Haemophilus influenzae non-serotype b, Invasive

Case Definition

Confirmed Case
Clinical evidence of invasive disease\(^{[1]}\) with laboratory confirmation of infection:
- Isolation of Haemophilus influenzae (serotypes a, c, d, e, f, undifferentiated and nontypable isolates) from a normally sterile site.\(^{[2]}\)

\(^{[1]}\) Clinical illness associated with invasive disease due to \(H. \) influenzae includes meningitis, bacteremia, epiglottitis, pneumonia, pericarditis, septic arthritis and empyema. Otitis media, conjunctivitis and sinusitis are not considered invasive.

\(^{[2]}\) Specimens from a normally sterile site are defined as:
- blood,
- cerebrospinal fluid (CSF),
- pleural fluid,
- peritoneal fluid,
- pericardial fluid,
- bone,
- joint fluid or
- specimens taken during surgery (e.g., muscle collected during debridement for necrotizing fasciitis or fluid from a deep abscess). **NOTE:** A specimen collected from a non-sterile site, during a sterile procedure is not considered a "normally sterile site".
Reporting Requirements

1. Physicians, Health Practitioners and others
   Physicians, health practitioners and others listed in Sections 22(1) or 22(2) of the Public Health Act shall notify the Medical Officer of Health (MOH) (or designate) of all confirmed cases in the prescribed form by mail, fax or electronic transfer within 48 hours (two days).

2. Laboratories
   All laboratories, including regional laboratories and the Provincial Laboratory for Public Health (PLPH) shall, in accordance with Section 23 of the Public Health Act, report all positive laboratory results by mail, fax or electronic transfer within 48 hours (two days) to the:
   - Chief Medical Officer of Health (CMOH) (or designate),
   - MOH (or designate) and
   - Attending/ordering physician.

3. Alberta Health Services and First Nations Inuit Health
   - The MOH (or designate) of the zone where the case currently resides shall forward the preliminary Notifiable Disease Report (NDR) of all confirmed cases to the CMOH (or designate) within two weeks of notification and the final NDR (amendment) within four weeks of notification.
   - For out-of-zone reports, the MOH (or designate) first notified shall notify the MOH (or designate) of the zone where the client currently resides by mail, fax or electronic transfer and fax a copy of the positive laboratory report within 48 hours (two days).
   - For out-of-province and out-of-country reports, the following information should be forwarded to the CMOH (or designate) by phone, fax or electronic transfer within 48 hours (two days) including:
     o name,
     o date of birth,
     o out-of-province health care number,
     o out-of-province address and phone number,
     o attending physician (locally and out-of-province) and
     o positive laboratory report (faxed).
Etiology
Haemophilus influenzae (serotype non-type b) are gram-negative coccobacillus in the family Pasteurellaceae. They require specific factors X (hematin) and V (nicotinamide adenine dinucleotide) for growth (Mandell). The isolates are divided into five distinct capsular types (a, c, d, e and f) and nonencapsulated (nontypable) strains. They are found most commonly in the upper respiratory tract but rarely cause disease. Type f is the most common serotype causing invasive infections in this group.

Clinical Presentation
Invasive disease is uncommon but, when it occurs, disease caused by non-type b strains is clinically indistinguishable from H. influenza type b (Hib) disease. Clinical presentation includes meningitis (usually associated with a bacteremia), epiglottitis, pneumonia, septic arthritis, bacteremia, cellulitis, pericarditis, empyema, and osteomyelitis. Those individuals with non-type b strains have a higher frequency of underlying medical disorders.

The nontypable strains typically cause upper respiratory tract infections including tracheitis, bronchitis, sinusitis, otitis media, and may cause pneumonia. Approximately one quarter of all cases of otitis media are caused by nontypable H. influenzae. The typical presentation is fever and irritability in infants plus ear pain in older children. More than 90% of all strains isolated from middle ear fluid are nontypable. Nasopharyngeal colonization in the first year of life is associated with recurrent otitis media. Nontypable H. influenzae frequently colonizes in the lower respiratory tract when chronic obstructive pulmonary disease (COPD) or cystic fibrosis (CF) is present. Exacerbations of COPD can be directly related to the culturing of H. influenzae in sputum. Nontypable H. influenzae is also an important cause of pneumonia in adults (especially in the elderly, those with COPD and those who are immunodeficient) and in children in developing countries. Other clinical manifestations of nontypable H. influenzae include acute respiratory tract infections, sinusitis, neonatal and maternal sepsis, bacteremia and invasive infections, and conjunctivitis.

Diagnosis
The diagnosis is made by the isolation of the Haemophilus influenzae organism from a normally sterile site. Clinical specimens should be inoculated onto appropriate culture media as soon as possible following collection as the viability of the organism is lost quickly. Non-type b serotyping is performed at the PLPH (G Tyrell, personal communication, December 8, 2003).

Epidemiology
Reservoir
Humans.

Transmission
Transmission is person to person via droplet spread, and direct or indirect contact with discharges from the nose and throat during the infectious period. Typically the nasopharynx is the portal of entry. Asymptomatic colonization is common, especially with nontypable and non-type b strains.

Transmission to neonates occurs by aspiration of amniotic fluid or by contact with genital tract secretions containing the organism during the antepartum period.

Incubation Period
The incubation period is unknown.
Period of Communicability
The period of communicability is unknown.

Host Susceptibility
Socioeconomic factors increase the risk of invasive \textit{H. influenzae}. Underlying medical conditions, such as alcoholism, cardiopulmonary disease or cancer, also increase the risk for invasive disease.

Occurrence
\textbf{General (1)}
Non-type b and nontypable strains increase in relative frequency with increasing age. Types e and f are the most frequent in North America. In a study in the United States, type a accounted for less than 1\% of invasive \textit{H. influenzae} cases among all age groups. The incidence of invasive disease due to \textit{H. influenzae} is 1.7 cases per 100,000. The highest incidence is among the elderly. The majority of adults with bacteremia have underlying medical conditions such as cardiopulmonary disease or cancer. Since the introduction of Hib vaccine there has been no change in the rates of nontypable and non-type b strains at a population level.

\textbf{Canada (2)}
There is no specific information on non-type b and nontypable strains of \textit{H. influenzae} in Canada. From 1995 to 2001, under the auspices of the Canadian Immunization Monitoring Program, ACTive (IMPACT), a pilot project undertaken in Saskatchewan typed all invasive \textit{H. influenzae} strains from children newborn to 19 years of age. A total of 34 cases were identified: type a - 12, type b - 6, type d - 3, type e - 2, type f - 1, and 10 were nontypable. Twenty seven infections were in children under the age of five years and two cases (both nontypable) were in infants less than one month of age. Of the 12 type a infections, 11 were in children less than two years old. Eight of 10 nontypable infections were also in children less than two years. There were at least two deaths and both were type a infections.

\textbf{Alberta (3)}
From 1998 to 2002, 91 cases of invasive \textit{H. influenzae} non-type b have been reported in Alberta ranging from nine cases in 1998 to 29 cases in 2002. Approximately one quarter of cases were nontypable and in one half of the reported cases the type was unknown. Of the typable strains reported from 1998 to 2002, type f (10 cases) had the highest incidence followed by type a (6 cases) and type e (6 cases).

Key Investigation
\textbf{Single Case/Household Cluster}
- Verify diagnosis with physician (as per the case definition).
- Verify serotype with laboratory. Once growth has occurred serotyping may take up to five days (K Kowalewska-Grochowska, personal communication, July 2002).

Control
\textbf{Management of a Case}
- Dependent on serotype and manifestation of invasive disease. Non-type b cases do not require follow-up.

\textbf{Treatment of a Case}
- Dependent on serotype and manifestation of invasive disease.
Management of Contacts

- No follow-up is done on non-type b infections.

Preventive Measures

- There is no vaccine available and there are no known preventive measures.
References


(2) *IMPACT News: Update on H. influenzae b (Hib) and non type b cases at IMPACT centres*. Canadian Paediatric Society. Issue 10. September 2002.