



Pertussis (whooping cough)

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1. CASE DEFINITION

Confirmed Case

- Laboratory
 - › Isolation of *Bordetella pertussis* (*B. pertussis*) from an appropriate clinical specimen (e.g., nasopharyngeal swab [NP]) **OR**
 - › Detection of *B. pertussis* DNA (e.g., polymerase chain reaction [PCR]) from an appropriate clinical specimen (e.g., NP swab) **AND** one or more of the following:
 - » cough lasting 2 weeks or longer
 - » paroxysmal cough of any duration
 - » cough with inspiratory “whoop”
 - » cough ending in vomiting or gagging, or associated with apnea
- Epidemiologic
 - › 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

Probable Case (outbreaks only)

- › In the absence of a more likely diagnosis; 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:
 - » paroxysmal cough of any duration
 - » cough with inspiratory “whoop”
 - » cough ending in vomiting or gagging, or associated with apnea

Suspect Case

- › One or more of the following, with no other known cause:
 - » paroxysmal cough of any duration
 - » cough with inspiratory “whoop”
 - » 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; technique is important
- For more information, refer to the [Alberta Provincial Laboratory Guide to Services](#)

3. REPORTING

As set out in the [NWT Public Health Act, Reportable Disease Control Regulations \(Section 4\) and Disease Surveillance Regulations \(Sections 6-10 and Schedule 3\)](#) health care professionals and laboratories are legally required to report a diagnosis or formed opinion of a reportable disease to the Chief Public Health Officer (CPHO) or designate **within the timeframe identified in the regulations.**

Health Care Professionals

- Confirmed, probable **AND/OR** suspect cases are to be reported to the Office of the Chief Public Health Officer (OCPHO) by telephone (867) 920-8646 within **24 hours** after diagnosis is made or opinion is formed, **AND**
- Complete and fax (867) 873-0442 the [Pertussis Investigation Form](#) to the OCPHO within **24 hours**
- **Immediately** report all outbreaks or suspect outbreaks by telephone (867) 920-8646 to the OCPHO

Laboratories

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

4. OVERVIEW

For more information about pertussis:

- The Government of Canada: [Canada/Pertussis](#)
- Centers for Disease Control and Prevention: [CDC/Pertussis](#)
- World Health Organization: [WHO/Pertussis](#)

Causative Agent

- *Bordetella pertussis*, an aerobic gram-negative rod bacterium

Clinical Presentation

- Severity of disease is greatest among young infants
- Older children, adults and those who are partially or have waning immunization may have symptoms with an atypical, but

persistent cough; however, they can still transmit disease

- The disease is divided into three stages:
 1. Catarrhal Stage:
 - » The first stage begins about 7-10 days after infection
 - » Runny nose, low-grade fever and mild occasional cough similar to a cold
 2. Paroxysmal Stage:
 - » Second stage begins about 10-14 days after infection and lasts 1-6 weeks but may persist up to 10 weeks
 - » Coughing frequency and severity and paroxysms increase rapidly
 - » Paroxysms are characterized by repeated violent coughs
 - » Each series of paroxysms have many coughs without inhalation causing a crowing or high-pitched inspiratory whoop at the end
 - » Patient may become cyanotic
 - » Paroxysms frequently end with expulsion of clear, thick mucus often followed by vomiting
 - » Paroxysms occur more at night
 - » Individuals may appear well between paroxysms
 - » Individuals with partial or waning immunity may experience less severe symptoms
 3. Convalescent Stage:
 - » Third stage symptoms gradually wane over weeks to months
 - » Paroxysms may recur with subsequent respiratory infections for many months after onset of pertussis

Major Complications

- Major complications include: otitis media, anorexia, dehydration, pulmonary hypertension, pneumonia, atelectasis, seizures, encephalopathy, weight loss, hernias or death

- Seizures and encephalopathy may occur as a result of hypoxia from coughing or from the toxin
- Pulmonary complications and secondary bacterial pneumonia are the most common cause of death
- Most severe disease and deaths occur in infants younger than 6 months, often in those too young to have completed the primary immunization series

Transmission

- Discharges from the nose and throat of infected individuals and through the airborne route via large droplets
- Indirect spread through contaminated objects rarely occurs
- Pertussis is highly communicable and individuals are most infectious during the early catarrhal stage and during the first 2 weeks after onset of paroxysmal cough
- Studies show an 80% secondary attack rate among susceptible household contacts
- A person can transmit infection from 7 days following exposure to 3 weeks after the onset of coughing episodes if untreated
- Patients are no longer contagious after 5 days of treatment with an effective antibiotic (see Alberta Health Services online resource, [Bugs & Drugs](#))

Incubation Period

- 6-20 days, usually 7-10 days

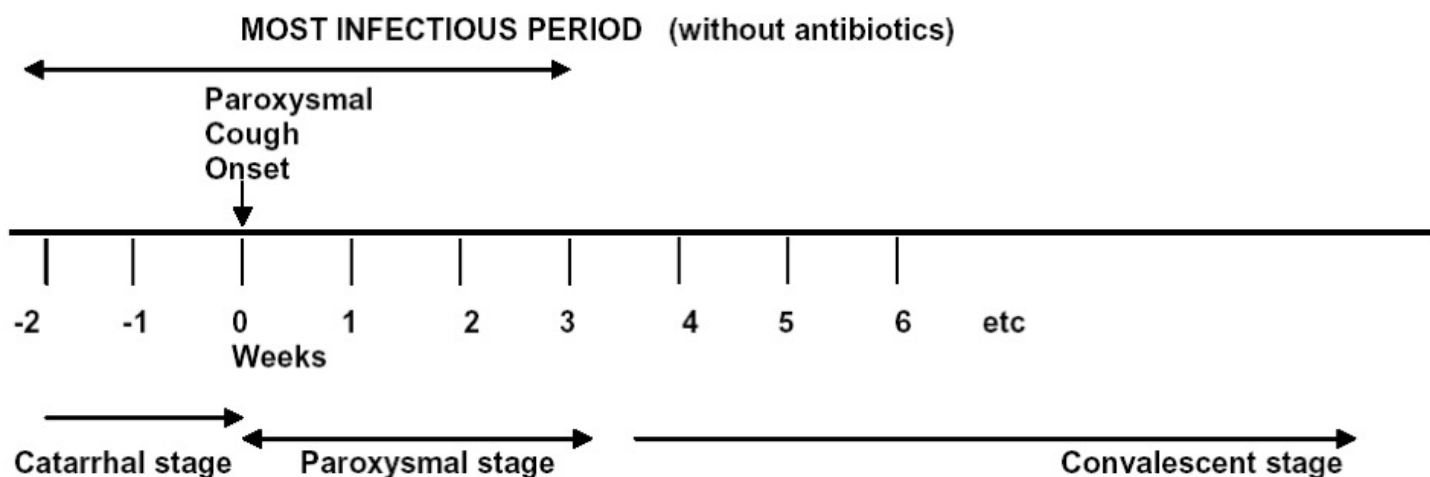
Clinical Guidance

- For patient-specific clinical management consult your local healthcare professional, paediatrician or infectious disease specialist

5. PUBLIC HEALTH MEASURES

Investigation of confirmed case of pertussis

- Determine immunization history of case and contacts
- Identify the possible source of infection
- Determine period of communicability using chart above for guidance; A person can transmit infection from 7 days following exposure (2 weeks prior to the onset of cough) to 3 weeks after the onset of coughing episodes if untreated
- Identify contacts:
 - All household contacts
 - All vulnerable/high-risk* contacts who:
 - » Have had face to face exposure **AND/OR**
 - » Have shared confined air with the confirmed case for more than one hour, **OR**
 - » Have other significant exposure decided upon on a case by case basis
 - Those who reside in households or working in or attending daycare centers and family day homes in which a vulnerable/high-risk* person also lives or attends on a regular basis



Management of Cases

- Exclusion of case from work, school, day care, etc., is at the discretion of the CPHO and is for the following time period:
 - Until 5 days after the start of effective antibiotic therapy
 - If no treatment is given then exclude until 21 days from onset of paroxysmal cough or until the end of the cough whichever comes first and with negative results from culture or PCR
- Hospitalized cases should be on routine and droplet precautions until the case has been on effective antimicrobial therapy for 5 days or until 3 weeks after the onset of paroxysms if appropriate antimicrobial therapy is not given
- Place hospitalized case on airborne isolation during aerosolizing procedures (e.g., while collecting NP swab)
- For hospitalized cases follow information in the [NWT Infection, Prevention and Control Manual](#), and notify the hospital's infection, prevention and control practitioner

Management of Contacts

- The primary objective of post-exposure chemoprophylaxis (PEP)** should be to prevent death and serious complications from pertussis in vulnerable/high-risk* individuals
- PEP** should only be offered after consultation with the OCPHO
- If PEP** is advised, it is offered to all eligible contacts, regardless of immunization status, as soon as possible and within 21 days of onset of cough in the index case
- There is no data to indicate that widespread use of PEP** among all possible contacts effectively controls or limits scope of pertussis outbreaks
- All contacts should be advised of and monitored for signs and symptoms of pertussis for up to 21 days post contact of active case or until they have completed effective antimicrobial therapy

- Household symptomatic contacts should be tested (NP culture) for pertussis and advised to self-isolate until the test result comes back; OCPHO may recommend starting PEP** prior to results of test being available, on a case by case basis
- Non-household symptomatic contacts should be tested and advised to self-isolate until the test result comes back; chemoprophylaxis/treatment and continued public health follow-up may be offered once the test result confirms diagnosis
- Inadequately immunized household contacts younger than 7 years, upon recommendation of the OCPHO, may be excluded from schools, day care centers and public gatherings for 21 days after last exposure or until the case and contacts have received 5 days of appropriate antibiotics

*High-risk/vulnerable persons include:

- Those who personally are at high-risk of developing severe illness from pertussis include:
 - Infants less than one year of age regardless of immunization status (due to increased mortality from pertussis in this age group)
 - Pregnant women in the third trimester (due to the risk of disease transmission from infected mother to neonate upon birth)
- Those with pre-existing health conditions that may be exacerbated by pertussis infection (including immunocompromised people, and those with moderate to severe medically treated asthma)

**Post-exposure chemoprophylaxis (PEP)

- Upon recommendation of the CPHO or designate, offer PEP to the following contacts within 21 days of onset of cough in the index case:
 - All household contacts
 - All vulnerable/high-risk* contacts
 - Those who reside in households or working in or attending daycare centers and family day homes in which a vulnerable/high-risk* person also lives or attends on a regular basis

- For additional information on PEP recommendations see: [Bugs & Drugs](#)
- If PEP is offered to those in a closed setting (i.e., household, day care or child care setting) then it would be prudent to start everyone on the same day rather than repeating courses of antibiotics

Immunization of contacts and/or during an outbreak

- Assess all contacts' immunization status and bring up to date according to the [NWT immunization schedule](#)
- Active immunization following recent exposure is not effective against current infection but should be undertaken to protect contacts against further exposure in case he or she was not infected during this exposure
- While vaccination is not an effective tool in outbreak management, every opportunity to update immunizations to prevent future disease is recommended
- Prioritize immunization campaigns to the following groups in this recommended order:
 - Household members of those < 8 weeks old, **AND**
 - Pregnant women in their third trimester
 - Those 12 months or less of age who are behind in their vaccine schedule or who are partially immunized
 - Pre-school boosters
 - Adolescent boosters
 - Offer adult boosters to those who are due for vaccination as they present to the clinic

Prevention

- Pertussis is a vaccine preventable disease
- Vaccine for pertussis is publicly funded in the NWT and offered according to the [NWT Immunization Schedule](#)
- Primary vaccination occurs in infancy and early childhood
- Booster doses of vaccine are recommended in adolescence, and as an adult every 10 years

- Since April 1 2018, a booster dose is recommended each pregnancy between 26-32 weeks gestation regardless of when the last dose was given
- Vaccination is approximately 80-85% effective after the primary series of acellular pertussis vaccine
- For more information on pertussis vaccination follow guidance in the [Canadian Immunization Guide-Pertussis](#)
- Public education should focus around risks of pertussis infection especially to those 12 months or younger, respiratory/cough etiquette, staying home when ill, ensuring vaccines are up to date

6. PATIENT & HEALTH CARE PROFESSIONAL EDUCATION

- Government of Canada: [Canada/Pertussis](#)
- Government of the NWT: [GNWT/Pertussis](#)
- Government of the NWT: [GNWT/Immunization](#)
- Immunize Canada: [Immunize/Canada](#)

7. EPIDEMIOLOGY

- For more information on the epidemiology of pertussis in the NWT see: [Epidemiological Summary of Communicable Diseases](#)

8. REFERENCES

1. Alberta Health Public Health Notifiable Disease Management Guidelines Pertussis: <https://www.alberta.ca/notifiable-disease-guidelines.aspx>
2. Alberta Health Services Bugs and Drugs: <http://www.bugsanddrugs.org/>
3. Alberta Provincial Laboratory Guide to Services: <https://www.albertahealthservices.ca/lab/page3317.aspx>
4. Canadian Immunization Guide on Pertussis: <https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-15-pertussis-vaccine.html>

5. Centers for Disease Control and Prevention: <https://www.cdc.gov/pertussis/>
6. Government of Canada: <https://www.canada.ca/en/public-health/services/immunization/vaccine-preventable-diseases/pertussis-whooping-cough.html>
7. Immunize Canada: <https://immunize.ca/>
8. Manitoba Communicable Disease Management Protocol Pertussis: <https://www.gov.mb.ca/health/publichealth/cdc/protocol/pertussis.pdf>
9. NWT Communicable Disease Forms: <https://www.hss.gov.nt.ca/professionals/tools/forms/communicable-disease>
10. NWT Immunization Schedule: <https://www.hss.gov.nt.ca/professionals/content/nwt-immunization-schedule>
11. NWT Infection Prevention and Control Manual: <https://www.hss.gov.nt.ca/professionals/sites/default/files/infection-control-manual.pdf>
12. NWT Pertussis: <https://www.hss.gov.nt.ca/en/services/pertussis-whooping-cough>
13. *NWT Public Health Act*: <https://www.hss.gov.nt.ca/en/about/legislation-and-policies>
14. World Health Organization: <http://www.who.int/immunization/diseases/pertussis/en/>