

04

Haemophilus influenzae type B (Hib)

Introduced in 1992

NOTIFIABLE

Introduction

Infections due to *Haemophilus influenzae*, a gram-negative coccobacillus, are an important cause of morbidity and mortality, especially in young children. Humans are the only known reservoir. The Hib vaccine was introduced into the primary schedule in Ireland in 1992 and subsequently there has been a dramatic fall in the incidence of invasive Hib disease. A booster dose at 12 months was introduced in 2006. The vaccine is specific for diseases caused by *H. influenzae type b*, and does not protect against infections caused by other haemophilus strains.

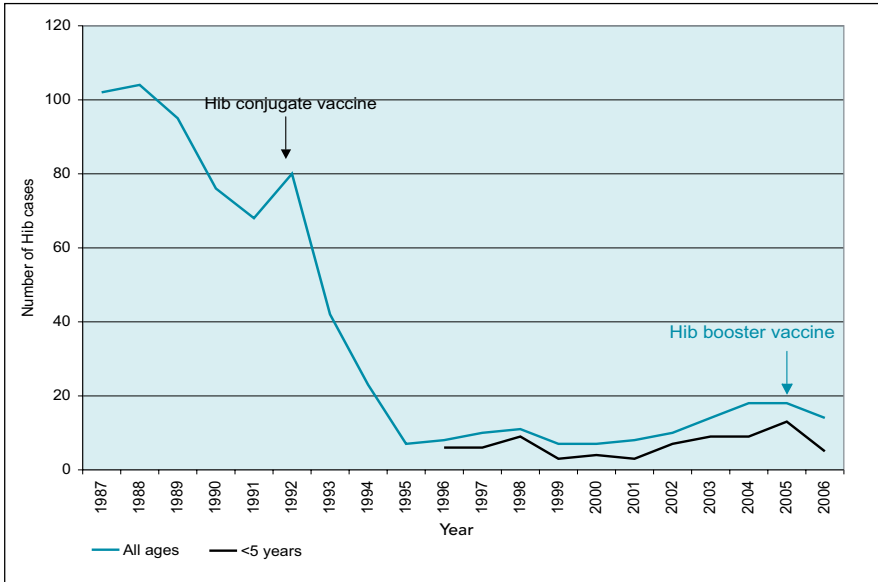
Epidemiology

The incidence of Hib disease fell significantly following introduction of the vaccine into the primary schedule in 1992. In 2002-2003 an increase of invasive Hib disease was noted in unvaccinated children aged under 5 years. However, in late 2004 and 2005 an increase of disease in fully vaccinated children was observed. A catch-up booster vaccination of all children aged 12-47 months, and the addition of routine Hib booster vaccine to those aged 12 months was therefore recommended.

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Figure 4.1 Number of invasive Hib cases by year, 1987-2006. Source: HPSC



Almost all invasive *H. influenzae* infections are caused by encapsulated strains, of which there are 6 serotypes (a-f). Type b (Hib) caused more than 80% of these infections in the pre-vaccine era. Non-encapsulated strains of haemophilus cause mucosal infection (e.g. otitis media) but rarely lead to serious invasive disease. Transmission is presumed to be by droplet spread.

The epidemiology has changed since the vaccine was introduced to the primary schedule. Prior to 1992, the highest incidence was in those under 1 year of age, with approximately 90% of all Hib disease occurring in those under 5 years of age. These infants are now protected if fully vaccinated. While there is evidence that carriage has been reduced, lessening the risk of exposure of unvaccinated persons, sporadic cases still occur in all age groups.

Effects of Hib disease

Invasive disease caused by *H. influenza* can affect many organs. The commonest effects are:

Meningitis The mortality rate is 2-5%, and neurological sequelae occur in 15-30% of survivors

Epiglottitis, with up to 10% mortality

Pneumonia, septic arthritis, cellulitis (usually involving the face or neck), *otitis media, osteomyelitis, and pericarditis*.

Hib vaccines

Hib vaccines consist of *Haemophilus influenzae* b capsular poly- or oligosaccharide conjugated with tetanus or diphtheria toxoid. Vaccines currently licensed are listed in Appendix 1. An updated list can be found on the IMB website (www.imb.ie).

All Hib vaccines are inactivated. They should be stored at 2-8°C. When the product brand given in the first and second courses is not known or not available, the 3-dose series can be completed with any Hib vaccine.

Dose and route of administration

The dose is 0.5 ml given by intramuscular injection. If BCG has been given within the previous 3 months, a different limb should be used.

The primary course consists of three doses at 2, 4 and 6 months of age, as DTaP/IPV/Hib/Hep B. A booster dose of Hib vaccine is given at 13 months of age. Children aged 12-47 months require only 1 dose. Booster immunisation is not normally required over 4 years of age. Unvaccinated children up to 10 years of age should be vaccinated. Such children may also need age-appropriate vaccination with DTaP, IPV, MenC, and MMR (see Chapter 2).

Indications

1. All infants at 2, 4 and 6 months of age, with a booster at 13 months of age.
2. Those less than 2 years of age who developed invasive Hib disease should be given Hib vaccine after one month. Immunocompetent children over 2 years of age who develop invasive Hib disease do not need to be immunised because the disease will most likely have induced a protective immune response
3. Persons at increased risk of invasive Hib disease, e.g. asplenia, hyposplenism, complement deficiency, etc *irrespective of age*, should be vaccinated. Those aged over 1 year should be given 2 doses of Hib vaccine (Hib/MenC if available) administered 2 months apart.
4. Children and adults who have completed a primary series and are undergoing elective splenectomy may benefit from an additional dose of Hib vaccine, preferably at least 2 weeks prior to the operation. Those who have developed hyposplenism should also get 2 doses.
5. Children aged 1-10 years who have never received Hib vaccine should be given 1 dose.

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Contraindications

Anaphylactic reaction to a preceding dose or any of the constituents.

Precautions

Acute severe febrile illness, defer until recovery.

Hib vaccine may be given to immunocompromised patients, but adequate antibody levels may not be reached.

Adverse reactions

Local: These include local redness, warmth or swelling at the injection site. Mild local reactions occur in about 20% of children.

General: Systemic reactions are uncommon, and include fever, irritability, headache, vomiting, diarrhoea, and rashes. Seizures have rarely been reported.

Immunisation and chemoprophylaxis of cases and contacts of invasive Hib disease

1. Household contacts (except pregnant women):
Household contacts are regarded as those who share living or sleeping accommodation with the case.
 - (a) Non-immunised contacts aged under 10 years should be given Hib vaccine.
 - (b) Chemoprophylaxis is indicated for all household contacts irrespective of age or immunisation history in the following situations:
 - (i) if there are any children under 4 years of age who are unvaccinated or incompletely vaccinated
 - (ii) if there are any unvaccinated children under 10 years of age
 - (iii) if there are any persons at increased risk of invasive Hib disease (asplenia, hyposplenism, etc.) irrespective of their age or immunisation status.
2. Play-group, creche or primary school contacts aged less than 10 years:
Non-immunised room contacts under the age of 10 years should be offered Hib vaccine. When two or more cases occur within 2 months, chemoprophylaxis should be offered to all room contacts, both adults and children.

3. Index case:
The index case, if younger than 2 years of age, may have low levels of anticapsular antibodies and could get a second episode of disease. Therefore immunisation should be given according to the current recommended schedule irrespective of vaccine history, starting 1 month after onset of disease or as soon as possible thereafter.

The index case should also be given chemoprophylaxis prior to discharge if not treated with cefotaxime or ceftriaxone. These drugs eradicate Hib from the nasopharynx. Immunised children who develop invasive Hib disease have an increased incidence of IgG2 deficiency and should be considered for immunological evaluation.

Notes:

1. Rifampicin dose for prophylaxis:
(a) Infants under 1 year of age – 10 mg/kg once daily for 4 days
(b) Children and adults – 20 mg/kg once daily for 4 days, max. 600 mg/day
2. Chemoprophylaxis is not recommended for pregnant women who are contacts of cases because rifampicin is not licensed for this indication.

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Bibliography

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