Pertussis

Manitoba
Public Health Branch

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Abbreviations

HCP	Health Care Provider
MHSU	Manitoba Health Surveillance Unit
PCR	Polymerase Chain Reaction
PEP	Post Exposure Prophylaxis
PH	Public Health
PHIMS	Personal Health Information Management System
PT	Pertussis Toxin
RO	Responsible Organization
Tdap	Tetanus, Diphtheria and Acellular Pertussis Vaccine
WHO	World Health Organization

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Summary of Updates

September 2024

The 2024 update of the Pertussis Protocol resulted in significant changes from the previous version (2007). All sections have been reviewed and updated to reflect the current practice and now reflect the current goals and expectations for pertussis management. Some sections removed to reflect changes in practice.

Please note documentation has been added:

- Appendix A: **Pertussis Contact Notification Letter**
- Appendix B: **Health Care Provider Letter**

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1. Etiology and Background

Pertussis is caused by the bacterium *Bordetella pertussis*, a small aerobic gram-negative coccobacillus that appears singly or in pairs (7, 11).

Parapertussis is a milder version of pertussis and is caused by a similar bacterium called Bordetella parapertussis (4). Although the clinical presentation for *B. parapertussis* is similar to that of *B. pertussis*, *B. parapertussis* usually causes less severe disease, which may be related to its lack of production of pertussis toxin (29) As of January 1, 2015, parapertussis (*Bordetella parapertussis)* is no longer reportable.

2. Case Definitions

2.1 Lab Confirmed Case

Fits the criteria for ONE of the following:

i) Isolation of *Bordetella pertussis* on culture from an appropriate clinical specimen

OR

ii) Detection of *B. pertussis* DNA from an appropriate clinical specimen **and**

- cough of any duration

OR

iii) Epidemiologic link to a laboratory-confirmed case **and** one or more of the following for which there is no other known cause:

- paroxysmal cough of any duration
- cough with inspiratory "whoop"
- cough ending in vomiting or gagging, or associated with apnea

2.2 Probable Case

Cough lasting 2 weeks or longer in the absence of appropriate laboratory tests and not epidemiologically linked to a laboratory-confirmed case **and** one or more of the following, with no other known cause:

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- paroxysmal cough of any duration
- cough with inspiratory "whoop"
- cough ending in vomiting or gagging, or associated with apnea

3. Reporting and Other Requirements

3.1 Reporting to Manitoba Health

Reporting of *B. pertussis* is as follows.

Laboratory:

All positive laboratory results for *B. pertussis* are reportable to the Manitoba Health Seniors and Long-Term Care Surveillance Unit (MHSU) by secure fax (204-948-3044) or established electronic interface.

Operators of clinical laboratories in Manitoba that are isolating *B. pertussis* from clinical specimens must submit isolate subcultures to the Cadham Provincial Laboratory (CPL) for subtyping, susceptibility testing and epidemiologic investigation.

Health Care Professional:

All probable (clinical) cases of pertussis are reportable by secure fax (204-948-3044) on the same day that they are identified.

The Clinical Notification of Reportable Diseases and Conditions form (http://www.gov.mb.ca/health/publichealth/cdc/protocol/form13.pdf) should be used.

4. Epidemiology

4.1 Reservoir

Humans are believed to be the only host for pertussis (8, 11). Although infections can be induced in animals in a laboratory setting, there are no known natural infections of animals or animal reservoirs (5). The organism is unable to survive for long periods in the environment (5). Adolescents and adults are an important reservoir for *B. pertussis* and are frequently the source of infection for susceptible infants (3, 12-15).

4.2 Transmission

The spread of pertussis requires close, direct contact such as droplets expelled from the respiratory tract of infected persons landing in the nose or mouth of susceptible persons (1, 6). The number of organisms required for infection is unknown (5). Transmission occurs less often by contact with recently contaminated articles of an infected person (3). Studies have shown that the proportion of household

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contacts with laboratory evidence of infection who were asymptomatic ranged from 5 to 56 percent, and 3 to 46 percent had a mild respiratory illness (i.e., non-classical symptoms of pertussis). It is likely that asymptomatic infection may contribute to transmission of pertussis between household or other close contacts (12).

4.3 Occurrence

Pertussis is endemic worldwide, occurs year-round, even in regions with high vaccination coverage and causes approximately 400,000 deaths per year (8). The World Health Organization (WHO) has estimated there are between 20-40 million cases of pertussis worldwide, 95% of which were in low- and middle-income countries (8). The highest incidence rates occur in young children where vaccination rates are low (8).

4.4 Epidemiological Information on Pertussis

4.4.1 World

While *Bordetella pertussis* circulates worldwide, disease rates are highest among young children in countries where vaccination coverage is low, primarily in low- and middle-income countries. In high income countries, the incidence of pertussis is highest among unvaccinated infants and young children and increases again among teens (26).

The World Health Organization reports on the estimated number of pertussis cases worldwide located at https://www.who.int/health-topics/pertussis#tab=tab_1

USA estimates of pertussis can be found here: https://www.cdc.gov/pertussis/surv-reporting.html

4.4.2 Canada

The epidemiology of pertussis in Canada occurs cyclically with peaks at two and five year intervals due to regional outbreaks and clusters (5). In 1997/98 the whole cell pertussis vaccine was replaced with acellular pertussis vaccines and a steady decline in incidence was observed to 2.0 cases per 100,000 in 2011. The introduction of the adolescent dose of acellular pertussis vaccine in between 1999 and 2004 across jurisdictions, resulted in a decrease in pertussis in all age groups between 2005-2011. However, outbreaks in 2012 across jurisdictions resulted in the national incidence increasing to 13.9 per 100,000. During this outbreak, the highest incidence rates were found in infants less than one year (120.8 per 100,000).

One to four deaths related to pertussis occur annually in Canada, usually in infants who are too young to be vaccinated or in children who are either unimmunzied or only partially immunized.

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Further epidemiology on pertussis occurrence in Canada can be located at the Public Health Agency of Canada website at https://www.canada.ca/en/public-health/services/immunization/vaccine-preventable-diseases/pertussis-whooping-cough.html

5. Clinical Presentation and Natural History

Pertussis, also known as whooping cough, is a respiratory infection caused by the bacterium *Bordetella pertussis* (1). *B. pertussis* is transmitted via droplets, which are aerosolized by paroxysms of coughing (1). After inhalation, the organism releases cytotoxins and damages protective respiratory cells (1). Respiratory tissue damage and loss of protective respiratory cells is likely responsible for micro aspiration and the cough (1). The most notable dissemination of the organism beyond the respiratory tract is lymphocytosis, which is caused by pertussis toxin (PT). PT may also cause hyperinsulinemia with resultant hypoglycemia in young infants (1).

The disease is divided into three stages: catarrhal, paroxysmal and convalescent (6):

1. **Catarrhal Stage** – The first stage begins about 7 to 10 days after infection (6), and is characterized by runny nose, sneezing, low-grade fever and a mild occasional cough similar to the common cold (7).
2. **Paroxysmal Stage** – This stage occurs 10 to 14 days after infection (6). The frequency and severity of coughing with paroxysms increases rapidly (2). Paroxysms are characterized by repeated violent coughs; each series of paroxysms has many coughs without intervening inhalation and can be followed by a crowing or high-pitched inspiratory whoop. The person may become cyanotic (6, 12). Paroxysms frequently end with the expulsion of clear, tenacious mucus, often followed by vomiting (12). Paroxysms may be more frequent at night and may be precipitated by external stimuli such as noises, cold air, eating, drinking, crying and laughing (12). Individuals may appear well between paroxysms (12). Individuals with partial immunity may experience less severe symptoms (5). The paroxysmal stage usually lasts one to six weeks but may persist for up to 10 weeks (5).
3. **Convalescent Stage** – Recovery is gradual with cough becoming less paroxysmal and disappearing in two to three weeks (5). A typical illness lasts 2 to 3 months but can last four months or longer (12).

Complications are most common in infants (under 12 months of age) and increase in frequency with younger age (higher under 6 months and highest under 2 months of age) (6). Secondary bacterial pneumonia is the most common complication and the cause of most pertussis-related deaths (5). Less common complications include seizures and encephalopathy (5,8). Minor complications include ear infections, nosebleeds, and small conjunctival hemorrhages as a result of forceful coughing (5). In Canada roughly two per cent of infants with pertussis are admitted to hospital (13).

5.1 Incubation Period

The average incubation period is 9-10 days, with a range of 6-20 days (8).

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5.2 Period of Communicability

Individuals with pertussis are most infectious during the catarrhal stage and the beginning of the paroxysmal stage (first two weeks after onset of symptoms) (4,5,8). Infectiousness declines quickly after this period but may last up to three weeks from the onset of paroxysms in untreated patients (6). Patients are no longer considered infectious after five days of treatment with appropriate antibiotics (2, 12). Pertussis has a secondary attack rate of 80 per cent among susceptible household contacts (12).

5.3 Susceptibility

Susceptibility is general. Natural infection or immunization does not confer lifelong immunity (11).

5.3.1 Vaccine Efficacy and Effectiveness

The vaccine efficacy following the primary series with acellular pertussis vaccines is estimated to be about 85%, and approximately 90% following booster immunization. Although the duration of protection afforded by acellular pertussis vaccine is unknown, available data suggests that protection does not significantly decline between the first booster (provided at 18 months of age) and second booster (provided at 4-6 years of age) with an acellular pertussis vaccine. However, a progressive decline in protection has been observed following the second booster dose. As protection following pertussis vaccination wanes after six to 12 years in industrialized countries (14), routine use of the acellular pertussis vaccine in adolescents and adults will likely reduce the overall disease burden and transmission to children (40).

NACI recommends that all Canadian adults receive a single dose of Tdap vaccine instead of a tetanus-diphtheria booster (19).

NACI recommends the Tdap vaccine should be offered in every pregnancy between 27 and 32 weeks gestation, irrespective of previous Tdap immunization history (18). Tdap immunization in pregnancy is estimated to protect approximately 90% of infants less than 3 months of age.

Please refer to NACI and the current Canadian Immunization Guide (13) for information on routine childhood immunization with pertussis vaccine. Manitoba's Routine Immunization Schedules are located at: https://www.gov.mb.ca/health/publichealth/cdc/div/schedules.html and https://www.gov.mb.ca/health/publichealth/cdc/div/not.html

5.3.2 Host Susceptibility

Non-immunized or partially immunized individuals are susceptible to pertussis as well as previously immunized adolescents and adults due to waning immunity (16). Immunized individuals of any age may also be susceptible, as the vaccine is not 100% effective at preventing disease (21). Lack of maternal/birthing parent immunity is assumed to result in increased infant susceptibility to infection by

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increasing the risk of disease in mothers as well as not providing passive immunity via the placenta or breastfeeding/chestfeeding (18). Although *B. pertussis* can infect people of all ages, infants appear to be the most susceptible (6,5). Milder and atypical cases occur in all age groups, however less severe clinical manifestations are more frequently observed in the adult and adolescent populations (14). Immunity following *B. pertussis* natural infection or induced by whole-cell vaccination (currently, only the acellular vaccine is used in Canada) is not life-long (4,14). Several recent studies have indicated a higher incidence of pertussis in females than in males in all age ranges (4).

6. Testing and Diagnosis

6.1 Polymerase Chain Reaction (PCR)

PCR has excellent sensitivity and specificity. (24). However, results should be interpreted along with the clinical symptoms and epidemiological information. Due to the short turn-around-time, PCR is particularly useful for detecting pertussis when the incidence in the population is higher.

Ideally, specimens should be collected during the first 3 weeks of illness following cough onset because after that time a false negative is more likely, but PCR may provide accurate results on specimens collected up to 4 weeks after onset (24).

The appropriate clinical specimen is a nasopharyngeal swab or nasopharyngeal aspirate in either viral transport medium or Amies charcoal medium (25). Nasopharyngeal swabs for pertussis PCR must be collected using swabs with non-toxic tips such as dacron or nylon.

6.2 Culture

Culture is the gold standard for pertussis diagnosis since it is the only 100% specific method for identification (24). However, the turn-around-time for culture is approximately 8 days (25). Therefore, culture can be useful for confirming pertussis diagnosis when the incidence in the population is low and to allow for further laboratory characterization.

Specimens should be collected during the first 2 weeks of illness following cough onset. This is when viable bacteria are still present in the nasopharynx. After the first 2 weeks, sensitivity decreases and the risk of false negatives increases (24).

The appropriate clinical specimen is a nasopharyngeal swab or nasopharyngeal aspirate in Amies charcoal medium (25). The same specimen can be used for both culture and PCR.

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7. Management of Cases

7.1 Public Health Roles

Investigate cases to determine sources of infection. Encourage client to seek treatment as soon as possible (see Section 6.3 Treatment).

Investigate risk factors for disease transmission to vulnerable populations, including:

- Work with vulnerable populations, including those who have direct contact with infants less than one year of age and pregnant individuals in their third trimester,
- Work/volunteer in childcare settings and
- Health care providers

Provide education about disease transmission and infection and prevention strategies including hand hygiene and respiratory etiquette to minimize transmission. Advise cases to avoid contact with young children, infants, and individuals in their third trimester of pregnancy until the completion of 5 days of appropriate antibiotic therapy or 21 days post paroxysm onset if appropriate antimicrobial therapy is not given. Advise symptomatic individuals to remain at home until they are well and avoid close contact with others in the home (12,13).

For hospitalized cases: Routine Practices and Droplet Precautions are recommended until five days after initiation of effective therapy or until three weeks after the onset of paroxysms if appropriate antimicrobial therapy is not given (2, 6, 12). For further information: https://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf

7.2 Exclusion

Exclusion from work or activities is not a proven effective strategy for the prevention of pertussis in the community; however, in high-risk situations (where there are vulnerable persons) exclusion until five days after the start of antibiotic therapy, or if no treatment is given, until after 3 weeks (21 days) from the onset of paroxysms or until the end of the cough, whichever comes first, should be at the discretion of the Medical Officer of Health (9).

7.3 Treatment

Table 1 indicates the treatment options recommended as of the date of publication of this protocol. Please confirm the recommended treatment using a reputable source, such as UpToDate ®. Treatment is mainly for the prevention of onward transmission but may also decrease the duration of symptoms. With appropriate antibiotic treatment, the infectious period is reduced to 5 days after the start of antibiotics.

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Table 1: Recommended oral antimicrobial treatment and post-exposure prophylaxis for pertussis, by age group (6, 12).

Drug	Children	Adults
Azithromycin[1]	Less than 6 months[o]: 10 mg/kg PO once daily for 5 days Age equal or greater than 6 months: 10 mg/kg/day PO for 1 day (max 500 mg), then 5 mg/kg/day PO daily for 4 days (max 250 mg)	500 mg PO once for 1 day then 250 mg PO daily for 4 days
Clarithromycin[2]	Minimum age: 1 month 15 mg/kg/day divided BID for 7 days PO (max 1 gram/day)	500mg PO BID for 7 days (not recommended in pregnancy)
Trimethoprim (TMP)-Sulfamethoxazole (SMX)[3]	Minimum age: 2 months TMP 8 mg/kg/day, SMX 40 mg/kg/day divided BID for 14 days (max TMP 320 mg, SMX 1600 mg/day)	TMP/SMX 160/800mg PO BID for 14 days (not recommended in pregnancy)

[1]Azithromycin is the preferred antimicrobial for all ages unless there is a contraindication. Pregnancy is not a contraindication to azithromycin.

[o] Clinicians should monitor infants younger than 1 month of age who receive a macrolide (i.e. azithromycin, clarithromycin) for the development of infantile hypertrophic pyloric stenosis and for other serious adverse events.

[2]Clarithromycin is not recommended during pregnancy.

[3]Trimethoprim (TMP)-Sulfamethoxazole (SMX) may be utilized if azithromycin or clarithromycin are not tolerated. TMP/SMX is not recommended during pregnancy.

7.4 Immunization

After recovery from the acute illness, persons who have had pertussis infection should receive pertussis-containing vaccines as recommended because infection may not confer long term immunity. For more information on Pertussis immunization:

https://www.gov.mb.ca/health/publichealth/cdc/vaccineeligibility.html

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https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-15-pertussis-vaccine.html

7.5 Management of Contacts

7.5.1 Definition of Contact:

Someone who has had the following contact with a symptomatic case during the period of communicability (see section 4.2 for period of communicability) (23):

- had direct face-to-face exposure for five or more minutes.
- shared confined space in proximity (e.g. household, day care, office) for one hour or longer, (27); or
- had direct contact with respiratory, oral or nasal secretions from a symptomatic case such as kissing, being directly coughed or sneezed upon or sharing food or eating utensils during a meal (23).

To determine post exposure prophylaxis (PEP) for vulnerable contacts. (see section 6.5.3),

7.5.2 Immunization status of Contacts

Contacts should have their immunization status reviewed and updated, if appropriate, particularly children younger than seven years of age (9) see Canadian Immunization Guide: https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-15-pertussis-vaccine.html#p4c14a5

7.5.3 Chemoprophylaxis of Contacts

May be warranted as pertussis immunity is not absolute and immunization may not prevent infection (23).

When indicated is the same antibiotic regimen described in the Treatment section (6.3) (see Table 1).

Initiating chemoprophylaxis after 21 days or more following first contact with the symptomatic primary case is unlikely to be beneficial (9).

There is no evidence that antibiotic prophylaxis of contacts changes the epidemic course of pertussis in the community, therefore, it is recommended only for the following situations.

1. Households and Home Day Cares
   - Chemoprophylaxis is indicated for all contacts (vaccinated against pertussis or not), ONLY where there is a vulnerable person* residing/working or in attendance (9). *Note*: Chemoprophylaxis for contacts is not indicated if the case is the infant or pregnant individual in the household or home daycare setting, and there are no other infants or pregnant individuals in the 3rd trimester present.

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- For pregnant individuals, if chemoprophylaxis is not completed by the time of delivery, it should be continued for the mother/birthing parent and started for the newborn (27).

2. Non-Home Day Cares/Schools/Community
   - Contacts should be offered chemoprophylaxis ONLY if they are a vulnerable person* (9, 27).
     - For pregnant individuals in their third trimester, if chemoprophylaxis is not completed by the time of delivery, it should be continued for the mother/ birthing parent and started for the newborn (27).
   - Contacts should have their immunization status reviewed and updated, if appropriate, particularly children younger than seven years of age (9) (see Canadian Immunization Guide).

A vulnerable person is defined as an infant under one year of age (vaccinated or not); or a pregnant individual in their third trimester (9).

Note: Chemoprophylaxis for other contacts may be recommended at the discretion of the Medical Health Officer (e.g., staff working with neonates, and/or infants < 1 year or pregnant individuals, those in a non-home daycare if an infant < 1 year of age or a pregnant individual in the 3rd trimester is present).

See Appendix B: Health Care Provider Referral Letter, to refer a contact for chemoprophylaxis.

Asymptomatic Contacts: Regardless of setting (excluding healthcare settings), activity restriction is not warranted (28). In healthcare settings, exclusion from certain settings (e.g. staff working with neonates, and/or infants < 1 year or pregnant individuals) may be appropriate. Healthcare workers should check with their institution's Occupational Health staff before returning to work.

Symptomatic Contacts: Symptomatic contacts (cough) should be investigated by a physician (including testing). If individuals are diagnosed as cases of pertussis, treatment and exclusion are as outlined in section 6: Management of Cases.

7.5.4 Contact Notification

Public Health-Initiated Contact Notification

Determine the type of exposure the contact had with the case, the setting, and the time since last exposure (12,14).

Determine immunization history (i.e., type of vaccine, number of doses and date of administration) (12,14).

Contacts not up to date with pertussis vaccinations, should be offered immunization per provincial recommended immunization schedule :

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https://www.gov.mb.ca/health/publichealth/cdc/div/schedules.html and Canadian immunization guide (12,14): https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-15-pertussis-vaccine.html

Assess contacts' eligibility for post exposure prophylaxis (PEP), refer to section 6.5.3 for more information.

Provide information about pertussis disease including signs and symptoms.

Notification of Contacts:

- Contacts who are recommended PEP (14)
  - Reference the criteria outlined in section 6.5.3 Chemoprophylaxis of Contacts
  - Public health will notify contacts directly.
  - Public health will refer contact to their health care provider to receive PEP. Medication is not provided or funded through public health and must be prescribed by a health care provider.
  - Public health referral for chemoprophylaxis can be facilitated using the template provided in Appendix B: Health Care Provider Referral Letter.
- For contacts who are not recommended PEP,
  - Public health will notify contacts of exposure.
  - Public health notification can be facilitated using the template provided in Appendix A: Pertussis Contact Notification Letter. This may be the method of notification for large groups of contacts.
- Refer symptomatic contacts for assessment with their health care provider as appropriate. Refer to above considerations for exclusions.
- Advise asymptomatic contacts to monitor closely for symptoms for at least 21 days after their last exposure to the infected person and if symptoms develop notify public health, get assessed by their health care provider and stay home until further advised (12,14).

7.6 Cluster and Outbreak Management

An outbreak is defined as an increase in the rate of pertussis infection over that which is normally expected in a defined area or time. The goals of outbreak management are to limit transmission in closed settings (such as household and family daycares) and to provide protection against disease for those at highest risk of severe disease and its complications.

For institutional or closed population outbreaks, broader use of post-exposure prophylaxis can be considered. Administration of post-exposure antibiotic therapy to an asymptomatic person who has had contact with a person with pertussis who is within 21 days of onset of cough can potentially prevent symptomatic infection. Implementation of post-exposure prophylaxis as part of an institutional protocol has been associated with termination of a pertussis outbreak (12).

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For broader community outbreaks, opportunities should be used to immunize any individuals who are overdue for their pertussis immunizations, particularly children younger than seven years of age (see Canadian Immunization Guide) (21). However, post-exposure immunization does not protect contacts from infection from that exposure; though it may be protective if there is exposure to pertussis in the future.

An outbreak can be declared over when the incidence of pertussis returns to baseline over a sustained period (e.g. over 3 months).

7.7 Preventive Measures

There are number of measures that can be taken to prevent infection with pertussis:

- Education on staying home when sick and during that time avoid close contact with others, especially people at higher risk of severe illness or complications from a respiratory infection (e.g. people who may be pregnant and infants).
- Education on the practice of good hand hygiene by washing hands with soap and water or using an alcohol-based hand sanitizer.
- Education on respiratory etiquette.
- Clean and disinfect surfaces and objects that are frequently touched by many people.
- Vaccination: refer to section 4.3.1 Vaccine Efficacy and Effectiveness
- Education: Educate the public, particularly parents of infants, about the dangers of pertussis (whooping cough) and the advantages of initiating immunization at two months of age and adhering to the immunization schedule (41).

8. Key Investigation Components for Public Health Response

Contact the testing healthcare provider prior to connecting with the client. All cases will be followed up by Public Health.

Key Components of the Case Investigation

- Confirm client meets case definition (see section 2 for case definition)
- Ensure appropriate lab tests completed,
- Obtain history of present illness including onset of signs and symptoms
- Determine possible source of infection,
  - Recent travel history or contact with a traveler,
  - Contact with a confirmed pertussis case or a person with pertussis like symptoms,
  - Determine if others in the household have similar symptoms or if there has been contact with a confirmed pertussis case or person with pertussis-like symptoms,
- Determine if case has started on antimicrobial therapy (confirm details of prescription and dates).

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- Determine period of communicability which is during the catarrhal stage (7-10 days after beginning of symptomatic infection) and in the first three weeks after onset of paroxysmal cough; or until completion of 5-day course of appropriate antibiotics.
- Determine if client is pregnant.
- Determine pertussis-specific immunization history (i.e., type of vaccine, number of doses and date of administration).
    - Upon recovery, cases not up to date for pertussis immunization should be offered an age-appropriate dose of acellular pertussis containing vaccine according to the current Manitoba Health Routine Immunization Schedules https://www.gov.mb.ca/health/publichealth/cdc/div/schedules.html
- Provide information about disease transmission and measures to prevent transmission, including practicing proper hand hygiene and respiratory etiquette.
- The MOH may exclude cases from situations where there are vulnerable persons until five days after the start of antibiotic therapy, OR if there is NO treatment or treatment is incomplete, for three weeks (21 days) from onset of paroxysmal cough or until the end of the cough, whichever comes first.
- Droplet precautions apply for hospitalized cases until no longer considered infectious.

Contact history

- Identify contacts that may have had significant exposure to the case during the period of communicability (see *6.5.1 Definition of Contact*).
- Determine which of the identified contacts would be considered vulnerable (i.e., infants less than one year of age and pregnant individual in the third trimester, regardless of immunization status).
- Determine possible high risk transmission settings (i.e., school, childcare, healthcare setting), and obtain list of contacts in these settings.

Key Components of the Contact Investigation

- Identify contacts based on case interview, including contacts identified by the case as well as contacts in settings where significant exposure occurred. All contacts should be notified.
- Determine the type of exposure the contact had with the case, the setting, and the time since last exposure.
- Determine if contacts should be offered post-exposure prophylaxis (PEP). Refer to section 6.5.3 more information. Public health referral for chemoprophylaxis can be facilitated using the template provided in Appendix B: Health Care Provider Referral Letter.
- Determine immunization history (i.e., type of vaccine, number of doses and date of administration).
- Contacts not up-to-date for pertussis immunization should be offered an age-appropriate dose of acellular pertussis containing vaccine according to the current Manitoba Health Routine Immunization Schedules https://www.gov.mb.ca/health/publichealth/cdc/div/schedules.html

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- Provide information about pertussis disease including signs and symptoms.
- Refer symptomatic contacts for assessment as appropriate.
- Advise asymptomatic contacts to monitor closely for symptoms for at least 21 days after their last exposure to the infected person and seek assessment by their health care provider, avoid contact with others and notify public health if they develop symptoms.

9. Documentation Guidelines and Resources

All case investigations are to be completed in PHIMS. For public health providers without access to PHIMS, the case/contact investigation forms should be completed and submitted for entry to the Manitoba Health Surveillance Unit. The critical data elements which are required for documentation for all case and contact investigation are listed with a "*" on the Vaccine Preventable Disease Investigation Form: https://www.gov.mb.ca/health/publichealth/surveillance/docs/mhsu_8733.pdf

PHIMS Quick Reference and User Guides are available at https://phimsmb.ca/

Documenting geography for the communicable disease investigation in PHIMS: https://www.gov.mb.ca/health/publichealth/surveillance/cds/docs/documenting_geography.pdf

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 Pertussis Cases in PHIMS and Public Heath Responses

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

Table 2

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. Responsible Org and Workgroup assigned by MHSU OR	• Create Investigation if new report of a probable case. • Assign Primary Investigator or CD Coordinator and review investigation and lab results.	1 day

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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: Document case and contact details in PHIMS	• Complete and update PHIMS data as soon as possible. • Update Classification based on case definition and classification date. • 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 OR Lost to Follow up, OR Unable to Locate. Investigation Status: Closed.	3-4 weeks
Quality Assurance	Each region employs a Quality Assurance process (Classification, Disposition, Treatment, and Closure). Consider use of PHIMS Quality Assurance report.	As per routine schedule

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Table 3: Regional Public Health Timelines for Documenting Pertussis Contacts in PHIMS and Public Health Responses

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 and referral for primary care provider for follow-up if appropriate. • If contact tests positive, close contact investigation with Disposition: Contact Turned Case. Continue documentation in Case Investigation. • If unable to locate client and/or unable to meet basic care criteria (client not notified of exposure, no treatment provided) – hold open for 21 days with regular attempts to locate, reconnect with testing practitioner.	1-3 days
Close investigation when investigation complete (contact, notified, referred to primary care provider if appropriate and prophylaxis initiated if required) Close if unable to complete (e.g. lost to follow up)	• Disposition: Follow up Complete, OR, Lost to Follow Up/Unable to Locate. • High risk contacts should remain open until referred to primary care provider if appropriate and prophylaxis initiated if required. • Other contacts not offered PEP can be closed after notification and education provided. • Status Closed	14 - 21 days

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Quality Assurance	• CD Coordinator Review by Quality Assurance Report level for minimal data elements only	As per routine schedule

Inter-jurisdictional Notifications:

Inter-jurisdictional follow up will only occur in the event of a significant incident/outbreak. See PHIMS quick reference for referral process.

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Appendix A: **Pertussis Contact Notification Letter**.

Manitoba

Health, Seniors and Long-Term Care

Public Health

300 Carlton Street

Winnipeg, Manitoba Canada R3B 3M9

Pertussis Contact Notification Letter

Dear Sir / Madam,

Re: Pertussis – Important Information to Protect Yourself and Your Community

You have received this letter because you have (your child has) been exposed to a case of pertussis (whooping cough) in the following setting _____.

What is Pertussis?

Pertussis is a very contagious disease of the lungs and throat. It is caused by a bacteria (germ) found in the mouth, nose, and throat of an infected person. Pertussis is spread when the sick person coughs or sneezes the germ into the air, where other people can breathe it in. If exposed people become infected, it takes about 7 to 10 days for them to develop cold-like symptoms which includes severe coughing fits.

What are the symptoms of pertussis?

Early symptoms are like those of a cold (sneezing, runny nose, a low fever, and a mild cough). But over the next week or two, the cough gets worse leading to longer episodes of coughing that often end with a whoop or crowing sound when the person breathes in. The coughing may be so bad that it makes a person gag or throw up. Sometimes a thick, clear mucous is spit out. In infants and children, the cough can increase to the point that makes breathing difficult. This cough can last up to a month or two and happens more at night.

If you develop symptoms:

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- If you develop (your child develops) early symptoms of pertussis it is very important to get tested and treated. Early diagnosis and treatment will prevent the spread of pertussis to those that are at the most risk from the disease (infants less than one year of age, and pregnant individuals in the last 3 months of pregnancy).
- A person who has pertussis and does not get treated can spread the germs to others for up to 3 weeks after the coughing fits start.
- Except for visiting your health care provider, stay home and minimize contact with others especially children under the age of one and pregnant people in their third trimester, until the completion of 5 days of appropriate antibiotic therapy.
- Cover your mouth and nose with a tissue when coughing or sneezing, or cough or sneeze into your sleeve. Throw used tissues in the garbage and immediately wash your hands or use an alcohol-based hand sanitizer.
  Wash your hands regularly with soap and warm water for at least 15 seconds and dry your hands thoroughly afterwards. If using an alcohol-based hand sanitizer, make sure it contains at least 60 per cent alcohol and allow your hands to dry afterwards.

If symptoms develop, contact your health care provider, public health, or Health Links- Info Sante at 204-788-8200 or toll free at 1-888-315-9257

For a listing of Public Health Offices in Manitoba:

http://www.gov.mb.ca/health/publichealth/offices.html

For more information, please visit:

https://www.gov.mb.ca/health/publichealth/diseases/pertussis.html

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Appendix B: Health Care Provider Referral Letter

Manitoba

Health, Seniors and Long-Term Care

Public Health

300 Carlton Street

Winnipeg, Manitoba Canada R3B 3M9

Health Care Provider Referral Letter

Dear Dr. _____,

Re: Your patient: _____

Date of Birth: _____ (yyyy/mm/dd)

The above-named patient has been exposed to a confirmed (probable) case of pertussis. Chemoprophylaxis is recommended for:

- Infants under one year of age
- Pregnant individuals in the 3rd trimester
- All household and/or family daycare contacts IF there is an infant < 1 year of age or a pregnant individual in the 3rd trimester in the household or daycare.

The above-named individual has been identified as a high-risk contact of a pertussis case for which public health recommends chemoprophylaxis. They have been notified that they have been exposed to a case of pertussis, informed of the early symptoms of pertussis, and advised to present to their health care provider for post-exposure prophylaxis. Post-exposure prophylaxis is not provided or funded by public health and must be prescribed by a health care provider.

Please consider the following recommendations for the above-named individual:

- Post-exposure chemoprophylaxis is recommended to be prescribed for this contact. For recommended antibiotic regimens, please refer to the next page.
- Consider pertussis in the differential diagnosis should they develop respiratory symptoms, especially within 21 days of their last exposure.
- If they develop symptoms compatible with pertussis, perform a nasopharyngeal swab and submit it for culture or PCR test for pertussis. See Cadham Provincial Laboratory's Guide to Services for details on specimen collection https://healthproviders.sharedhealthmb.ca/services/diagnostic-services/cpl/

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Review your patient's immunization status. Immunization will not protect your patient from pertussis illness due to this exposure but will provide protection if subsequent exposure occurs. For more information about immunization schedules please visit: Immunization (Vaccination) | Health | Province of Manitoba (gov.mb.ca)

Pertussis oral antimicrobial treatment and post-exposure prophylaxis for pertussis, by age group

Drug	Children	Adults
Azithromycin[1]	Less than 6 months[o]: 10 mg/kg PO once daily for 5 days Age equal to or greater than 6 months: 10 mg/kg/day PO for 1 day (max 500 mg), then 5 mg/kg/day PO daily for 4 days (max 250 mg)	500 mg PO once for 1 day then 250 mg PO daily for 4 days
Clarithromycin[2]	Minimum age: 1 month 15 mg/kg/day divided BID for 7 days PO (max 1 gram/day)	500mg PO BID for 7 days (not recommended in pregnancy)
Trimethoprim (TMP)-Sulfamethoxazole (SMX)[3]	Minimum age: 2 months TMP 8 mg/kg/day, SMX 40 mg/kg/day divided BID for 14 days (max TMP 320 mg, SMX 1600 mg/day)	TMP/SMX 160/800mg PO BID for 14 days (not recommended in pregnancy)

[1]Azithromycin is the preferred antimicrobial for all ages unless there is a contraindication. Pregnancy is not a contraindication to azithromycin.

[o]Clinicians should monitor infants younger than 1 month of age who receive a macrolide (i.e. azithromycin or clarithromycin) for the development of infantile hypertrophic pyloric stenosis and other serious adverse events.

[2]Clarithromycin is not recommended during pregnancy.

[3]Trimethoprim (TMP)-Sulfamethoxazole (SMX) may be utilized if Azithromycin or Clarithromycin are not tolerated. TMP/SMX is not recommended during pregnancy.

All confirmed and probable cases of pertussis are reportable. Report new probable (clinical) cases using the Clinical Notification of Reportable Diseases and Conditions Form (https://www.gov.mb.ca/health/publichealth/cdc/protocol/mhsu_0013.pdf) by secure fax (204-948-3044) on the same day that they are identified. Please refer to the pertussis communicable disease protocol found at https://www.gov.mb.ca/health/publichealth/cdc/protocol/pertussis.pdf for further information.

Please contact public health if you have any questions at XXX-XXX-XXXX.

Sincerely,

Public Health Reginal Office
