Invasive *Haemophilus Influenzae* Disease

Manitoba
Public Health Branch

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Abbreviations

CD	Communicable Disease
CDC	Communicable Disease Coordinator
CPL	Cadham Provincial Laboratory
CSF	Cerebrospinal Fluid
DNA	Deoxyribonucleic Acid
DTaP-IPV-Hib	Diphtheria, Tetanus, acellular Pertussis, Polio and *Haemophilus Influenzae* Type B
FNIHB	First Nations and Inuit Health Branch
HCP	Health Care Provider
Hib	*Haemophilis influenzae* type b
IM	Intramuscular
MB	Manitoba
MDA	Materials Distribution Agency
MHSLTC	Manitoba Health Seniors and Long-Term Care
MHSU	Manitoba Health Surveillance Unit
MOH	Medical Officer of Health
PHAC	Public Health Agency of Canada
PHIMS	Public Health Information Management System
QA	Quality Assurance
RHA	Regional Health Authority
RO	Responsible Organization
SOP	Standard Operating Procedure

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Summary of Updates

May 2024

The 2024 update of the Invasive *Haemophilus influenzae* Disease Protocol resulted in significant changes from the previous version (2007). All sections have been reviewed and updated to align with current practice and now reflect the current goals and expectations for invasive *Haemophilus influenzae* disease management. An amendment that may result in a change in practice is:

- Section 7.2.1: additional guidance for Public Health to consider initiating a preliminary investigation of confirmed and probable *H. influenzae* cases, while awaiting serotype results.

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1. Etiology and Background

1.1 Etiology

Haemophilus influenzae is a bacterium that 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) (4). However, *Haemophilus influenzae* can cause serious invasive disease primarily in young children. It is a gram-negative organism that is either encapsulated (typeable) or non-encapsulated (non-typeable). Encapsulated strains are more likely to invade normally sterile sites, causing invasive disease, while non-encapsulated strains generally cause milder infections.

Encapsulated strains are divided into types 'a' through 'f', depending on the antigenic characteristics of their polysaccharide capsule. *H. influenzae* type b (Hib) is the most pathogenic strain, which caused 95% of the disease before vaccine programs were introduced (1).

Only confirmed cases of *H. influenzae* serotype b require public health follow up to help identify the potential source of infection. Preliminary investigation of confirmed or probable *H. influenzae* cases should be considered depending on when serotyping results would be available (see section 7.1).

2. Case Definitions

2.1 *Haemophilus influenzae*, type B, invasive disease

Lab confirmed case:

Clinical evidence of invasive disease with laboratory confirmation of infection, based on (2):

- Isolation of *H. influenzae* (type b) from a normally sterile site (i.e. blood, cerebrospinal fluid, joint, pleural and pericardial fluid) **OR**
- Isolation of *H. influenzae* (type b) from the epiglottis in a person with epiglottitis

Probable case:

- Clinical evidence of invasive disease with demonstration of *H. influenzae* type b antigen in cerebrospinal fluid (CSF) **OR**
- Clinical evidence of invasive disease with demonstration of *H. influenzae* DNA in a normally sterile site (i.e. blood, cerebrospinal fluid, joint, pleural and pericardial fluid) **OR**
- Buccal cellulitis or epiglottitis in a child < 5 years of age with no other causative organisms isolated.

Detection of *H. influenzae* DNA is considered probable because Hib may be present in a non-pathogenic role and thus, depending on the site, may NOT reflect the actual pathogen. Additionally, detection of *H. influenzae* DNA in a sterile site does NOT indicate that it is type b, since this test does not differentiate between serotypes.

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Clinical evidence: Clinical illness associated with invasive disease due to *H. influenzae* includes meningitis, bacteremia, epiglottitis, pneumonia, pericarditis, septic arthritis and empyema.

2.2 *Haemophilus influenza*e non-b, invasive disease

Lab confirmed case: Clinical evidence of invasive disease with laboratory confirmation of infection (3):

- Isolation of *H. influenzae* (types a, c, d, e, f, undifferentiated and non-typeable isolates) from a normally sterile site (i.e. blood, cerebrospinal fluid, joint, pleural and pericardial fluid) or
- Isolation of *H. influenzae* (types a, c, d, e, f, undifferentiated and non-typeable isolates) from the epiglottis in a person with epiglottitis.

3. Reporting requirements

3.1 Laboratory

All positive laboratory results noted in the case definition are reportable to the Manitoba Health Surveillance Unit (MHSU) by secure fax (204-948-3044) or established electronic interface. Operators of clinical laboratories in Manitoba (MB) processing *H. influenzae* isolates obtained from sterile sites must forward isolate subcultures to the Cadham Provincial Laboratory for further testing. A phone report must also be made to a Medical Officer of Health at 204-788-8666 on the same day the result is obtained, in addition to the standard surveillance reporting by fax or electronic interface.

3.2 Health Care Professional

Probable (clinical) cases of invasive *H. influenzae* disease are reportable to MHSU using the Clinical Notification of Reportable Diseases form: www.gov.mb.ca/health/publichealth/cdc/protocol/MHSU_0013.pdf ONLY if a positive lab result is not anticipated (e.g., poor or no specimen taken, person has recovered).

4. Epidemiology

4.1 Reservoir

Humans

4.2 Transmission

Person-to-person transmission of *H. influenzae* occurs by respiratory droplets or by direct contact with secretions. In neonates (babies up to four weeks of age), infection can be acquired intrapartum by aspiration of amniotic fluid or by contact with genital tract secretions containing the organism (4).

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4.3 Occurrence

4.3.1 World

Invasive *H. influenzae* infection occurs worldwide with peak incidence in children less than 6 months of age in low- and middle-income countries, and between 6-12 months of age in high income countries (1). With widespread use of Hib vaccines by the late 1990s, most high-income countries have drastically reduced the incidence of Hib disease; however, currently, there are no vaccines for the other typeable strains (5). For more information on the global burden of disease caused by Hib, please refer to www.emro.who.int/health-topics/haemophilus-influenzae-type-b/disease-burden.html.

Non-typeable *H. influenzae* causes the majority of invasive *H. influenzae* infections in all age groups. Although the overall incidence of invasive disease due to non-typeable *H. influenzae* and non-b types remains low, there has been an increased recognition of invasive disease due to non-typeable *H. influenzae* and non-b types (e.g., types a, e, and f) in children and adults. It is unclear whether these changes are related to vaccine-mediated strain replacement, improved bacterial detection and serotyping, increased virulence of non-typeable *H. influenzae* strains, or demographic changes (10).

4.3.2 Canada

Prior to the introduction of a Hib vaccine into routine childhood vaccination schedules in 1988, Hib was the most common cause of bacterial meningitis in Canada, especially in infants. With routine vaccination, the incidence of invasive Hib disease declined by 99% in children less than 5 years of age and 98% in the general population between the pre-vaccine era (1986-1987) and the period between 2015 to 2019 (6).

Further epidemiology on invasive Hib disease occurrence in Canada can be located at the Public Health Agency of Canada website: www.canada.ca/en/public-health/services/immunization/vaccine-preventable-diseases/haemophilus-influenzae-disease/health-professionals.html.

5. Clinical Presentation and Natural History

H. Influenzae can cause a variety of infections, which range from mild to severe. Infections of the respiratory tract may result in pneumonia, bronchitis and can lead to infections in the ear, sinuses and eyes. Other presentations can include meningitis (most common), epiglottitis, bacteremia, cellulitis, pneumonia, septic arthritis, or infections in other sites such as osteomyelitis (1).

Symptoms of meningitis usually develop 2 to 4 days after infection, and may include sudden onset of fever, changes in mental status or behavior, severe headache, or stiff neck and back. In infants, the fontanelle may bulge.

Long-term complications following Hib meningitis may include permanent hearing loss, paralysis, seizures, and brain damage. The case-fatality rate of Hib meningitis is about 5%. Severe neurologic sequelae may occur in 10–15% of survivors. Deafness may occur in 15–20% of survivors.

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5.1 Incubation Period

The incubation period is usually 2 to 7 days (7).

5.2 Period of Communicability

The exact period of communicability of *H. Influenzae* is unknown. Hib disease is considered non-communicable within 24-48 hours after starting effective antibiotic therapy (7).

5.3 Susceptibility and Resistance

5.3.1 Vaccine efficacy and effectiveness

Clinical efficacy of Hib vaccination has been estimated at 95% to 100%. When the primary series is given and one dose is given at or after 12 months of age, more than 95% of infants develop protective antibody concentrations (8).

For information on vaccines that protect against Hib and Manitoba's Immunization Program, please visit www.gov.mb.ca/health/publichealth/cdc/vaccineeligibility.html.

5.3.2 Host susceptibility

Infection with Hib can occur in any age group; however, most cases occur in children less than five years of age. Children younger than four years of age who are not immunized are at increased risk for invasive Hib disease. Globally, invasive Hib disease is most prevalent in children aged 2 months to 2 years. Risk factors for children include splenic dysfunction (such as sickle cell disease or asplenia), antibody deficiency, malignancies, HIV or cochlear implant(s) (1, 9).

Those most susceptible to invasive non-typeable *H. influenzae* disease are very young children (< 20 weeks of age) and the elderly (over 65 years of age) (9).

In adults, typeable and non-typeable *H. Influenzae* disease has been associated with underlying conditions such as structural lung disease (e.g., cystic fibrosis, chronic obstructive pulmonary disease, bronchiectasis), smoking, alcoholism, pregnancy, and older age (10).

Additional factors that increase the risk of *H. influenzae* disease include household crowding and daycare attendance (10).

Re-infection with *H. Influenzae* can occur. Protective factors (for infants younger than age 6 months) include breastfeeding and passively acquired maternal antibodies (4),

6. H. Influenzae Testing and Diagnosis

The diagnosis of invasive *H. influenzae* disease, including Hib, is based on one or more laboratory tests using a sample of infected body fluid, such as blood or spinal fluid. All *H. influenzae* specimens taken from sterile sites should be sent to the Cadham Provincial Laboratory for serotyping and/or surveillance analysis.

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H. influenzae appears as a small Gram-negative coccobacillus on microscopy and can be cultured in microbiology laboratories on supplemented culture media (1-3 days). Further identification procedures are necessary to differentiate from other *Hemophilus* species (1-2 days) and serotyping of invasive isolates by slide agglutination or molecular methods make take 1-2 additional days or more (12).

The timeframe for which results can be anticipated will vary based on the serotypes. For *H. influenzae* type a, b and f, serotyping results are expected to be available within 1-2 days after receipt of the isolate. For *H. influenzae* not type b (serotype other than a and f), results may take 2 days. *H influenzae* not type b results are sent to NML for confirmation of serotype. Results from NML are usually available 2 weeks after receipt of the isolates. Most results are *H. influenzae* non typeable and serotypes other than a, b and f.

7. Control

7.1 Management of Cases

Preliminary investigation of confirmed and probable *H. influenzae* cases should be considered if serotype results are not available 3-5 days after receipt of the initial positive *H. influenzae* result, or if the anticipated date of receiving the serotype result would cause a delay in initiating a full case investigation and the timely administration of chemoprophylaxis if the case is later confirmed to have Hib. The case's Hib-specific immunization history can assist in determining the likelihood of Hib infection until the serotyping is known. If the case has completed an age-appropriate Hib immunization series, it is less likely to be Hib. Hib vaccine failure occurs rarely and may be associated with immunodeficiency.

Public Health should complete the full case investigation only for invasive Hib cases to help identify the potential source of infection.

Information required for Hib case investigations is captured on the Manitoba Health, Seniors and Long-term Care Vaccine Preventable Disease Investigation Form: www.gov.mb.ca/health/publichealth/surveillance/docs/mhsu_8733.pdf.

For hospitalized cases, Routine and Droplet Precautions are recommended until 24 hours of appropriate antimicrobial therapy has been received (5).

7.1.1 Treatment

Most infections caused by *H. influenzae* are treated empirically. Antibiotics that have activity against *H. influenzae* include beta-lactams (e.g., amoxicillin, amoxicillin-clavulanate, or second- and third-generation cephalosporins), fluoroquinolones, macrolides, and tetracyclines. For patients with microbiologically diagnosed *H. influenzae* infections, antibiotic selection depends on the site and severity of infection and, when available, the results of laboratory susceptibility tests.

In addition, chemoprophylaxis is recommended for the case (and usually provided before discharge from hospital) IF:

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- Younger than 2 years of age,

OR

- Is a member of a household with a susceptible contact (as defined in section 7.2.1),

AND

- Had been treated with a regimen other than cefotaxime or ceftriaxone (14).

This is because other drug regimens do not reliably eradicate Hib from the nasopharynx (10). See section 7.2.1 for recommended antibiotics and dosages.

7.1.2 Immunization

Children who develop invasive disease when younger than 2 years of age are at risk of developing a second episode of disease and should be immunized according to the age-appropriate schedule for unimmunized children as if they had received no previous Hib vaccine doses. Immunization should be initiated 1 month after onset of disease or as soon as possible thereafter. An immunologic assessment should be considered for children who develop invasive Hib disease after complete or partial immunization (17).

7.2 Management of Contacts

Public health follow-up of contacts should occur with confirmed cases of *H. influenzae* serotype b. A preliminary investigation to identify contacts of confirmed and probable *H. influenzae* cases while awaiting serotype results may be done in consultation with the Medical Officer of Health (see Section 7.1). If the case is highly suspected to have Hib infection, the Medical Officer of Health may recommend chemoprophylaxis for eligible contacts while serotype results are still pending.

Public health follow-up of contacts should include determining if the case attends a childcare facility or nursery program and identifying close contacts who may be eligible for chemoprophylaxis.

Close contacts include:

- People living in the same household as the index case (17).
- Non-household contacts who had four or more hours of contact per day with the case for five of the seven days prior to the day of hospitalization of the index case and until the case completed at least 24 hours of appropriate antibiotic therapy. This would include children or staff who attend the same childcare setting with the index case (9).

If attending a childcare facility or nursery program, Public Health should determine how many cases of invasive Hib have occurred in the facility within the past 60 days.

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7.2.1 Chemoprophylaxis for Hib

Public Health will determine whether chemoprophylaxis for contacts is recommended to eliminate nasopharyngeal carriage and prevent secondary transmission. If so, Public Health will arrange availability. If the source case is highly suspected to have Hib infection, the Medical Officer of Health may recommend chemoprophylaxis for eligible contacts while serotype results are still pending.

With the advent of effective immunization against Hib, the role of chemoprophylaxis for contacts of Hib cases has diminished. However, secondary cases of Hib have been reported in incompletely immunized or unimmunized children who may have been exposed to an invasive Hib case in a household or childcare setting (17). Regardless of eligibility for post-exposure prophylaxis, efforts should be made to locate all contacts and provide education on the risk of secondary cases and the need for prompt evaluation and treatment if signs and symptoms should occur (17). Exposed children who develop a febrile illness should receive prompt medical attention and, if indicated, appropriate antibiotic therapy should be initiated.

Chemoprophylaxis is recommended for all household contacts regardless of age if they themselves meet the criteria below or are occupants of a household with a susceptible child who is:

- Younger than four years of age who is unimmunized or incompletely immunized (See Canadian Immunization Guide).
- Younger than 12 months who has not completed a primary Hib series.
- Immunocompromised child regardless of that child's immunization status.

Chemoprophylaxis is recommended for contacts in childcare settings for (18):

- Incompletely or unimmunized children younger than 4 years of age if one case of invasive Hib disease has occurred.
- All attendees and childcare providers (if unimmunized or incompletely immunized children attend) if two or more cases of invasive Hib disease have occurred within 60 days.

When indicated, chemoprophylaxis should be administered as soon as possible as most secondary cases in households occur during the first week after hospitalization of the index case. However, initiation of prophylaxis more than 7 days after hospitalization may still be beneficial, as some secondary cases may occur later (18). If more than 14 days have passed since the last contact with the index case, the benefit of chemoprophylaxis is likely to be decreased (9, 14).

To effectively prevent secondary spread, chemoprophylaxis should be given concurrently to all contacts (at the same time or within 3 days) to prevent reinfection within the contact group. Determining whether the individual has nasopharyngeal carriage of the organism is not necessary or recommended.

Rifampin given orally is the prophylaxis of choice as it is highly effective (9, 14, 17).

Rifampin Chemoprophylaxis Dosages:

- Adults: 600 mg orally once daily for four days
- Children: 20 mg/kg (maximum 600 mg) orally once daily for four days

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- Infants younger than one month: 10 mg/kg orally once daily for four days

Ceftriaxone may be used for pregnant people, individuals for whom rifampin is contraindicated or who cannot tolerate oral medication.

Ceftriaxone Chemoprophylaxis Dosages (14, 15, 16):

- Adults and children ≥ 12 years of age: A single dose of 250 mg given IM.
- Children < 12 years of age: A single dose of 125 mg given IM.

MHSLTC will cover the costs of providing chemoprophylaxis to Hib contacts and cases (if applicable). Regional Public Health units should initiate planning by contacting their regional Medical Officer of Health or the FNIHB Medical Officer of Health. After regular office hours, a Medical Officer of Health on-call can be reached by calling (204) 788-8666. Health Regions are to provide chemoprophylaxis by using regional pharmaceutical stock in a manner that meets their needs operationally and logistically. The Health Regions can then invoice MHSLTC for the cost of the medications and dispensing fees by filling out and submitting the "Meningococcal and *Haemophilus influenzae* Post Exposure Prophylaxis Invoicing Process" form: manitoba.ca/health/publichealth/cdc/protocol/mid_invoicing.pdf.

7.2.2 Chemoprophylaxis for Non-Hib Typeable Strains

Chemoprophylaxis of contacts to cases caused by other serotypes of *H. Influenzae* is not routinely recommended. The MOH may recommend chemoprophylaxis for eligible contacts prior to obtaining serotype results if the case is highly suspected to have Hib infection. There are currently no vaccines for other typeable strains of *H. Influenzae*.

7.2.3 Immunization

Unimmunized or partially immunized contacts less than 5 years of age should be offered a Hib vaccine according to an age-appropriate schedule.

7.3 Cluster and Outbreak Management

If two or more confirmed invasive Hib cases have occurred within the past 60 days at the childcare facility or nursery program where children are inadequately immunized, chemoprophylaxis should be considered for all attendees (17) and staff regardless of age and immunization status. If the decision is to provide chemoprophylaxis to all contacts, Public Health should work with the facility operator to notify parents and provide education about invasive Hib and potential side effects of chemoprophylaxis. Parents and caregivers should also be encouraged to check and update their child(ren)'s immunizations.

7.4 Preventive Measures

There are general preventive measures that can be taken to limit the spread of *H. influenzae*:

- Staying home when ill. When ill, avoid close contact with others, especially people at higher risk of severe illness or complications from a respiratory infection, and avoid non-essential visits to high-risk settings.

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- Practicing good hand hygiene by washing hands with soap and water (minimum of 15 seconds) or using an alcohol-based hand sanitizer.
- Practicing respiratory etiquette by covering coughs and sneezes.
- Cleaning and disinfecting surfaces and objects that are frequently touched by many people.

8. Key Investigation Components for Public Health Response

8.1 Key Components of the Case Investigation

- **While awaiting serotype result**, consult with the Medical Officer of Health if a preliminary investigation should be conducted if serotype results are not available 3-5 days after receipt of the initial positive *H. influenzae* result, or if the anticipated date of receiving the serotype result would cause a delay in initiating a full case investigation and the timely administration of chemoprophylaxis if the case is later confirmed to have Hib (see Section 7.1). Preliminary investigation should include the following:
  - Confirm that the client meets the case definition (see section 2).
  - Obtain a history of the illness including date of symptom onset, signs and symptoms and possible source of infection.
  - Determine Hib-specific immunization status and whether further immunization is recommended.
  - Determine if the case is immunocompetent.
  - Determine if the case attends a childcare facility or nursery program during their period of communicability. If so, determine if any cases of invasive Hib have occurred in the facility within the past 60 days.

Note: The Medical Officer of Health may recommend chemoprophylaxis for eligible contacts if the case is highly suspected to have Hib infection. See section 7.2 for management of contacts.

- **If serotype result received and confirmed as type b**, complete all the steps identified in the previous section on preliminary investigation plus the following:
  - Investigate the potential source of infection.
  - Identify close contacts. Obtain the ages, immunization status and weights of each contact. Determine if any contacts meet eligibility criteria for post exposure prophylaxis (see section 7.2).
  - Confirm what antibiotic regimen the case was treated with and whether chemoprophylaxis is/was also recommended (usually provided during hospital admission). This is because some regimens do not reliably eradicate Hib from the nasopharynx (see section 7.1).
  - If the case is a child under 2 years of age, they should be immunized according to the age-appropriate schedule for unimmunized children as if they had received no previous Hib vaccine doses. Immunization should be initiated 1 month after onset of disease or as soon as possible thereafter.

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  - Children who develop invasive Hib disease after complete or partial immunization should be referred to a pediatrician for an immunologic assessment.
  - Complete the key components of the contact investigation (section 8.2)
- **If serotype result received and identified as non-type b**:
  - Public Health follow up of contacts is not required.

8.2 Key Components of the Contact Investigation

- If chemoprophylaxis for eligible contacts has been recommended by the Medical Officer of Health, refer to sections 7.2.1 and 7.2.2.
- Locate and notify all contacts of confirmed Hib cases and provide education on the risk of secondary cases and the need for prompt evaluation and treatment if signs and symptoms should occur.
- Obtain Hib-specific immunization status of close contacts less than 5 years of age and offer Hib vaccine to those that are under or unimmunized.

9. Documentation Guidelines and Resources

All case investigations are to be completed in PHIMS. Critical data elements to collect on all cases and contacts are listed with a star (*) on the VACCINE PREVENTABLE DISEASE INVESTIGATION FORM

PHIMS Quick Reference and User Guides are available at the PHIMS website.

Refer to the Outbreak Module SOP for guidance on documenting outbreaks in PHIMS. All case/contact investigations within a transmission chain should be linked to the outbreak.

Check the Regional Management of Outbreaks and Clusters in PHIMS.

9.1 Regional Public Health Timelines for Documenting Hib Cases in PHIMS and Public Heath Responses

The following is intended to provide broad guidance and timelines for most Hib case and contact investigations but may not align with the chronology or flow of some investigations.

Table 1 – Case Investigations

Investigation Component	PHIMS Data Entry/Public Health Response	Timeline from Public Health Report Date Days refer to working days
Region receives new Investigation from MHSU.	Assign Primary Investigator or CD Coordinator and review investigation and lab results.	1 day

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Table 1 – Case Investigations		
Investigation Component	PHIMS Data Entry/Public Health Response	Timeline from Public Health Report Date Days refer to working days
Responsible Org and Workgroup assigned by MHSU OR Report of new investigation outside of PHIMS (e.g., Report from a care provider of a diagnostic that did not go through CPL and MHSU)	Contact provider and initiate case and contact investigation. Update Disposition from Pending (e.g., Follow up in Progress). Contact case directly and proceed with case investigation.	
Data entry: treatment and contacts	Complete and update PHIMS data as soon as possible. Update Classification based on case definition and classification date (with all available data; there may be delays of up to 2 weeks for confirmed lab results). Update "site" based on presentation of illness. Document treatment as an intervention as soon as confirmed. Enter contacts (identified either by testing practitioner or contact with client)	1-3 days
Close investigation	Update Disposition. Follow up Complete: ensure all minimum data requirements have been entered: Updated Classification, Signs and Symptoms, Acquisition Events, Risk Factors, Treatment, Disposition, Context Document(s) and Closure. OR Lost to Follow up OR Unable to Locate Investigation Status: Closed	3-4 weeks

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Table 1 – Case Investigations		
Investigation Component	PHIMS Data Entry/Public Health Response	Timeline from Public Health Report Date Days refer to working days
Quality Assurance	Each region employs a Quality Assurance process to ensure all data requirements have been entered. Consider use of PHIMS Quality Assurance report.	As per routine schedule

9.2 Regional Public Health Timelines for Documenting Hib Contacts in PHIMS and Public Health Responses

Table 2- Contact Investigations		
Investigation Component	PHIMS Data Entry/Public Health Response	Timeline from Public Health Report Date Days refer to working days
Region receives or creates a new Investigation	Assign Primary Investigator, Responsible Organization, and Workgroup	1 Day
Primary investigator attempts to locate and contact client for notification of exposure	Update Disposition: Follow-up in Progress	1 Day
Critical data elements listed on form	Complete PHIMS documentation as soon as available. Document all interventions, including post-exposure prophylaxis, immunization, and referral for primary care provider for follow-up if appropriate.	1-3 days
Close investigation when investigation complete (contact notified, referred to primary care provider if appropriate and	Disposition: Follow up Complete, OR, Lost to Follow Up/Unable to Locate.	14-21 days

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prophylaxis initiated if required) Close if unable to complete (e.g. lost to follow up)	Contacts who were notified, received education, and completed chemoprophylaxis can be closed. Contacts for which chemoprophylaxis is not indicated or recommended can be closed after notification and education is provided. If unable to locate client and/or unable to meet basic care criteria (client not notified of exposure, no treatment provided) – hold open for 14 days with regular attempts to locate and reconnect with testing practitioner. In the context of an outbreak- hold open and continue attempt to locate for 21 days. If contact becomes a case, close contact investigation with Disposition: Contact Turned Case. Continue documentation in Case Investigation.	
Quality Assurance	CD Coordinator Review by Quality Assurance Report level for minimal data elements only	1 week post closure of investigation

9.3 Inter-jurisdictional Notifications

If, during the investigation, it is determined that there was either acquisition or transmission in another jurisdiction, this should be noted in PHIMS under the Exposures section of the Case Investigation Form. If outside of MB, the MHSU should be notified to refer this information to the appropriate jurisdiction. MHSU must also provide exposure location and other pertinent details, such as dates that the individual was at the location, as part of the referred information. If the exposure occurred in another jurisdiction within MB, the primary investigator must notify the region where the exposure occurred. In general, the region where the exposure occurred is responsible for follow-up related to the exposure.

For further information related to inter-jurisdictions documentation in PHIMS:

- PHIMS Quick Reference and User Guides
- Documenting Geography for Communicable Disease Investigations in the Public Health Information Management System: 2019 (gov.mb.ca)

9.4 For Health Care Professionals

- Public Health Agency of Canada – Invasive *Haemophilus Influenzae* Disease
- Public Health Agency of Canada - Canadian Immunization Guide, 7th edition

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- Immunization Program Manual for Immunization Providers in Manitoba

9.5 For the Public

Fact sheets available from Material Distribution Agency (MDA), telephone (204) 945-0570, fax (204) 942-6212 or e-mail: InfoResources@gov.mb.ca

- Fact sheet on *Haemophilus Influenzae* Type b (Hib) Vaccine: *Haemophilus Influenzae* Type b (Hib) Vaccine
- Fact sheet on the 5-in-1 Vaccine (DTaP-IPV-Hib): The 5-in-1 Vaccine (DTaP-IPV-Hib)

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