



Alberta Public Health Disease Management Guidelines

Pertussis



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Health and Wellness Promotion Branch

Public Health and Compliance Branch

Alberta Health

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Case Definition

Confirmed Case

Laboratory confirmation of infection:

- Isolation of *Bordetella pertussis* from an appropriate clinical specimen (e.g., nasopharyngeal swab)^(A)

OR

- Detection of *Bordetella pertussis* nucleic acid by nucleic acid testing (e.g. polymerase chain reaction [PCR]) from an appropriate clinical specimen (nasopharyngeal swab) **AND** one or more of the following:
 - cough lasting two weeks or longer,
 - paroxysmal cough of any duration,
 - cough with inspiratory “whoop”, and/or
 - cough ending in vomiting or gagging, or associated with apnea

OR

A person who is epidemiologically linked to a laboratory-confirmed case **AND** has one or more of the following for which there is no other known cause:

- cough lasting two weeks or longer,
- paroxysmal cough of any duration,
- cough ending in vomiting, or associated with apnea, and/or
- cough with inspiratory “whoop”.

Probable Case (Outbreaks Only)

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

- paroxysmal cough of any duration,
- cough with inspiratory “whoop”, and/or
- cough ending in vomiting or gagging, or associated with apnea.

^(A) Refer to the Public Health Laboratory’s [Guide to Services](#) for current specimen collection and submission information.

Reporting Requirements

Physicians, Health Practitioners and Others

- A physician, health practitioner or person in charge of an institution shall notify the Medical Officer of Health (MOH) (or designate) of the health zone, of confirmed cases in the prescribed form by mail, fax or electronic transfer within 48 hours (two business days).
- In an outbreak situation, the MOH (or designate) of the zone shall also be notified of all probable cases (in addition to confirmed cases) in the above prescribed form.

Laboratories

- All laboratories shall report all positive laboratory results by mail, fax or electronic transfer within 48 hours (two business days) to the:
 - Chief Medical Officer of Health (CMOH) (or designate), and
 - MOH (or designate) of the zone.

Alberta Health Services and First Nations Inuit Health Branch Public Health

- The MOH (or designate) of the zone where the case currently resides shall forward the initial Notifiable Disease Report (NDR) of all confirmed cases to the CMOH (or designate) within two weeks of notification and the final NDR (amendment) within four weeks of notification.
- In an outbreak situation, the MOH (or designate) of the zone where the case currently resides shall also forward the NDR of all probable cases (in addition to confirmed cases) to the CMOH (or designate) in the above prescribed form.
- For out-of-province and out-of-country reports, the following information should be forwarded to the CMOH (or designate) by phone, fax or electronic transfer within 48 hours (two business days) including:
 - name,
 - date of birth,
 - out-of-province health care number,
 - out-of-province address and phone number,
 - positive laboratory report, and
 - other relevant clinical/ epidemiological information.

Epidemiology

Etiology

Pertussis (whooping cough) is caused by *Bordetella pertussis*, a small, gram-negative *coccobacillus*.⁽¹⁾

Clinical Presentation

Pertussis typically occurs in three stages. The initial **catarrhal stage** is characterized by cold-like symptoms with an insidious onset of coryza (runny nose), sneezing, absent or low-grade fever, and a mild occasional cough that gradually worsens. After one to two weeks, the second, **paroxysmal stage**, begins with powerful prolonged coughing spasms (paroxysms) followed by an inspiratory whoop or post-cough vomiting or both. This stage may last four to six weeks but may persist for up to 10 weeks. In the final, **convalescent stage**, coughing gradually wanes over weeks to months.⁽¹⁻³⁾

The clinical presentation of pertussis may vary according to the person's age, early use of antibiotics, respiratory co-infections and previous immunization against pertussis.⁽³⁾ Adults, adolescents or children may have atypical symptoms or experience milder disease if they have been immunized with pertussis vaccine.⁽⁴⁾

Pertussis is most severe when it occurs in infants less than 6 months of age, particularly those who are unimmunized or partially immunized. Infants often present with a shorter catarrhal stage and are less likely to have the inspiratory "whoop". They can also have gagging, apnea and gasping in the early stages of the illness.^(1,3) Complications in this age group can include pneumonia, seizures, encephalopathy and death. Adults and adolescents can experience complications such as syncope, sleep disturbances, incontinence, rib fractures and pneumonia.⁽³⁾

Diagnosis

The nasopharyngeal swab is tested using a polymerase chain reaction (PCR) assay, which allows timely detection of *B. pertussis*.⁽⁴⁾ PCR has optimal sensitivity during the first three weeks of cough when bacterial DNA is present in the nasopharynx. After the fourth week of cough, the amount of bacterial DNA rapidly diminishes which increases the risk of obtaining false-negative results.⁽⁵⁾ Pertussis cultures are no longer routinely performed unless specifically requested in consultation with the microbiologist/virologist-on-call.⁽⁴⁾

Treatment

- Pregnant women with pertussis in their third trimester of pregnancy are important sources of pertussis infection in newborn infants. Treatment options for pregnant cases should be managed by the attending physician.
- Recommended medications for treatment are outlined in [Appendix 1](#).
- Alberta Health will provide publicly funded medications for the treatment of confirmed cases of pertussis.
- Complete and fax the *Alberta Health Post Exposure Prophylaxis (PEP) form*.
- Ensure that the case has received appropriate antimicrobial treatment as soon as possible after the onset of illness.
 - Early treatment is important for decreasing infectivity and lessening the duration and severity of symptoms.
 - There is no limit as to when to start antibiotic treatment of untreated symptomatic cases of pertussis.^(5,6)
 - Treatment eradicates *B. pertussis* from the nasopharynx but has no effect on the clinical symptoms or course of pertussis unless given in the early stages of infection (catarrhal stage).⁽⁶⁾

Reservoir

Humans.⁽²⁾

Transmission

Pertussis is highly communicable and is transmitted person-to-person via aerosolized droplets produced from a cough or a sneeze, or by direct contact with respiratory secretions or saliva of an infected person.⁽⁷⁾ The secondary attack rate of pertussis among susceptible household contacts is 80%.

Incubation Period

The incubation period is usually seven to 10 days with a range of five to 21 days.^(1,3)

Period of Communicability

Pertussis is most infectious during the initial catarrhal stage and in the first two weeks after the onset of any cough (i.e., approximately 21 days).^(8,9) Communicability gradually decreases thereafter and becomes negligible.⁽²⁾ The length of communicability may be affected by factors such as age, immunization status, history of previous pertussis infection, and when appropriate antimicrobial therapy was initiated.⁽³⁾

Host Susceptibility

Susceptibility is general. Natural infection or immunization does not confer lifelong immunity⁽¹⁾ The estimated efficacy of pertussis vaccine is approximately 80 to 85% after three doses.⁽⁵⁾ Research has shown that there is waning of vaccine immunity over the next five years after the fifth dose of DTaP has been given. Therefore, adolescents and adults who have not received a booster dose are at risk of infection and are important sources of pertussis for infants and young children.^(1,3)

Incidence

Whole-cell pertussis vaccine was introduced in Alberta in 1939 and was replaced by acellular pertussis in 1997. In 2004, acellular vaccine was added to the routine grade nine program in Alberta.⁽⁶⁾ There has been a steady decrease in reported pertussis cases since acellular vaccine was introduced; however, outbreaks of pertussis remain common and continue to occur in two to five year cycles.⁽³⁾ Annual case counts can be accessed through the Alberta Health's Interactive Health Data Application (IHDA) at www.ahw.gov.ab.ca/IHDA_Retrieval/.

Public Health Management

Key Investigation

- Confirm the diagnosis and that individual meets case definition.
- Ensure appropriate clinical specimen(s) have been collected in appropriate media.
- Obtain history of illness including date of onset of signs and symptoms.
- Determine pertussis-specific immunization history:
 - number of doses,
 - date administered,
 - where the person was immunized (e.g., out of country),
 - type of immunization provider (e.g., public health, doctor's office, travel clinic),
 - if not immunized, determine reason why.
- Determine possible source of infection:
 - identify recent travel history or contact with a recent traveler,
 - recent contact with a known pertussis case or a person with pertussis-like illness,
 - assess if other members in the household have similar symptoms or if there has been any contact with a known pertussis case/person with pertussis-like illness.
- Determine the period of communicability, which is during the catarrhal stage and in the first two weeks after onset of paroxysmal cough (i.e., approximately 21 days).
- Determine possible transmission settings (e.g., school, childcare, healthcare setting).
- Identify contacts that may have had **significant exposure** to the case during the period of communicability.
- **Significant exposure** is defined as:
 - living in the same household as the case;
 - sharing the same confined space for a prolonged period of time (i.e., \geq one hour); and/or
 - direct contact with nasal or respiratory secretions of the infected person⁽¹⁰⁾.
- Determine which of the identified contacts would be considered **vulnerable** (i.e., infants less than one year of age, regardless of immunization status; pregnant women in the third trimester).

Management of a Case

- Provide information about disease transmission and measures to minimize transmission, including practicing proper hand hygiene and respiratory etiquette.
- Droplet precautions apply for hospitalized cases until no longer considered infectious.
- 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,
and
 - negative results from PCR testing have been received.

Management of Contacts

- Determine the type of exposure the contact had with the case and the setting, and the time since last exposure.
- 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 [Alberta Immunization Policy \(AIP\)](#).

- Determine if contacts should be offered post-exposure prophylaxis (PEP). Refer to Post Exposure Prophylaxis section below for more information.
- Provide information about pertussis disease including signs and symptoms. This includes notification of contacts at school, workplace etc. that are not eligible for PEP.
- 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 notify public health if they develop symptoms.

Post Exposure Prophylaxis (PEP) for Contacts

- PEP is provided to prevent the development of disease in individuals at increased risk of severe disease (if given early in the incubation period) and to limit secondary transmission to **vulnerable persons**.
- PEP is most effective if given early as it is unlikely to be of benefit if given 21 days after last exposure.⁽⁶⁾
- PEP should be offered to the following who have had **significant exposure** to a pertussis case:
 - A **vulnerable person** (i.e., infants less than one year of age status and/or pregnant women in the third trimester regardless of immunization);
 - ALL household contacts, regardless if vulnerable persons are in the household.
- Under MOH direction, PEP may be offered to contacts (with significant exposure) who will have contact with a **vulnerable person** (e.g., healthcare worker who works in pediatrics, NICU/PICU, or daycare worker who takes care of children less than one year of age).
- The management of pregnant contacts must be individualized and should be discussed with the MOH (or designate) or the contact's physician.
- Infants born to mothers who have had confirmed pertussis in the two to three weeks prior to delivery have an extremely high risk of disease. Chemoprophylaxis for the newborn should be reviewed by the MOH (or designate) and attending physician.
- Recommended medications for PEP are outlined in [Appendix 1](#).
- Alberta Health will provide publically funded medications for PEP to eligible contacts of confirmed and probable cases (regardless of their immunization status).
- Complete and fax the *Alberta Health Post Exposure Prophylaxis form*.
- **NOTE:** A broader use of PEP may be appropriate when there are a small number of cases and when there is NO ongoing community wide transmission/outbreak. During ongoing community wide transmission of pertussis, multiple rounds of antibiotics are not recommended. Contacts should be monitored for onset of signs and symptoms of pertussis for 21 days, rather than repeating a course of antibiotics.⁽⁵⁾

Management of Outbreaks

- A pertussis outbreak may be declared if there is evidence of epidemiologically linked transmission of pertussis:
 - between two or more individuals from different households that attend a community facility (i.e., schools, day homes, community events, churches etc.); **OR**
 - between three or more households, regardless of the number of individuals involved.
- The *Alberta Outbreak Reporting Form (AORF)* **must** be completed and sent to Alberta Health when an outbreak is declared as described above.
- **NOTE:** Acellular pertussis vaccine has been used for the control of pertussis outbreaks in defined populations, such as in schools or hospitals, although data supporting its effectiveness are lacking. Children exposed to a case of pertussis should have their immunization status reviewed and updated as required.⁽⁷⁾

Preventative Measures

- Promote routine immunization against pertussis including offering dTap to pregnant women in every pregnancy. Refer to the [AIP](#) for current recommendations.
- Educate the public about the risks of pertussis infection.
- Educate the public about respiratory etiquette and hand hygiene.

Appendix 1: Recommended Antibiotics for Treatment and PEP

Antibiotic	Dosage	Comments
Azithromycin	<p>Infants < 6 months: 10 mg/kg/day as a single dose orally daily for 5 days</p> <p>Infants ≥ 6 months to Children < 12 years: Day 1: 10 mg/kg/day as a single dose orally (maximum 500 mg/day) Day 2–5: 5 mg/kg/day as a single dose orally (maximum 250 mg/day)</p> <p>Children ≥ 12 years and adults: Day 1: 500 mg/day as a single dose orally Day 2-5: 250 mg/day as a single dose orally</p>	First Line
Clarithromycin	<p>Infant ≥ 1 month to Children < 12 years: 15 mg/kg/day in 2 divided doses orally for 7 days (maximum 1g/day)</p> <p>Children ≥ 12 years and adults: 500 mg BID orally/day for 7 days</p>	Second Line Not recommended for infants aged <1 month and in pregnancy
Erythromycin	<p>Adults: 2000 mg/day divided into 4 doses orally for 7 days</p>	Third Line For adult use ONLY. * <i>Erythromycin estolate (liquid/oral suspension) for pediatric population is not available in Canada as of spring 2017</i>
Trimethoprim-Sulfamethoxazole (TMP-SMX)	<p>Infants ≥ 2 months to Children <12 years: 8 mg/kg/day (TMP) and 40 mg/kg/day (SMX) divided into 2 doses orally for 14 days</p> <p>Children ≥ 12 years and adults: 320 mg/day (TMP) and 1600 mg/day (SMX) divided into 2 doses orally for 14 days</p>	Alternate – used only if above drugs are contraindicated. Cannot be used for children under the age of 2 months, in pregnancy or during lactation

Appendix 2: Revision History

Revision Date	Document Section	Description of Revision
2021/09/07	General	<ul style="list-style-type: none">• Updated Template• Diagnosis and Treatment section moved to Epidemiology• Updated web links

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