Pertussis
(Whooping Cough)

CHAPTER CONTENT

The following chapter is adapted with permission from Alberta Health, for additional guidance related to the management of pertussis see: Alberta Public Health Disease Management Guidelines: Pertussis.

1. CASE DEFINITION

Confirmed Case

Laboratory confirmation of infection:

- Isolation of *Bordetella pertussis* from an appropriate clinical specimen (e.g., nasopharyngeal swab).
  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 with inspiratory "whoop".
- Cough ending in vomiting or gagging, or associated with apnea, and/or

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.

2. DIAGNOSIS

- Diagnosis of pertussis is made through PCR testing of the organism from posterior NP specimens obtained during the catarrhal and early paroxysmal stages of illness. Bronchoscopy specimens are also acceptable.
- The organism can be recovered from the case during the first 3-4 weeks of illness but is more difficult to isolate and confirm in those that were previously immunized.
- Negative cultures do not necessarily exclude pertussis as the cause of disease.
- NP cultures should be collected and placed in Regan-Lowe transport medium and **not** a viral swab.
- For more information, refer to the Alberta Provincial Laboratory Guide to Services.

3. REPORTING

All HCPs must follow the NWT *Public Health Act*. Measures for contact tracing and legislative requirements are laid out within the *Reportable Disease Control Regulations* and reporting timelines are found in the *Disease Surveillance Regulations*.

Note: the only acceptable methods of reporting to the OCPHO are outlined below. Information provided outside of these methods will not be considered reported unless otherwise stated by a CPHO delegate.

Health Care Professionals

For **Part 2** written report within 24 hours

- Confirmed or probable cases are to be reported to the Office of the Chief Public Health Officer (OCPHO) within **24 hours** after diagnosis is made or opinion is formed by completing and faxing (867) 873-0442 or SFT (CDCU@gov.nt.ca) the Pertussis Investigation Form and Pertussis Contact List to the OCPHO.
- **Immediately** report all outbreaks or suspect outbreaks by telephone to the OCPHO.

Laboratories

- Report all positive results to the OCPHO by fax (867) 873-0442 within **24 hours.**

4. OVERVIEW

Causative Agent

Bordetella pertussis, an aerobic gram-negative rod bacterium.

Clinical Presentation

Pertussis typically occurs in three stages:

1. **Initial catarrhal stage**: 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.
2. **Paroxysmal stage**: Occurring after one to two weeks, the paroxysmal stage begins with powerful prolonged coughing spasms (paroxysms) followed by an inspiratory whoop or post-cough vomiting, gagging or apnea. Individuals may appear well between paroxysms. This stage may last four to six weeks but may persist for up to ten weeks.
3. **Convalescent stage**: In the final stage, coughing gradually wanes over weeks to months. Paroxysms may recur with subsequent respiratory infections for many months after onset of pertussis.

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. Adults, adolescents, or children may have atypical symptoms or experience milder disease if they have been immunized with pertussis vaccine.

Pertussis is most severe when it occurs in infants less than six 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.

Major Complications

Complications in infants can include pneumonia, seizures, encephalopathy, and death.

Adults and adolescents can experience complications such as syncope, sleep disturbances, incontinence, rib fractures and pneumonia. Pulmonary complications and secondary bacterial pneumonia are the most common cause of death.

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.
- The secondary attack rate of pertussis among susceptible household contacts is 80%.
- A person can transmit infection from seven days following exposure to three weeks (21 days) after the onset of coughing episodes if untreated.
- Patients are no longer contagious after five days of treatment with an effective antibiotic, please see Bugs and Drugs for additional guidance.

Incubation Period

The incubation period for pertussis is usually 7-10 days with a range of 5-21 days.

Clinical Guidance

- For patient-specific clinical management consult your local healthcare professional, paediatrician, or infectious disease specialist.
- Also see: Alberta Public Health Disease Management Guidelines: Pertussis Appendix 1: Recommended Antibiotics for Treatment and PEP.

5. PUBLIC HEALTH MEASURES

Key Investigation

- Confirm the diagnosis and that the 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 (i.e., ≥ one hour)
      AND/OR
    - Direct contact with nasal or respiratory secretions of the infected person.
- 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 Cases

- 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.
- Refer to the facility's infection, prevention, and control policies for further information.
- The OCPHO 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 NWT Immunization Schedule.
- 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.
- 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) **AND**
    - **ALL** household contacts, regardless of if vulnerable persons are in the household.
- Under the OCPHO 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 reviewed by the CPHO (or designate) and attending 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 CPHO (or designate) and attending physician.
- Recommended medications for PEP are available at Alberta Public Health Disease Management Guidelines: Pertussis Appendix 1: Recommended Antibiotics for Treatment and PEP and Bugs and Drugs: Pertussis (Whooping Cough) Prophylaxis.

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.

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.

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.

Prevention

- Promote routine immunization against pertussis, including offering dTap to pregnant women in every pregnancy.
- Educate the public about the risks of pertussis infection.
- Educate the public about respiratory etiquette and hand hygiene.

6. PUBLIC & HEALTH PROFESSIONAL EDUCATION

For more information about pertussis:

- Bugs and Drugs: Pertussis (Whooping Cough)
- Centers for Disease Control and Prevention: CDC/Pertussis
- Government of Alberta: Alberta Public Health Disease Management Guidelines: Pertussis
- Government of British Columbia: BC Centre for Disease Control/Whooping Cough/Pertussis
- Government of Canada: Canada/Pertussis (whooping cough)
- Government of Canada: Canadian Immunization Guide: Part 4 Immunizing Agents: Pertussis (whooping cough) vaccines.
- Government of Canada: Health Canada/National Consensus Conference on Pertussis.
- Government of the Northwest Territories: NWT Immunization Schedule
- Government du Nunavut: La coqueluche fiche d'information
- Government of Nunavut: Pertussis Fact Sheet.
- Prov Lab: ProvLab Guide to Services
- World Health Organization: WHO/ Pertussis

7. EPIDEMIOLOGY

- For more information on the epidemiology of Pertussis in the Northwest Territories (NWT) see: Epidemiological Summary of Communicable Diseases HSS Professionals

8. REFERENCES

Government of Alberta: Alberta Public Health Disease Management Guidelines: Pertussis

Government of Canada: Health Canada/National Consensus Conference on Pertussis.