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Unless otherwise stated the content of this guideline has been adapted from
BCCDC Communicable Disease Control Invasive Haemophilus influenzae type b March 2010 (draft)

1.0 AUTHORITY

Yukon Public Health and Safety Act (2009). Available at http://www.hss.gov.yk.ca/ifo_professionals.php

2.0 GOAL

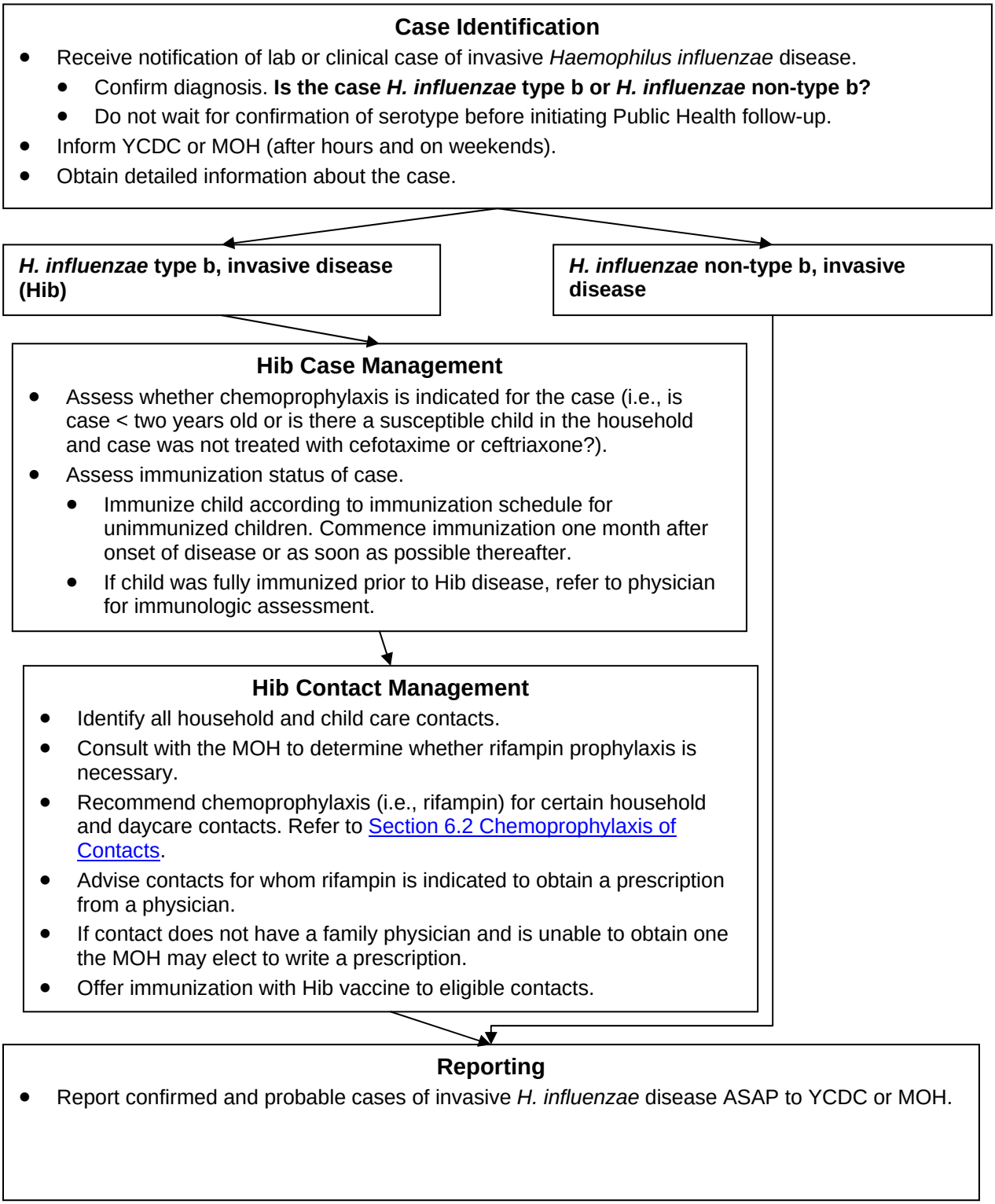
To monitor the incidence of invasive *Haemophilus influenzae* disease in Yukon.

To eliminate vaccine preventable cases of invasive *Haemophilus influenzae* type b (Hib) disease in children under five years of age. This will be accomplished by:

- delivery of routine on-time immunization to children at ages two, four, six and 18 months
- immunization of previously unimmunized children under five years of age
- immunization of high risk individuals aged older than five years
- case management and contact follow-up with chemoprophylaxis if indicated
- reporting of cases of invasive Hib disease.

3.0 INVASIVE *HAEMOPHILUS INFLUENZAE* DISEASE FLOW CHART

The flow chart below describes actions Public Health (Yukon Communicable Disease Control and Medical Officer of Health) will take when notified of a case of invasive *Haemophilus influenzae* disease.


Case Identification
Receive notification of lab or clinical case of invasive Haemophilus influenzae disease.
Confirm diagnosis. Is the case H. influenzae type b or H. influenzae non-type b?
Do not wait for confirmation of serotype before initiating Public Health follow-up.
Inform YCDC or MOH (after hours and on weekends).
Obtain detailed information about the case.
H. influenzae type b, invasive disease (Hib)
H. influenzae non-type b, invasive disease
Hib Case Management
Assess whether chemoprophylaxis is indicated for the case (i.e., is case < two years old or is there a susceptible child in the household and case was not treated with cefotaxime or ceftriaxone?).
Assess immunization status of case.
Immunize child according to immunization schedule for unimmunized children. Commence immunization one month after onset of disease or as soon as possible thereafter.
If child was fully immunized prior to Hib disease, refer to physician for immunologic assessment.
Hib Contact Management
Identify all household and child care contacts.
Consult with the MOH to determine whether rifampin prophylaxis is necessary.
Recommend chemoprophylaxis (i.e., rifampin) for certain household and daycare contacts. Refer to Section 6.2 Chemoprophylaxis of Contacts.
Advise contacts for whom rifampin is indicated to obtain a prescription from a physician.
If contact does not have a family physician and is unable to obtain one the MOH may elect to write a prescription.
Offer immunization with Hib vaccine to eligible contacts.
Reporting
Report confirmed and probable cases of invasive H. influenzae disease ASAP to YCDC or MOH.

4.0 CONFIRM THE DIAGNOSIS

Investigate all laboratory and clinical reports of invasive *Haemophilus influenzae* disease as soon as possible.

Confirm the diagnosis. Determine whether the lab report indicates:

- *H. influenzae* type b
- *H. influenzae* type a, c, d, e, f, or non-typeable

Assess whether case is confirmed or probable.

Haemophilus influenzae **serotype b, invasive disease**		
Surveillance	**Definition**	**Reportable**
Confirmed case	Clinical illness compatible with invasive Hib disease[1] and laboratory confirmation of infection: • Isolation of *H. influenzae (*serotype b) (Hib) from a normally sterile site **OR** • Demonstration of *H. influenzae* type b antigen in cerebrospinal fluid **OR** • Demonstration of *H. influenzae* DNA in a normally sterile site	**Yes**
Probable case	Clinical illness compatible with invasive Hib disease[1] with laboratory evidence of infection: • Demonstration of *H. influenzae* type b antigen in urine **OR** • Isolation of *H. influenzae* (serotype b) from the epiglottis in a person with epiglottitis	**Yes**
Haemophilus influenzae **non-b, invasive disease**		
Confirmed case	Clinical illness compatible with invasive Hi disease[1] with isolation of *H. influenzae* (serotypes a, c , d, e, f, or non-typeable isolates) from a normally sterile site.	**Yes**
Probable case	Epiglottitis in person with isolation of *H. influenzae* (serotypes a, c, d, e, f, and undifferentiated and non-typeable isolates) from the epiglottis.	

[1] Clinical evidence of invasive disease includes meningitis, bacteremia, epiglottitis, pneumonia, pericarditis, septic arthritis, or empyema.

5.0 *HAEMOPHILUS INFLUENZAE* TYPE B (Hib) CASE MANAGEMENT

5.1 Identification of Case

Investigate all laboratory and clinical reports of invasive *Haemophilus influenzae* type b (Hib) illness as soon as possible.

Obtain detailed information about the case. To facilitate case management, the Invasive *Haemophilus influenzae* type b (Hib) Case Management Worksheet (Section 11.1) may be used.

The exact **period of communicability** for Hib is unknown but is thought to be communicable for up to seven days prior to the onset of illness, remaining communicable until the organism is no longer present. (Obtained from Alberta Public Health Notifiable Disease Management Guidelines June 2005). Communicability ends within 24 to 48 hours after starting effective antibiotic therapy.

5.2 Management of Case

Assess whether chemoprophylaxis is indicated for the case and, if indicated, whether it was administered while case was in hospital. Chemoprophylaxis is indicated for the case when:

- the case is younger than two years of age **or**
- there is a susceptible child in the household **and** the case was not treated with cefotaxime or ceftriaxone. A susceptible child is:

    - < 48 months of age and unimmunized or incompletely immunized for age, or
    - < 12 months of age and has not received the primary series of three doses of Hib containing vaccine, or
    - ≤ 18 years of age and immunocompromised, regardless of that child's Hib immunization status (i.e., even if fully immunized).

5.3 Immunization of Case

Assess immunization status of case.

Children under 24 months of age in whom Hib disease develops should still receive vaccine as recommended, as disease may not induce protection. Immunize child according to age-appropriate schedule for **unimmunized** children and as if they had not received any prior Hib vaccine doses. Refer to the current edition of the Canadian Immunization Guide for vaccine schedule for unimmunized children. Commence immunization one month after onset of disease or as soon as possible thereafter.

Individuals who develop Hib disease at 24 months of age or older do not need immunization, because disease almost always induces a protective immune response.

5.3.1 Hib Conjugate Vaccine Failure

Hib conjugate vaccine failure is defined as onset of confirmed invasive Hib infection:

- more than 28 days after a child has completed the primary series (two, four and six-month immunizations) but before they are due for the 18 month booster
  OR
- more than two weeks after receipt of the booster dose of Hib vaccine (at 18 months of age).

While it is rare with the products in current use, recent studies suggest that when Hib conjugate vaccine failure does occur, it is often associated with underlying immune deficiency.

It is recommended that children who have invasive disease before 18 months of age after completing the primary immunization series **or** after 18 months of age after receiving the booster dose of vaccine be evaluated for evidence of an underlying immune deficiency.

6.0 HIB CONTACT MANAGEMENT

The worksheet 11.2 Invasive *Haemophilus influenzae* type b (Hib) Contact Management Worksheet is provided to facilitate contact follow-up.

6.1 Contact Identification

Prioritize identification of contacts:

- All household contacts - any person who is residing with the case of invasive Hib disease **OR** any person who has spent four or more hours per day with the case for at least five of the seven days preceding the day of hospital admission of the case.
- Preschool/child care contacts.

Assess all household and preschool/child care contacts for:

- Date of birth or age
- Hib immunization status if contact is < 48 months of age
- Presence of immune-compromising conditions if contact is ≤ 18 years of age.

Consult with Yukon Communicable Disease Control or the Medical Officer of Health immediately to determine whether rifampin chemoprophylaxis is necessary.

Incubation period – The incubation period is unknown but is probably short (two to four days).

Mode of transmission – *H. influenzae* bacteria are spread from person to person by inhalation of respiratory droplets or by direct contact with respiratory tract secretions. In neonates, infection is acquired intrapartum by aspiration of amniotic fluid or by contact with genital tract secretions containing the organism.

Secondary illness – Illness occurring one to 60 days following contact with an ill person; accounts for less than five per cent of all invasive Hib disease. Attack rates vary from 3.7 per cent among children two years of age and younger to zero per cent in contacts six years of age and older.

6.2 Chemoprophylaxis of Contacts

Chemoprophylaxis is recommended for:

1. **All household contacts**, regardless of age, when there is a susceptible child in the household. A susceptible child is:

    - < 48 months of age and unimmunized or incompletely immunized for age, or
    - < 12 months of age and has not received the primary series of three doses of Hib containing vaccine, or
    - ≤ 18 years of age and immunocompromised, regardless of that child's Hib immunization status (i.e., even if fully immunized).

2. **Preschool/day care contacts (including staff)**, regardless of age, when **two** or more cases of invasive Hib disease have occurred within 60 days among attendees and unimmunized or incompletely immunized children are attending.

At the discretion of the Medical Officer of Health, chemoprophylaxis MAY be considered for:

- **Preschool/day care contacts (including staff)**, regardless of age, when **one** case of invasive Hib disease has occurred and unimmunized or incompletely immunized children are attending. Experts disagree about the magnitude of risk among preschool/child care contacts when a single case of Hib disease has occurred. Secondary disease in child care contacts is rare when all contacts are older than two years of age.

Rifampin is the recommended chemoprophylactic agent for identified contacts to invasive Hib disease. Rifampin eradicates Hib from the nasopharynx in approximately 95 per cent of carriers and decreases the risk of secondary invasive illness in exposed household contacts. To effectively prevent secondary spread and re-infection within the contact group, rifampin should be given concurrently to all contacts (at the same time or within three days).

When indicated, chemoprophylaxis should be initiated as soon as possible. Chemoprophylaxis may be initiated for identified contacts for up to 30 days after illness onset in the index case. Most secondary cases in households occur during the first week after hospitalization of the index case.

Advise contacts for whom rifampin is indicated to obtain a prescription from a physician. Refer to 11.6 Sample Letter to Physician of Contact to Invasive *Haemophilus influenzae* type b (Hib) Disease. If

the contact does not have a physician and cannot acquire one for the purpose of prescribing chemoprophylaxis, contact the MOH who may elect to write a prescription.

Consult with YCDC or MOH to determine how rifamin chemoprophylaxis is to be distributed.

- Rifampin may be provided by the Whitehorse General Hospital pharmacist from inventory maintained for this purpose and/or as locally arranged by YCDC/MOH. The supply of rifampin for Hib chemoprophylaxis shall be maintained separately from rifampin provided for anti-tuberculosis therapy.

- There must be no client charges for the antibiotic or the service.

- Nurses working in rural Community Health Centres, may distribute rifampin to clients with physician authorization.

For more information regarding the dosage recommendations, contraindications, precautions, and common side effects of rifampin, refer to 11.3 Rifampin Prophylaxis Following Exposure to Invasive *Haemophilus influenzae* type b (Hib) disease – Recommendations, Contraindications, and Precautions.

When a prescription is to be written by the MOH, refer to 11.4 Prescription for Chemoprophylaxis Following Exposure to Invasive *Haemophilus influenzae* type b (Hib) Disease

Ensure the client taking rifampin receives the Sample Client Letter for Contacts of Invasive *Haemophilus influenzae* type b (Hib) Disease (Section 11.5) and information sheet Rifampin: Client Information for the Prevention of Hib Infection.

When rifampin is contraindicated, there is no alternative treatment. Inform contacts for whom rifampin is contraindicated about the signs and symptoms of invasive Hib disease and the infrequency of secondary cases. Advise these individuals to access prompt medical attention should symptoms occur.

Contacts of an index case should **not** be swabbed for culture of Hib prior to initiating rifampin chemoprophylaxis since the result has no bearing on the decision to administer rifampin.

Chemoprophylaxis is **not** recommended for occupants of households when:

- there are no children younger than 48 months of age (other than index case)
- all household contacts > 48 months to ≤ 18 years of age are immunocompetent
- all household contacts 12 to 48 months of age are immunocompetent and have completed their Hib immunization series
- all household contacts younger than 12 months of age are immunocompetent and have completed the primary series of Hib immunization.

Chemoprophylaxis is only recommended for cases of type b *Haemophilus influenzae*, not for other serotypes.

6.3 Immunoprophylaxis of Contacts

Offer immunization to contacts that are:

- two months to 59 months of age and are unimmunized or not completely immunized for age
- ≥ **15** months of age if they have not yet received the booster dose of vaccine
- older than five years of age with the following conditions if they have never received a dose of Hib-containing vaccine: functional or anatomic asplenia; sickle cell disease; immunosuppression related to disease or therapy (e.g., congenital immunodeficiency states such as complement, properdin, or factor D deficiency or severe rheumatoid arthritis requiring immunosuppressive therapy); candidate or recipient of solid organ or islet cell transplant, or cochlear implant
- any age, after receipt of hematopoietic stem cell transplant (HSCT) if they have not received two doses of Hib-containing vaccine post HSCT.

Post-exposure Hib immunization is not known to decrease the risk of infection. Rather, the situation presents an opportunity for completion of Hib immunization of contacts.

6.4 Educate Contacts

Educate contacts and parents of children who are contacts about signs and symptoms of invasive Hib disease. Advise individuals who develop symptoms of invasive Hib disease (particularly fever and headache) to seek prompt medical attention, even if rifampin has been taken.

- If the index case attends preschool or day care, and the decision is to provide rifampin to all contacts, inform all parents of the situation. Together with the facility operator, plan and provide parent education about invasive Hib disease. It is especially important to discuss signs and symptoms of invasive Hib disease, and contraindications and side effects of rifampin. Refer to Section 9.0 Clinical Description and 11.3 Rifampin Prophylaxis Following Exposure to Invasive *Haemophilus influenzae* type b (Hib) disease – Recommendations, Contraindications, and Precautions

Refer clients to the following for more information:

- Healthlink BC Files at http://www.healthlinkbc.ca/kbaltindex.asp

7.0 NON-HIB CASE MANAGEMENT

There are currently no recommendations for public health follow-up of cases of invasive *H. influenzae* caused by non-Hib strains.

In order to ensure complete reporting of the case, the form Invasive *Haemophilus influenzae* non-b Case Follow Up Worksheet (Section 11.7) may be used.

Chemoprophylaxis is only recommended for cases of type b *Haemophilus influenzae*, not for other serotypes.

8.0 REPORTING

Report confirmed and probable cases of invasive *H. influenzae* infection, regardless of type, as soon as suspected/confirmed to YCDC or MOH (After hours and weekends).

9.0 CLINICAL DESCRIPTION

Infection with *Haemophilus influenzae* bacteria is often severe, particularly among infants. *H. influenzae* bacteria are classified into encapsulated and unencapsulated strains. The encapsulated strains are further classified into six serotypes (a through f). The unencapsulated strains are non-typeable. The outermost structure of each of the encapsulated strains of *H. influenzae* is composed of polyribosyl – ribitol phosphate (PRP), a polysaccharide that is responsible for virulence and immunity.

H. influenzae type b (Hib) is the most pathogenic and, before the use of Hib vaccine, Hib was responsible for 95% of cases of invasive *H. influenzae* disease. It appears that the capsule structure of *H. influenzae* type a (Hia) is more similar to Hib than to any of the other serotypes and that Hia may be the second most clinically virulent type.

The organism enters the body through the nasopharynx. Organisms colonize the nasopharynx and may remain only transiently or for several months in the absence of symptoms (asymptomatic carrier). In the prevaccine era, Hib could be isolated from the nasopharynx of 0.5%–3% of normal infants and children but was not common in adults. Non-typeable (unencapsulated) strains are also frequent inhabitants of the human respiratory tract. They may cause invasive disease but are generally less virulent than encapsulated strains.

In some persons, the organism causes an invasive infection. The exact mode of invasion to the bloodstream is unknown. Antecedent viral or mycoplasma infection of the upper respiratory tract may be contributing factors. The bacteria spread in the bloodstream to distant sites in the body and can affect many organs. Meninges are especially likely to be affected. The most common types of invasive disease are meningitis, epiglottitis, septicemia, pneumonia, arthritis, and cellulitis.

Hib usually affects children under 5 years of age. Before the introduction of Hib vaccine, approximately 1 in 200 children in this age group developed invasive Hib disease. About 55% to 65% of affected children had meningitis and the remainder suffered from epiglottitis, bacteremia, cellulitis, pneumonia, or septic arthritis.

The risk of Hib meningitis is at least twice as high for children attending full-time day care as for children cared for at home. Other factors that predispose to invasive disease include splenic dysfunction (e.g., sickle cell disease, asplenia), HIV infection, certain immunodeficiency syndromes, malignant neoplasm, bone marrow transplantation, and receipt of a solid organ transplant or a cochlear implant.
The onset of Hib meningitis can be subacute but is usually sudden, including fever, vomiting, lethargy, and meningeal irritation with bulging fontanelle in infants or stiff neck and back in older children. Progressive stupor or coma is common. The case fatality rate for Hib meningitis is two per cent to five per cent, despite appropriate antimicrobial therapy.

Severe neurologic sequelae occur in 10 per cent to 15 per cent of survivors and deafness in 15 per cent to 20 per cent. Deafness is severe in three per cent to seven per cent.

Epiglottitis caused by *H. influenzae* bacteria is an infection and swelling of the epiglottis, the throat tissue that protects the larynx during swallowing. Epiglottitis may cause life threatening airway obstruction and is a medical emergency.

Septic arthritis, cellulitis (rapidly progressing skin infection which usually involves the face, head, or neck), and pneumonia are common manifestations of invasive disease.

Non-typeable (unencapsulated) strains may cause invasive disease but are generally less virulent than encapsulated strains. Non-typeable strains are commonly associated with otitis media, sinusitis, bronchitis, and other respiratory tract disorders. Non-typeable strains have been associated with invasive *H. influenzae* infection more commonly in adolescents and adults than children.

10.0 EPIDEMIOLOGY

Hib vaccines were introduced in Canada in 1988. Between 1988 and 2004 the incidence of Hib disease decreased from 2.6 per 100,000 to 0.3 per 100,000. During this period, the number of cases among children < five years of age decreased by almost 97 per cent. The majority of pediatric cases now occur in unimmunized children or in children too young to have received their primary series of Hib-containing vaccine.

Non-typeable *H. influenzae* as well as other non-b typeable *H. influenzae* rarely cause invasive disease. In Canada, only invasive Hib disease is under national surveillance. Between 2000 and 2004, 51 cases of invasive *H. influenzae* were detected in northern Canadian regions participating in the International Circumpolar Surveillance (i.e., Yukon, Northwest Territories, Nunavut and northern regions of Quebec and Labrador). Of these, only five cases (11 per cent of 47 with serotype information) were due to serotype b. Fifty-five percent of cases were caused by serotype a, and 28 per cent of invasive disease involved non-typeable isolates. Serotypes c, d and e were isolated in one case each of invasive disease.

(Obtained from: http://www.phac-aspc.gc.ca/im/vpd-mev/hib-eng.php)

Since 1989, Yukon has had two cases of invasive *Haemophilus influenzae* type b disease.

11.0 CASE AND CONTACT MANAGEMENT FORMS

The following documents are intended to facilitate case and contact management of invasive *H. influenzae* disease.

- 11.1 Invasive *Haemophilus influenzae* type b (Hib) Case Management Worksheet
- 11.2 Invasive *Haemophilus influenzae* type b (Hib) Contact Management Worksheet
- 11.3 Rifampin Prophylaxis Following Exposure to Invasive *Haemophilus influenzae* type b (Hib) disease – Recommendations, Contraindications, and Precautions
- 11.4 Prescription for Chemoprophylaxis Following Exposure to Invasive *Haemophilus influenzae* type b (Hib) Disease
- 11.5 Sample Client Letter for Contacts of Invasive *Haemophilus influenzae* type b (Hib) Disease
- 11.6 Sample Letter to Physician of Contact to Invasive *Haemophilus influenzae* type b (Hib) Disease
- 11.7 Invasive *H. influenzae* non-b Case Follow-up Worksheet

11.1 Invasive *Haemophilus influenzae* type b (Hib) Case Management Worksheet

Information is collected under the authority of the Health Act and the Public Health Act for purposes of providing health services and public health services. Queries should be directed to the Manager of Yukon Communicable Disease Control, at (867) 667-8323 or toll free at 1-800-661-0507

Date Reported *(YYYY/MM/DD)*	**Date Contacted** *(YYYY/MM/DD)*	**Form Completed By**

Reporting Source
☐ Hospital ☐ Physician ☐ Community Health Centre Nurse ☐ Other_____

Demographic Information

Case Surname	**First Name**	**Initial**	**PHN**

Birthdate *(YYYY/MM/DD)*	**Age**	**Gender** ☐ **M** ☐ **F**	**Parent/Guardian (If applicable)**

Address	**Phone number**

Physician Surname	**Initial**	**City**	**Phone number**

For Nurses:
Case discussed with physician? ☐ **Yes** **Date:**_____ ☐ **No**
Case discussed with MOH/YCDC? ☐ **Yes** **Date:**_____ ☐ **No**

Immunization History

Has client received the age-appropriate number of doses of Hib vaccine?

☐ **Yes** ☐ **No**

Immunization dates (if available)
1. *(YYYY/MM/DD)*_____
2. *(YYYY/MM/DD)*_____
3. *(YYYY/MM/DD)*_____
4. *(YYYY/MM/DD)*_____

Case Details

Lab confirmed invasive *H. influenzae* type b?
☐ Yes ☐ No

Type of infection:
☐ Meningitis ☐ Epiglottitis ☐ Septic Arthritis ☐ Septicemia
☐ Other (please specify) _____

Was Case Hospitalized? ☐ No ☐ Yes Date Admitted: _____ *(YYYY/MM/DD)* Date Discharged: _____ *(YYYY/MM/DD)*

Was Case Treated with Cefotaxime or Ceftriaxone?
☐ Yes ☐ No **If no, and case is younger than two years of age or a member of a household with a susceptible contact, ensure case receives chemoprophylaxis.**

Case Outcome: ☐ Pending ☐ Recovered ☐ Deceased Date: _____ *(YYYY/MM/DD)*

Contacts

Does case reside in a household with:
☐ at least one contact younger than 48 months of age who is unimmunized or incompletely immunized for age
☐ a child younger than 12 months of age who has not received the primary series of three doses of Hib vaccine
☐ an immunocompromised child regardless of that child's age or Hib immunization status (i.e., even if fully immunized)

If yes to any of the above, list on contact sheet and do appropriate follow up.

Does case attend child care or preschool?
☐ **Yes** ☐ **No**
If yes, name of facility:

Have there been any other cases of Hib in this same facility within the past 60 days?
☐ **No** ☐ **Yes** **If yes, when:**_____ *(YYYY/MM/DD)*
Who:_____

Other

☐ **FOI discussed with client**

☐ **Health teaching done**

Notes:

Information is collected under the authority of the Health Act and the Public Health Act for purposes of providing health services and public health services. Queries should be directed to the Manager of Yukon Communicable Disease Control, at (867) 667-8323 or toll free, at 1-800-661-0507

11.2 Invasive *Haemophilus influenzae* type b (Hib) Contact Management Worksheet

Information is collected under the authority of the Health Act and the Public Health Act for purposes of providing health services and public health services. Queries should be directed to the Manager of Yukon Communicable Disease Control, at (867) 667-8323 or toll free at 1-800-661-0507

Name of index case		**Completed:** *(YYYY/MM/DD)*		**Completed by**	
	CONTACT	**CONTACT**	**CONTACT**	**CONTACT**	**CONTACT**
Name					
DOB / Age					
Gender	☐ **M** ☐ **F**	☐ **M** ☐ **F**	☐ **M** ☐ **F**	☐ **M** ☐ **F**	☐ **M** ☐ **F**
Parents names (if under 18 yrs)					
Phone					
Address					
Physician's name and address or phone number					
Relationship to case (i.e., household [1] or childcare)					
Immunization status [2] (# of doses of Hib vaccine)					
Prophylaxis recommended	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**
Prophylaxis provided	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**	☐ **Yes** ☐ **No**

1. **Household Contact -** A person who is residing with the case of invasive Hib disease **OR** a person who has spent four or more hours per day with the case for at least five of the seven days preceding the day of hospital admission of the case.

2. **Immunization Status –** Refer to current edition of Canadian Immunization Guide or to Community Nursing Vaccine Program Manual

11.3 Rifampin Prophylaxis Following Exposure to Invasive *Haemophilus influenzae* type b (Hib) Disease – Recommendations, Contraindications, and Precautions

Rifampin is a broad spectrum antibiotic taken orally to prevent invasive *Haemophilus influenzae* type b disease after exposure to *Haemophilus influenzae* type b bacteria.

Indicated for:

- **The case**, if the case is younger than two years of age **or** there is a susceptible household contact **and** the case was not treated with cefotaxime or ceftriaxone.
- **All household contacts**, regardless of age, when there is a susceptible child in the house. A susceptible child is:
  - < 48 months of age and unimmunized or incompletely immunized for age
  - < 12 months of age and has not received the primary series of three doses of Hib containing vaccine
  - ≤ 18 years of age and immunocompromised, regardless of that child's Hib immunization status (i.e., even if fully immunized).
- **Preschool/day care contacts (including staff)**, regardless of age, when **two** or more cases of invasive Hib disease have occurred within 60 days among attendees and unimmunized or incompletely immunized children are attending.
- **Preschool/day care contacts (including staff),** regardless of age, when one case of invasive Hib disease has occurred (at the discretion of the Medical Health Officer).

Dosage Recommendations:

Age	Dosage
≤ one month of age	10 mg/kg once daily for four days
Children and adults who are ≤ 30 kg	20 mg/kg (maximum dose is 600mg) once daily for four days
Children and adults who are > 30 kg	600 mg once daily for four days

Contraindications:

- jaundice
- hypersensitivity to rifamycins
- premature infants in whom liver function is not yet mature
- receipt of ritonavir/saquinavir combination therapy
- pregnancy (effect on the fetus is not known)

Precautions:

Several medications may interact with rifampin when taken concurrently. When rifampin is indicated, assess whether client currently takes any other medication. Refer to the product monograph and/or the current version of the CPS before prescribing rifampin.

Pregnancy/Breastfeeding:
Rifampin should **not** be used in pregnancy. It is a "Pregnancy Risk Category type C drug." That is, a drug for which studies in animals have revealed adverse effects on the fetus (teratogenic or embryocidal, or other) and there are no controlled studies in women, or studies in women and animals are not available. Drugs should be given only if the potential benefit justifies the potential risk to the fetus.

Rifampin may be used with caution during breastfeeding. It is a "Lactation Risk Category type L2 drug." That is, a drug which has been studied in a limited number of breastfeeding women without an increase in adverse effects in the infant; and/or, the evidence of a demonstrated risk which is likely to follow use of this medication in a breastfeeding woman is remote.

Common side effects:
- CNS – Headache, drowsiness, fatigue, ataxia, dizziness
- GI – sore mouth and tongue, dyspepsia, nausea, vomiting, diarrhea

Other considerations:
- Urine, feces, saliva, sputum, sweat, and tears may be colored reddish orange by rifampin and its metabolites. Advise individuals with soft contact lenses against wearing their lenses while taking rifampin to prevent permanent staining of the lenses.
- Rifampin is best taken on an empty stomach, one hour before eating or two to three hours after eating.
- Counsel women taking a hormonal form of birth control to use an additional (non-hormonal e.g., condoms) method of birth control until current cycle is completed.

11.4 Prescription for Chemoprophylaxis Following Exposure to Invasive *Haemophilus influenzae* type b (Hib) Disease (sample template)

Client Information			
Surname	**Given names**	**PHN**	**Date of Birth** *(YYYY/MM/DD)*
Address		**Phone number**	**Weight (kg)**

Nursing Assessment

Is client:

Allergic to rifamycins? ☐ Yes ☐ No
Pregnant? ☐ Yes ☐ No
Receiving ritonavir/saquinavir (combination antiretroviral) therapy? ☐ Yes ☐ No
Jaundiced? ☐ Yes ☐ No
Less than one month of age? ☐ Yes ☐ No
If client is an infant and was born prematurely, is the infant's adjusted age currently less than 40 weeks? ☐ Yes ☐ No
Taking any other medications? ☐ Yes ☐ No
If yes, list medications:

***If answer to any question is yes, consult with Medical Officer of Health.**

Nurse Signature	**Date Signed** *(YYYY/MM/DD)*

Prescription Information for the Dispensing Pharmacist

☐ **Rifampin:**
Children ≤ 30kg: _____kg X 20mg/kg = _____po OD X 4 days

☐ **Rifampin:**
Children and adults > 30kg: 600 mg po OD X 4 days

Medical Officer of Health Signature	**MSC#**

11.5 Sample Client Letter for Contacts to Cases of Invasive *Haemophilus influenzae* type b (Hib) Disease

Dear _____,

You (or your child) have been identified as being in contact with someone with invasive *Haemophilus influenzae* type B (Hib) infection. It is recommended that you (or your child) receive a course of the antibiotic rifampin. You (or your child) must take the full course of antibiotics for your body to completely eliminate the Hib bacteria.

Antibiotics are recommended for certain close contacts to a case of Hib. This includes people who live in the same household as the person who has Hib when there is also a child in the household who is under four years old and is not completely immunized, or when there is an immunocompromised child in the household. If the child who is ill with Hib attends a day care or preschool, the Medical Officer of Health will determine whether antibiotics are recommended for other children and staff at the day care or preschool.

Please see a physician promptly and obtain a prescription for rifampin. If you are unable to see a physician promptly and are in Whitehorse, please inform Yukon Communicable Disease Control (YCDC), or inform a nurse at your local Community Health Centre. There will be no charge for this medication.

Please review the attached page "Rifampin: Client Information for the Prevention of Hib Infection". Discuss any contraindications or side effects with the nurse or physician.

If you (or your child) develop symptoms of Hib, especially fever or headache, contact your physician promptly.

If you have any questions about this letter or Hib, please contact your physician, Yukon Communicable Disease Control or call your local Community Health Centre. You can also obtain information here:

- Phone 811
- Website http://www.healthlinkbc.ca/kbaltindex.asp

Please take this opportunity to review your child's immunization status. Immunization will not protect your child from Hib illness due to this contact but it will protect your child if he or she is exposed to Hib disease again in the future. For more information about immunization schedules contact your local health centre.

Attached:

- ☐ Rifampin: Client Information for the Prevention of Hib Infection
- ☐ Prescription for Chemoprophylaxis Following Exposure to Invasive Hib Disease

Signature block

Followed by:

Yukon Communicable Disease Control
4 Hospital Rd
Whitehorse, YT Y1A 3H8
Telephone: (867) 667-8369
Fax: (867) 667-8349

Medical Officer of Health
#4 Hospital Road
Whitehorse, YT Y1A 3H8
Telephone: (867) 456-6136
Fax: (867) 667-8349

RIFAMPIN: CLIENT INFORMATION FOR THE PREVENTION OF HIB INFECTION

WHY is this medicine prescribed?

Rifampin is an antibiotic prescribed to prevent the spread of *Haemophilus influenzae* type b (Hib) infection after contact with someone who is infected with it. Hib bacteria are spread by close contact with an infected person: living in the same household, sleeping together, or sharing saliva such as using the same eating utensils, drinking from the same container, or kissing.

HOW is this medicine taken?

To prevent Hib infection, one to two capsules of rifampin are usually taken by mouth once a day for four days. It is important that you finish taking all of the rifampin prescribed for you.

For infants and young children unable to swallow capsules, a pharmacist can prepare the rifampin dose as a liquid suspension.

WHO should NOT take this medicine?

- Premature infants
- Those who are allergic to it
- Those who have jaundice
- Those on ritonavir/saquinavir (combination antiretroviral therapy)

Women who are breastfeeding can take rifampin, as only small amounts are secreted into breast milk.

WHAT precautions should you be aware of before taking rifampin?

- If you are pregnant, consult your doctor before taking rifampin.
- Tell your nurse, pharmacist, or doctor if you are taking any other medicines.
- If you are taking warfarin, inform your doctor that you are taking rifampin because you will need to be more closely monitored.
- Rifampin may cause oral contraceptives (i.e., birth control pills) and the contraceptive patch (EVRA®) to be less effective. You will need to use a second form of contraception (e.g., condoms) to prevent pregnancy.
- Rifampin may color urine and tears a red-orange colour. This is harmless. However, since this may cause permanent staining of soft contact lenses, do NOT wear soft contact lenses until you have finished taking rifampin.
- Rifampin may cause drowsiness. Do not drive or operate dangerous machinery until you know how the drug affects you.

WHAT side effects can rifampin cause?

Side effects are uncommon when rifampin is taken for such a short time, but may include the following:

- Reddish-orange coloring of your urine, bowel movements, tears, or saliva. This is harmless.
- Stomach upset
- Headache

**** Tell your doctor or nurse <u>immediately</u> if you experience any of these after taking rifampin:**

- Skin rash, itching, or hives
- Difficulty breathing or swallowing
- Swelling of the face or throat
- Persistent upset stomach, vomiting, or diarrhea
- Fever or chills
- Sore mouth or throat
- Muscle or bone pain
- Yellowing of the skin or eyes

11.6 Sample Letter to Physician of Contact to Case of Invasive *Haemophilus influenzae* type b Hib Disease

Dear Dr. _____,

Re: Your patient: _____

Date of birth: _____
(*yyyy/mm/dd*)

The above named patient has been exposed to a case of invasive *Haemophilus influenzae* type b (Hib). Rifampin chemoprophylaxis is recommended for this patient because he/she is:

- A household contact and there is a susceptible child in the household. A susceptible child is:
  - < 48 months of age and unimmunized or incompletely immunized for age
  - < 12 months of age and has not received the primary series of three doses of Hib containing vaccine
  - ≤ 18 years of age and immunocompromised, regardless of that child's Hib immunization status (i.e., even if fully immunized)
- A preschool or child care contact, regardless of age, and **two** or more cases of invasive Hib disease have occurred within 60 days among attendees and unimmunized or incompletely immunized children are attending.
- A contact for whom the MHO has recommended chemoprophylaxis.

Please consider prescribing rifampin for this patient.

For Hib prophylaxis, rifampin dosage recommendations are:

Age	Dosage
≤ 1 month of age	10 mg/kg once daily for four days
Children and adults who are ≤ 30 kg	20 mg/kg (maximum dose is 600mg) once daily for four days
Children and adults who are > 30 kg	600 mg once daily for four days

Please take this opportunity to review your patient's immunization status. Immunization will not protect your patient from Hib illness due to this exposure but will protect your patient if they are exposed to Hib disease again in the future. For more information about immunization schedules refer to the current edition of the Canadian Immunization Guide or contact your local community health centre.

Please contact me should you wish to discuss these recommendations.

Thank you.

Signature block

11.7 Invasive *Haemophilus influenzae* non-b Case Follow-Up Worksheet

Information is collected under the authority of the Health Act and the Public Health Act for purposes of providing health services and public health services. Queries should be directed to the Manager of Yukon Communicable Disease Control, at (867) 667-8323 or toll free at 1-800-661-0507

Date Initial Report Received *(YYYY/MM/DD)* **Date Serotype Report Received** *(YYYY/MM/DD)*	**Date Contacted** *(YYYY/MM/DD)*	**Form completed by**

Reporting Source

☐ Hospital ☐ Physician ☐ Nurse ☐ Other _____

A. Demographic Information

Case Surname	**Initial**	**First Name**	**PHN**

Birth date *(YYYY/MM/DD)*	**Age**	**Gender** ☐ **M** ☐ **F**	**Parent / Guardian if applicable**

Address	**Phone number**

Physician Surname	**Initial**	**City**	**Phone number**

B. Case Details

Lab confirmed invasive *Haemophilus influenzae* non-type B

☐ Yes ☐ No

Type of *Haemophilus influenza*e bacteria:

☐ Non-typeable ☐ Type d
☐ Type a ☐ Type e
☐ Type c ☐ Type f

Type of infection:

☐ Meningitis ☐ Epiglottitis ☐ Septic Arthritis ☐ Septicemia
☐ Other (please specify) _____

Was Case Hospitalized?

☐ No ☐ Yes Date Admitted: _____ *(YYYY/MM/DD)*

Date Discharged: _____ *(YYYY/MM/DD)*

Case Outcome:

☐ Pending ☐ Recovered ☐ Deceased Date: _____ *(YYYY/MM/DD)*

C. Other

Notes

12.0 COMPARISON OF Hib and Non-Hib STRAINS

	Hib	**Non-Hib Typeable Strains (a, c, d, e, f) and Non-typeable Strains**
Reportable	Yes	Yes
Public Health Follow-up	Yes	No
Invasive Disease	More common	Less common
Communicability	The exact period of communicability is unknown but an individual is infectious as long as organisms are present, which may be for a prolonged period even without nasal discharge. Communicability ends within 24 to 48 hours after starting effective antibiotic therapy.	Unknown
Contact management	Rifampin recommended for certain close contacts	Not recommended
Prevention	Vaccine	No vaccine

13.0 REFERENCES

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14.0 CONTACT INFORMATION

Yukon Communicable Disease Control
Hours: Monday- Friday (08:30 to 16:30)
#4 Hospital Road, Whitehorse, YT Y1A 3H8
Telephone:
Local (867) 667-8323
Within Yukon 1-800-661-0408, ext. 8323
Fax: (867) 667-8349

Dr. Brendan E. Hanley MD CCFP (EM) MPH
Chief Medical Officer of Health, Yukon
#4 Hospital Road, Whitehorse, YT Y1A 3H8
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Cell: (867) 332-1160
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Whitehorse General Hospital
(Ambulatory Care)
#5 Hospital Road, Whitehorse, YT Y1A 3H7
Telephone: (867) 393-8700
Fax: (867)393-8707
WGH Laboratory telephone: (867) 393-87639