HAEMOPHILUS INFLUENZAE TYPE B INVASIVE DISEASE

Based on the Ministry of Health Communicable Disease Manual 2012[1]

Associated Documents

Case Report Form:
K:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Haemophilus Influenzae type b\FormsStdLettersQuest\Hib_Nov2013.pdf

Fact Sheet:
K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\HaemophilusInfluenzaeFactSheet.pdf (April 2017)

The Illness[2,3]

Haemophilus influenzae is a gram-negative coccobacillus, which occurs in typeable and non-typeable (NTHi) forms. There are six antigenically distinct capsular types (a–f), of which type b is the most important.

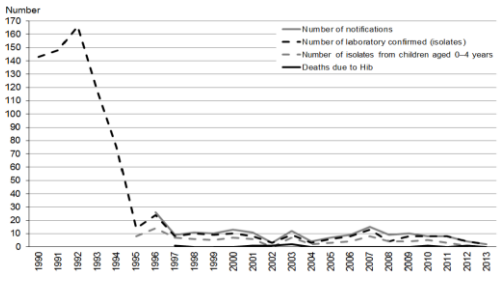
Prior to immunisation, the most common presentations of Hib invasive disease in New Zealand were meningitis and epiglottitis. Meningitis tends to occur in younger children aged between 3 months and 3 years, while epiglottitis usually occurs in children aged between 2 and 4 years. In the absence of vaccination these presentations may still occur. There have always been a small number of cases of *H. influenzae* invasive disease in adults, and these continue to occur.

Non-typeable *H. influenzae* (NTHi) organisms usually cause non-invasive mucosal infections, such as otitis media, sinusitis and bronchitis, but can occasionally cause bloodstream infection, especially in neonates. They are frequently present (60% – 90%) in the normal upper respiratory tract flora. Immunisation against Hib does not protect against infections due to other *H. influenzae* types or NTHi strains.

Young infants (aged under 2 years) do not produce an antibody response following Hib invasive disease, so a course of Hib vaccine is recommended when they have recovered. *H. influenzae* type b and NTHi strains also cause diseases (including pneumonia and septicaemia) in the elderly.

Epidemiology in New Zealand
Historically, *Haemophilus influenzae* type b (Hib) was an important cause of serious illness in children under 5 years of age in New Zealand. However, following the addition of Hib vaccine to the national immunisation schedule in 1994, the age-specific rate of the disease reduced from 36.4 cases per 100,000 in 1993 to 1.7 cases per 100,000 by 1999 and has remained at low levels since then (Fig.).

Fig. Number of culture-positive cases of Haemophilus influenzae type b invasive disease in NZ 1990-2013



Source: Institute of Environmental Science and Research

In 2015 there were three cases notified; all were aged less than 5 years and none were vaccinated.

CASE DEFINITION
Clinical description
Invasive disease due to Hib may manifest as bacteraemia, meningitis, epiglottitis, cellulitis, septic arthritis, *(pneumonia – this is not a notifiable condition unless it is associated with bacteraemia/septicaemia [ESR Invasive Pathogens Laboratory Nov 2017],* empyema, pericarditis or osteomyelitis.

- **Transmission:** inhalation of respiratory tract droplets or by direct contact with respiratory tract secretions.
- **Communicability:** May be prolonged. Non-communicable within 24–48 hours of starting effective antimicrobial therapy.
- **Incubation period:** unknown, probably from 2-4 days.
- **Prevention:** Immunisation at 6 wks, 3, 5 and 15 months. Antibiotic prophylaxis for contacts of sporadic cases.

Notification Procedure

Attending medical practitioners and laboratories must immediately notify the local medical officer of health of suspected cases. Notification should not await confirmation. If clusters of cases occur MOH should notify the Ministry of Health.

Case Classification

- **Under investigation** - A case which has been notified but information is not yet available to classify it as probable or confirmed.
- **Probable**
  - A clinically compatible illness with detection of a positive antigen test in CSF
  OR
  - A confident diagnosis of epiglottitis by direct vision, laryngoscope or X-ray.
- **Confirmed** - A clinically compatible illness that is laboratory confirmed.
- **Not a case** - A case that has been investigated, and subsequently has been shown not to meet the case definition.

Laboratory Testing

Isolation of *H. influenzae* type b, or detection of *H. influenzae* type b nucleic acid, from a normally sterile site. *(Sputum from a case with Haemophilus influenza pneumonia is not sent for typing as it is not from a normally sterile site. Furthermore Haemophilus influenza type b pneumonia is not notifiable as it is not regarded as being invasive – see Clinical description above).*

Management of Case

Investigation

In **South Canterbury** and **West Coast**, the Public Health Nurses follow up these notifications.

- **Action immediately.**
  Note; If the notification is associated with childbirth and the serotype has not been identified at the time as type b, prophylaxis may not be required as *Haemophilus influenzae untypeable* occasionally causes disease in this situation.
  Therefore:
  - discuss the need for prophylaxis with the obstetrician and neonatal paediatrician.
  - follow-up laboratory result and be prepared to give prophylaxis if isolate turns out to be type b.
- Ensure isolates from normally sterile sites are serotyped.
- Case Report Form completed from case notes plus interview with case/caregiver or faxed to notifying doctor for completion.
- Obtain a history of vaccination, possible contacts and travel.
- Ascertain if suspected or proven cases have occurred in the same household or child care facility in the previous 60 days.
- Contact parent/caregiver at the hospital and arrange to see them as soon as possible.
- Obtain a list of contacts from the case/case's parents.
- Inform MOH

Restriction
- Droplet precautions until 24 hours after the start of third-generation cephalosporin therapy (cefotaxime, ceftriaxone, ceftazidime) or until a 4-day course of rifampicin is completed.
- Exclude case from any early childhood service or school and from close contact with previously unexposed people until 24 hours after commencing treatment.

Treatment
- All cases should be under the care of a physician or paediatrician.
- Cases treated with amoxycillin/ clavulanate or amoxycillin alone should also receive oral rifampicin 20 mg/kg (maximum 600 mg) once daily for 4 days to eradicate carriage of the organism before discharge from hospital. Cases treated with a third-generation cephalosporin (cefotaxime, ceftriaxone, ceftazidime) do not need rifampicin.

Immunisation
Cases under 2 years of age should complete a course of Hib immunisation regardless of any previous Hib immunisation. The number of doses required will depend on the age at which the first dose is given after the illness. Re-immunisation should start 1 month after the onset of the disease.

Counselling
- Advise the case's parents or caregivers of the nature of the infection and its mode of transmission.
- A fact sheet is available: K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\HaemophilusInfluenzaeFactSheet.pdf

Management of Contacts

Investigation
- Routine throat or nasopharyngeal culture of contacts is **not** recommended.
- Follow up within 24 hours to identify contacts for restriction, immunisations and antibiotic prophylaxis where appropriate.

Definition
- Contacts for public health follow-up include members of the household, and staff and children at early childhood services – see below**.
- Duration of exposure of contacts to the case should be assessed on a case-by-case basis, but has been defined as spending 4 or more hours with the index case for at least 5 of the 7 days preceding the day of hospital admission of the index case.[4]

Contact Time
- Within 7 days before case developed symptoms and until 24 hours after starting effective antibiotic therapy.

Prophylaxis
To eradicate the carrier state and protect susceptible children, antimicrobial prophylaxis should be given to the following contacts as soon as possible and ideally within 7 days of the index case developing the disease, irrespective of their own immunisation status. Prophylaxis started after 7 days may still be of benefit and is recommended up to one month after the last exposure.

The relevant contacts are:
- all members of the case's household (including adults) where there is at least one contact under the age of 4 years who is either unimmunised or partially immunised
- all members of a household where there is a child aged under 12 months, even if the child has had three doses (primary series) of the Hib vaccine
- all members of the case's household where there is a person with immune suppression **
- all staff and children at an early childhood service where two or more cases of Hib have occurred within 60 days.

Antimicrobial prophylaxis is **not** recommended for:

- occupants of households where there are no children aged under 4 years other than the index case
- occupants of households where all contacts aged under 4 years have completed their immunisation series, including the second-year-of life dose.

Antibiotics

- Use oral rifampicin 20 mg/kg (maximum 600 mg) daily for 4 days.
- Rifampicin is contraindicated in pregnant women but not in breast feeding (refer to **Contraindications to Rifampicin** below).
- Prior to giving medication, check doses with MOH (legal requirement).

Recommended dose for rifampicin prophylaxis:
Capsules: 300 mg, Syrup (suspension): 100mg/5ml in 60ml bottles

CONTACT'S AGE	RIFAMPICIN DOSE Taken daily for four days	Total amount dispensed = dose x 4
Birth to less than 1 month	see below	
1 month to less than 6 months	see below	
6 months to less than 3 yrs	10 ml	40 ml
3 yrs to less than 4 yrs	15 ml	60 ml
4 yrs to less than 7 yrs	20 ml	80 ml
7 yrs to less than 11 yrs	30ml or 2x300 mg caps	120ml or 8x300 mg caps
11 yrs and over	2 x 300mg caps	8 x 300mg caps

If contacts are considerably under weight/over weight, the following is recommended:

- Adults: 600 mg daily for 4 days (usual adult dose regardless of weight)
- Children: 1 ml of syrup/kg (to a maximum of 30ml, ie: 600mg) daily for 4 days.

Dose (mls) = weight (kg). Total volume dispensed (mls) is the dose x 4.

- Infants under 1 month: 0.5ml of syrup/kg per dose daily for 4 days.

Rifampicin must be taken 1 hours before or 2 hours after meals to ensure absorption.

Chch

- Rifampicin (and protocols including Hib) are kept in the 'meningitis' case. Case and supplies are kept in the storeroom room. Ward 22 and the After Hours Surgery (Bealey Ave) may also have a small amount. Patient/caregiver also given a rifampicin information handout and letter for GP.

If supplies of Rifampicin get low:

- Further supplies are purchased from Christchurch Hospital Pharmacy.

Timaru

- The HPO contacts the pharmacy, requests access to the rifampicin and calls to collect anticipated requirements (after hours, phone Timaru Hospital and ask for the on-call pharmacist). The HPO dispenses rifampicin after discussing each contact with the MOH. Unused rifampicin is returned to the pharmacy, along with the completed Meningitis Contacts sheet. The pharmacy will provide individual scripts for an MOH signature as soon as practicable

Ashburton

- The hospital pharmacy hold the C&PH supply. Contacts can collect rifampicin, the antibiotic information pages and the Hib pamphlet from the hospital pharmacy and the letter to the GP, after a fax from the HPO.

Greymouth

- Rifampicin is obtained from the Grey Hospital Pharmacy. The HPO contacts the pharmacy, requests access to rifampicin, faxes a request (Fax 768 2699) and then calls to collect anticipated requirements. After hours, phone Grey Hospital and ask for the on-call pharmacist or pharmacy technician, fax the request and allow sufficient time for pharmacy on call staff to attend before collecting the medication. The HPO dispenses rifampicin after discussing each contact with the MOH. Unused rifampicin is returned to the pharmacy, along with the completed Meningitis Contacts sheet. The pharmacy has provided preformatted individual scripts for completion and an MOH signature as soon as practicable. The scripts are kept in the on-call kit in the on-call vehicle.
- Protocols are kept in the on-call kit in the on-call vehicle.

Contraindications to rifampicin:

- Pregnancy
- Previous severe reaction to rifampicin
- Premature infants
- Those who have jaundice
- Those on ritonavir/ saquinavir (combination antiretroviral therapy)

- **Pregnancy**.
  Pregnant women who are a contact should be offered i.m. ceftriaxone (1 gm) daily for 4 days.[5]
- Rifampicin is **not** contraindicated during lactation, as only small amounts are secreted into breast milk and because of the short duration of the course.

- Consultation with an infectious diseases physician is recommended for other contacts in whom rifampicin is contraindicated:

Explain the side effects of rifampicin:

- Orange discoloration of soft contact lenses (not to be worn while taking rifampicin), tears and urine.
- May decrease the effectiveness of oral contraceptives. Women should be advised to use alternative barrier contraception for two weeks after rifampicin course is finished.
- There is a **Rifampicin information** sheet:
  Y:\CFS\Quality\ApprovedDocuments\ProtectionTeam\ComDisAssocDocs\Rifampicin_InformationSheet_Hib.pdf]
- Chemoprophylaxis is not usually recommended for contacts in early childhood learning services where there is one index case and all contacts are over two years of age.
- It is not recommended in a household where all children under four have completed the full course of Hib vaccine, except if there is a child with immune suppression.
- Discuss with MOH if other children under four years of age have been exposed.
- If a preschool centre is involved (see definition of preschool contacts above**), contact supervisor and arrange for rifampicin distribution as soon as possible. Dispense according to child's age (see Table).
- Record the details of all contacts and the dose of rifampicin they are to be given, on the Meningitis Contacts sheet. Contact the MOH for authorisation prior to giving the medication. Complete the Meningitis Contacts sheet and forward to MOH for signature the next day.

Restriction

- When chemoprophylaxis is required at an early childhood service (see above), children and staff should be excluded from the service until prophylaxis has been started. Children entering the group while prophylaxis is being given should also receive it. Contacts on rifampicin may attend a child care facility 24 hours after the start of treatment.

Outbreak

- In a cluster or outbreak scenario a larger group of individuals may need to be offered prophylaxis, ie. if two or more cases of Hib have occurred in a child care facility within a sixty-day period, all staff and children should be offered prophylaxis- see above **.

	Immunisation • All children aged less than 5 years should have their Hib immunisation status checked and if incomplete should update with a Hib vaccine. **Counselling** • Inform contacts who do not receive prophylaxis about the signs and symptoms of invasive Hib disease, the infrequency of secondary cases, and advise them to access prompt medical attention should symptoms occur. • All children should have their immunisation status checked and, if it is incomplete, should complete their immunisation with an appropriate vaccine containing Hib. • A fact sheet is available: K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\HaemophilusInfluenzaeFactSheet.pdf
Other Control Measures	
	Disinfection Discuss with the MOH the possibility of involving an Infection Control Officer if disinfection of articles is required. **Health Education** Stress the importance of full immunisation for all children. Encourage early childhood services to keep up-to-date immunisation records of attending children. **Epidemic Control** In a cluster or outbreak scenario, a larger group of individuals may need to be offered prophylaxis. **Health Education** • Educate the parents regarding the risk of secondary cases in contacts less than four years old and the need for prompt evaluation and treatment if symptoms develop • Consider a media release and direct communication with local parents, early childhood services, schools and health professionals to ensure children receive a full course of immunisation with Hib-vaccine and to encourage prompt reporting of symptoms • In communications with doctors, include recommendations regarding diagnosis, treatment and infection control • Encourage parents and early childhood services to ensure children receive a full course of on time immunisation with a Hib vaccine • Encourage early childhood services to keep up-to-date immunisation records of children [see the Health (Immunisation) Regulations 1995 • A fact sheet is available: K:\CFS\Quality\ApprovedDocuments\ProtectionTeam\FactSheets\HaemophilusInfluenzaeFactSheet.pdf
Reporting	
	• Enter case details on EpiSurv. • If a cluster of cases occurs, inform the MoH and ESR and forward an outbreak surveillance report to ESR. • File.

References

1. Ministry of Health, Communicable Disease Control Manual, 2012. https://www.health.govt.nz/system/files/documents/publications/cd-manual-hib-may2012.pdf
2. Ministry of Health. 2014. *Immunisation Handbook 2014*. Wellington: Ministry of Health. http://www.health.govt.nz/system/files/documents/publications/imm-handbk-6-haemophilus-influenzae-type-b-dec16.pdf
3. The Institute of Environmental Science and Research Ltd. *Notifiable Diseases in New Zealand: Annual Report 2015.* Porirua, New Zealand https://surv.esr.cri.nz/PDF_surveillance/AnnualRpt/AnnualSurv/2015/2015AnnualReportFinal.pdf
4. American Academy of Paediatrics, Red Book 2015, Section Section 3: Summaries of Infectious Diseases,H, *Haemophilus influenzae* Infections, Table 3.9 footnote. https://redbook.solutions.aap.org/chapter.aspx?sectionid=88187152&bookid=1484
5. Ladhani S, Neely F, Heath PT, et al. 2009. Recommendations for the prevention of secondary *Haemophilus influenzae* type b(Hib) disease. *Journal of Infection* 58: 3–14.