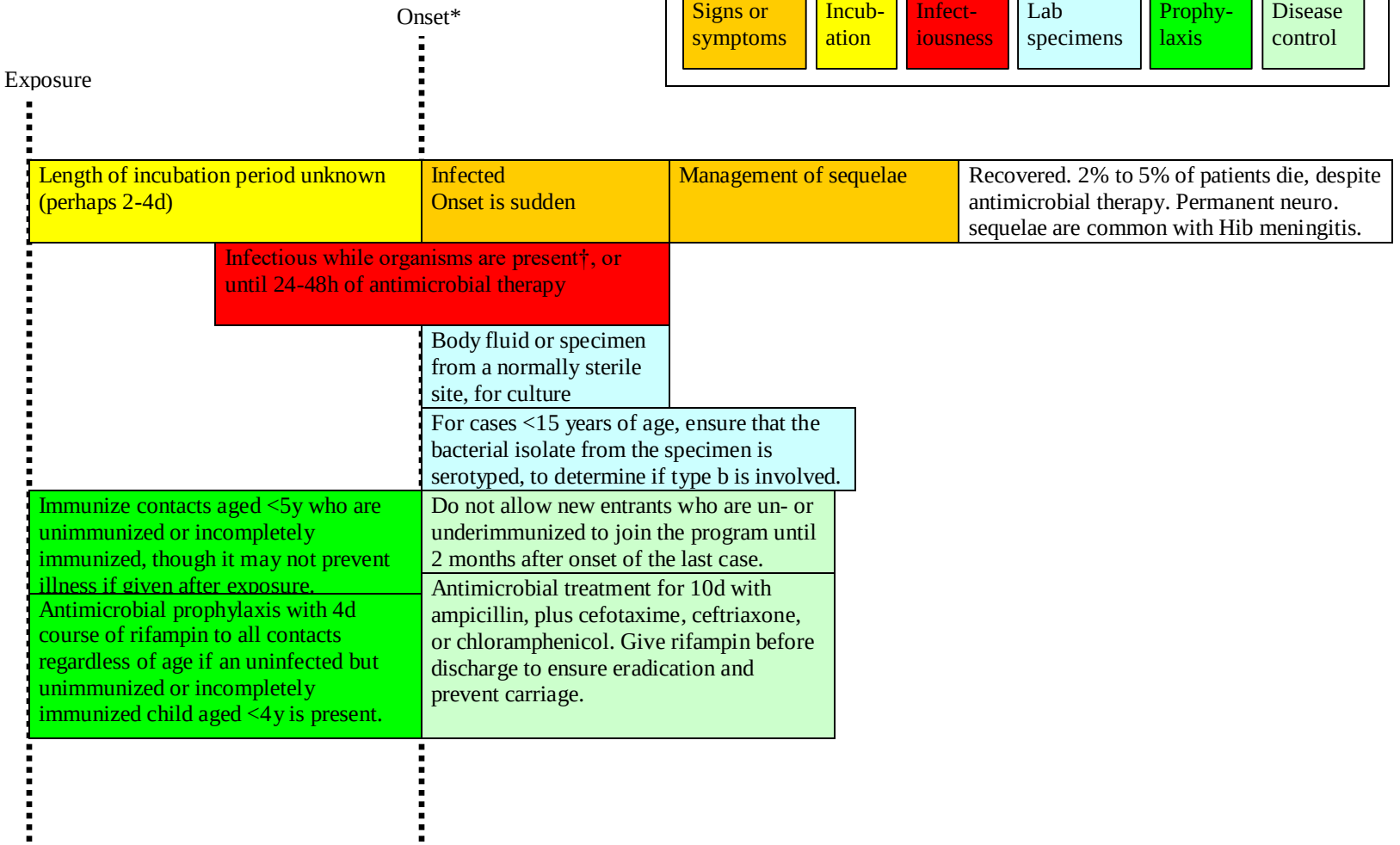
Hib* timeline diagram

Key: Numbers in parentheses, e.g., "(12-25d)", are outer ranges.

Signs or symptoms | Incub-ation | Infect-iousness | Lab specimens | Prophy-laxis | Disease control



* Invasive disease caused by *Haemophilus influenzae* type b only, which is rare in children older than 5y. Invasive disease includes meningitis, epiglottitis, pneumonia, septic arthritis, and cellulitis (less commonly osteomyelitis and pericarditis).
† Asymptomatic carriage occurred in 0.5% to 3% of normal children and infants in the pre-vaccine era.

Sources: APHA Control of Communicable Diseases Manual, AAP Red Book, CDC Pink Book, CDC VPD surveillance manual