

# 07

## *Haemophilus influenzae* type b (Hib)

Vaccine introduced in 1992

NOTIFIABLE

In some circumstances, advice in these guidelines may differ from that in the Summary of Product Characteristics of the vaccines. When this occurs, the recommendations in these guidelines, which are based on current expert advice from NIAC should be followed.

### Introduction

Infections due to *Haemophilus influenzae* (*H. influenzae*) a Gram-negative coccobacillus, are an important cause of morbidity and mortality, especially in young children. Prior to the introduction of *H. influenzae* type b (Hib) vaccine into the primary schedule in 1992, most *H. influenzae* infections were caused by Hib. An increase in the number of cases of invasive Hib disease in vaccinated children <5 years of age was observed between 2002 and 2005. Consequently, a booster dose of vaccine was introduced in September 2006 for all children at 12 months of age, with a catch-up programme for those aged 12-47 months. Since 2008 the booster has been given at 13 months of age.

Following introduction of the vaccine, invasive Hib disease and carriage have become rare.

### Epidemiology

*H. influenzae* is a human-only pathogen. Since the Hib vaccine was introduced, most *H. influenzae* infections have been caused by non-encapsulated strains; these result mainly in mucosal infection (e.g. otitis

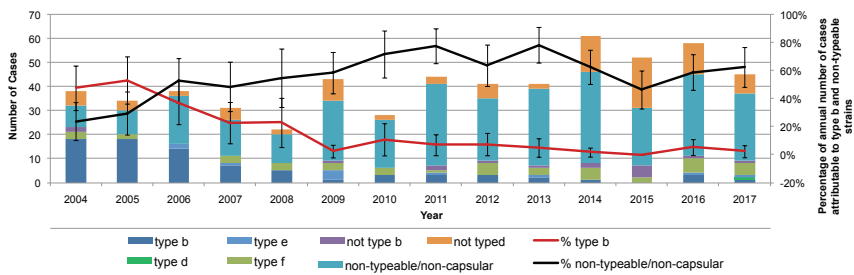
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media) and rarely cause invasive disease (Figure 7.1). Transmission is by respiratory droplets or direct person to person contact.

Since 2004 the highest frequency of Haemophilus infections has been in the 0-4 year age group, after which it falls sharply before increasing again among those aged 65 years and older. While there is evidence that vaccination strategies have resulted in the reduction of asymptomatic Hib carriage, lessening the risk of exposure of unvaccinated persons, sporadic cases still occur in all age groups.

**Figure 7.1** Number of invasive *H. influenzae* cases and proportion of cases attributable to type b and non-typeable strains with 95% confidence intervals, Ireland, 2004-2017

Source: HPSC



### Clinical Manifestations

Since the introduction of the Hib vaccine, non-typeable strains cause most invasive disease. The commonest forms of invasive disease are:

- Meningitis, with a mortality rate of 2-5% even with appropriate therapy. Neurological sequelae, including deafness, 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 may also occur.

### Hib vaccines

Hib vaccines contain *H. influenzae* type b capsular poly- or oligosaccharide conjugated to tetanus toxoid. All Hib vaccines are non-live. The vaccine is supplied as a monocomponent vaccine or as part of combination vaccines. The vaccines do not protect against infections caused by non-Hib types.

An up-to-date list of authorised vaccines and SmPCs can be accessed on the HPRA website [www.hpra.ie](http://www.hpra.ie)

A list of vaccines currently available from the National Cold Chain Service can be found at [www.immunisation.ie](http://www.immunisation.ie)

Hib vaccines should be stored at +2 to +8°C. If a vaccine has been frozen, it should not be used.

### **Dose and route of administration**

The dose is 0.5 ml. It must be given by intramuscular injection into the vastus lateralis muscle (anterolateral thigh) or the deltoid muscle (see Chapter 2).

### **Recommendations**

#### **1. Primary and booster vaccination**

The primary course consists of three doses, at 2, 4 and 6 months (as 6-in-1 vaccine), with a booster dose at 13 months of age (as Hib/MenC vaccine).

#### **2. Catch up vaccination**

Unvaccinated or incompletely vaccinated children up to 10 years of age should be fully vaccinated. Children over 12 months of age require only 1 dose. Such children may also need other age appropriate vaccinations (see Chapter 2).

#### **3. Index cases**

Index cases of any age who are unimmunised or partially immunised should complete an age-appropriate vaccine schedule.

Age appropriately vaccinated index cases

- aged 7 to <12 months should receive a booster Hib vaccine, at least 1 month after their last Hib containing vaccine, followed by the routine 13 month booster.
- aged 12 months to <10 years should receive a booster Hib vaccine at least 1 month after their last Hib containing vaccine.
- patients of any age with asplenia or hyposplenia who have completed the vaccine schedule more than 1 year previously, should receive a booster dose after recovery from the acute illness.

Children who develop Hib disease despite appropriate vaccination should be assessed for evidence of immune deficiency. Consultation with a specialist is advised.

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### 4. **Contacts of cases**

Unvaccinated or partially vaccinated children (and those adults at risk of infection) should complete an age appropriate vaccination schedule.

### 5. **At risk persons**

Those aged 1 year and older with the following medical conditions are at increased risk of Hib infection and require additional Hib vaccines:

- Asplenia or hyposplenia (including haemoglobinopathies and coeliac disease; see Chapter 3)

Those *unimmunised or partially immunised* should be given 2 doses of Hib 2 months apart *irrespective of age*

Those *fully vaccinated*: should be given an additional dose of Hib vaccine.

- For those requiring splenectomy, vaccination should be completed at least 2 weeks and preferably 4 weeks or more before surgery. In the case of emergency splenectomy, or if immunisation was not completed pre operatively, vaccination can be commenced 2 weeks post operatively.
- Haematopoietic Stem Cell Transplant recipients (HSCT):  
HSCT recipients require 3 doses of Hib vaccine 2 months apart.

### **Contraindications**

Anaphylaxis to any of the vaccine constituents.

### **Precautions**

Acute severe febrile illness, defer until recovery.

#### *Latex*

None of the Hib containing vaccine syringes or needle caps contain latex.

#### *Pregnancy and breast feeding*

Hib containing vaccines may be given to pregnant and breast feeding women

### **Adverse reactions**

A full list of adverse reactions may be found in the Summary of Product Characteristics (SmPC) and is accessible through the HPRA website at [www.hpra.ie](http://www.hpra.ie).

The following are common or very common adverse reactions.

*Local*: injection site pain, erythema, swelling.

*General:* fever  $\geq 38.0^{\circ}\text{C}$ , sleepiness, irritability, crying, decreased appetite.

Large injection-site reactions ( $>50$  mm), including extensive limb swelling from the injection site beyond one or both joints may occur uncommonly following the DTP/IPV/Hib/HepB vaccine. These reactions start within 24-72 hours after vaccination, and may be associated with erythema, warmth, tenderness or pain at the injection site. They resolve spontaneously within 3-5 days. The risk appears to be dependent on the number of prior doses of acellular pertussis containing vaccine, with a greater risk following the 4th and 5th doses. They have not been reported following either Hib or Hib/MenC vaccines.

### Chemoprophylaxis of invasive Hib disease

#### 1. Index cases

Children aged  $<10$  years who develop invasive Hib disease have an increased risk of a second episode of serious Hib infection (especially if  $<1$  year of age). They are also more likely to become asymptomatic carriers and transmit the organism to others.

Index patients aged  $<10$  years with confirmed or probable invasive Hib disease treated with an antibiotic other than cefotaxime or ceftriaxone should receive rifampicin prior to hospital discharge.

Index cases of any age treated with an antibiotic other than cefotaxime or ceftriaxone should receive rifampicin chemoprophylaxis prior to hospital discharge if there is a vulnerable individual in the household.

#### 2. Household contacts

Household contacts are regarded as those who share living or sleeping accommodation with the index case.

Chemoprophylaxis is indicated for *all* household contacts (irrespective of age, immunisation history, pregnancy or breastfeeding) in the following situations (and for up to four weeks after the exposure):

- (i) all aged  $<10$  years who are unvaccinated or incompletely vaccinated
- (ii) any person at increased risk of invasive Hib disease (see Chapter 3).

#### 3. Play-group, crèche or school contacts aged $<10$ years

When two or more cases occur within 4 months, chemoprophylaxis with rifampicin should be offered to all room contacts, both adults and children, following discussion with local Public Health Officers.

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### **Antibiotic doses for prophylaxis**

#### 1. *Rifampicin*

- (a) aged < 3 months– 10 mg/kg once daily for 4 days.
- (b) aged ≥3 months (including if pregnant or breastfeeding) – 20mg/kg once daily for 4 days (max. 600 mg/day).

#### 2. *Ceftriaxone*

Ceftriaxone can be given if rifampicin is contraindicated.

Recommended dose is 50mg/kg (max 1g) IM or IV once daily for 2 days.

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