PERTUSSIS

Disease Overview

Pertussis (commonly called whooping cough) is caused by *Bordetella pertussis* a gram-negative bacterium found worldwide. Pertussis is vaccine preventable. The disease interferes with the normal transfer of mucus from the airways to the mouth, leading to attacks of coughing.

Symptoms

The disease is divided into three stages, the catarrhal, paroxysmal and convalescent stage.

The first stage, the catarrhal stage, begins about 7 to 10 days after exposure to the infectious agent (i.e. infection) and is characterized by runny nose, low-grade fever and a mild occasional cough similar to the common cold. This stage typically lasts 1 or 2 weeks.

The second stage, the paroxysmal stage, occurs 10 to 14 days after infection. The frequency and severity of coughing with paroxysm increases rapidly. 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 patient may become cyanotic. Paroxysms frequently end with the expulsion of clear, tenacious mucus, often followed by vomiting. Paroxysms may be more frequent at night and may be precipitated by external stimuli such as noises, cold air, eating, drinking, crying and laughing. The paroxysmal stage usually lasts 1 to 6 weeks but may persist up to 10 weeks.

The third stage, the convalescent stage, there is a gradual recovery with cough becoming less paroxysmal and disappearing in 2 or 3 weeks.

Please note that not all cases with pertussis disease present with all of the above symptoms.

Reservoir

Humans.

Mode of Transmission

Transmission occurs by direct contact with discharges from respiratory droplets of infected persons.

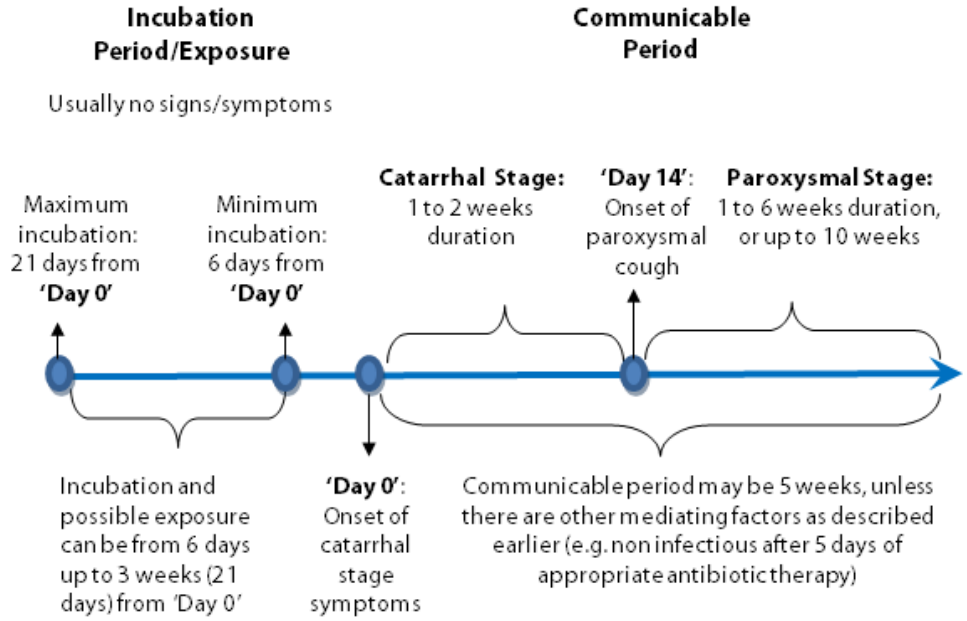
Incubation Period

Commonly between 7-10 days with a range of 6 up to 21 days.

Period of Communicability

Individuals are most infectious during the early catarrhal stage and in the first 2 weeks after onset of paroxysmal cough. Communicability gradually decreases thereafter and becomes negligible about 3 weeks after onset of paroxysmal cough. The length of communicability may be affected by age, immunization status or previous episode of pertussis and antimicrobial therapy. Infected individuals are no longer contagious after 5 days of appropriate antimicrobial therapy.

Typical Pertussis Clinical Presentation



Risk Factors

Increased risk of acquiring illness and severe illness:

- Infants appear to be most susceptible, however cases occur in all age groups. Neither vaccination nor natural disease confers lifelong protection; immunity wanes after five to 10 years.
- Unvaccinated or incompletely vaccinated infants aged < 12 months have the highest risk for severe and life-threatening complications.

Surveillance Case Definition

Confirmed case

Laboratory confirmation of infection:

- Isolation of *Bordetella pertussis* from an appropriate clinical specimen.

OR

- Detection of *B. pertussis* DNA from an appropriate clinical specimen.

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

OR

- 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

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.

Diagnosis and Laboratory Guidelines

Testing for pertussis is done on a nasopharyngeal specimen. The most common test for pertussis diagnosis is PCR testing. It detects bacterial DNA in a clinical specimen. Specimen for PCR can be collected in the first 3-4 weeks of illness. Pertussis can also be detected in microbial culture. Specimen for microbial culture should be collected in the first 1-2 weeks of illness. Bacterial culture is more sensitive than PCR and specimen destined for bacterial culture should be stored with special care and shipped quickly.

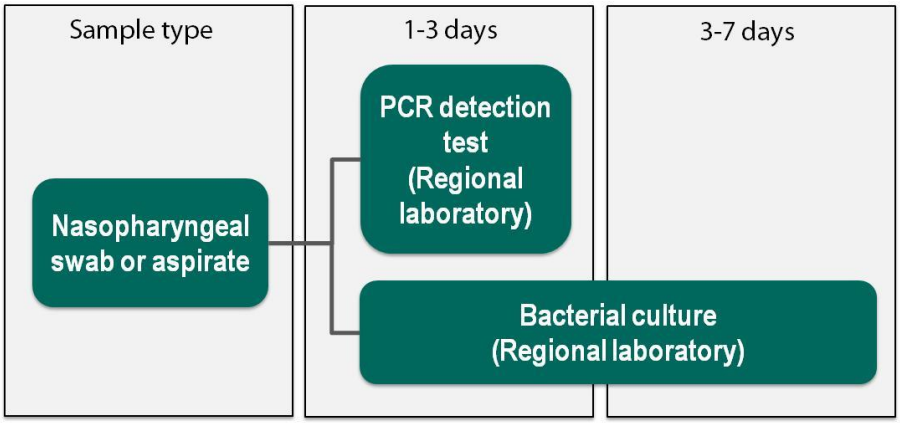
A positive PCR test result does not confirm a diagnosis by itself, and a negative PCR or culture does not exclude a pertussis diagnosis. All laboratory results should be considered with epidemiological data before confirming a case. Recently vaccinated individuals can cause false-positive in both culture and PCR and you should contact your regional laboratory before collecting specimen on persons with a recent history of pertussis vaccination.

The Moncton City Hospital regional laboratory and GDL perform Real-Time PCR testing for *B. pertussis*.

Contact your laboratory for specifics on testing, specimen collection, handling and shipping.

Laboratory Testing

An overview of testing timelines for samples after the sample has been received by the laboratory. Turnaround times are averages and may change depending on the urgency of the situation.



Reporting

Per Policy 2.2 Disease and Event Notification to OCMOH and Disease and Event Reporting section.

- Routine Surveillance (RDSS) for all confirmed cases.

Case Management

Education

The case or relevant caregiver should be informed about:

- The nature of the infection, the length of the communicable period, and the mode of transmission.
- Hand washing.
- Respiratory disease precautions.
- Cough/sneeze etiquette.

Investigation

Management of cases should start as soon as a probable, suspect or confirmed case of pertussis is reported to Public Health. Initiation of control measures for cases under investigation (person has infection or person suspected to have infection) must not wait for laboratory confirmation of the case.

Exclusion/ Social Distancing

Self isolation. Cases under investigation (person has infection or person suspected to have infection) should avoid close contact with vulnerable individuals (infants under 1 year of age and pregnant women in 3rd trimester) until 5 days of antibiotic treatment have been completed. If no antibiotic treatment is taken avoid close contact with vulnerable individuals until 21 days from the onset of cough or until the end of cough, whichever occurs first.

Exclusion. Cases under investigation that are caregivers of high risk individuals (infants under 1 year of age and pregnant women in the last trimester of pregnancy) should be excluded until 5 days after start of antibiotic treatment. If no treatment is taken, the case under investigation should be excluded for 3 weeks from the onset of cough or until the end of cough, whichever occurs first.

Follow school exclusion guidelines. Regional Medical Officers of Health may exclude individuals with pertussis from high-risk settings (schools, daycares and hospitals) during outbreaks.

Treatment

Cases under investigation are advised to seek medical attention. Antibiotic treatment should be administered as soon as possible after onset of illness or clinical suspicion of pertussis to eradicate the organism and limit ongoing transmission. Treatment with antibiotics is recommended within 3 weeks of

the onset of cough; in infants less than 1 year of age treatment *may* be initiated within 6 weeks of cough onset. The effect of treatment on reducing symptoms is limited and sometimes even lacking.

Immunization

Pertussis cases are to be immunized after recovery and according to the Routine Immunization Schedule if the case is not up-to-date.

Contact Management

Education

The contact of a case (or relevant caregiver) should be informed about the nature of the infection and the mode of transmission. Public health advice would include the following: to practice good hand hygiene, avoid sharing drinking glasses or utensils and cover coughs and sneezes with a tissue or forearm.

Investigation

Identified contacts with symptoms should be considered as cases under investigation and case management protocols apply.

Upon identification of a (confirmed, probable or suspect) case, **determination of close contacts** should be made. Close contacts are those who:

- Had direct face-to-face exposure for five or more minutes with a symptomatic case during the infectious period.
- Shared a confined space in close proximity for a prolonged period of time, such as one hour or longer, with a symptomatic case during the infectious period.
- Had direct contact with respiratory, oral or nasal secretions from a symptomatic case during the infectious period such as kissing, being directly sneezed or coughed upon or sharing food or eating utensils during a meal.

Additional considerations:

- Proximity: close proximity can be considered in contacts in household, daycare, school and office settings.
- Severity of symptoms of the case; a violent cough may generate higher velocity of droplets.
- Infectious period of the case; Pertussis is highly communicable in the early catarrhal stage and at the beginning of the paroxysmal cough stage i.e. the first two weeks after onset of symptoms. Thereafter, communicability gradually decreases and becomes negligible by approximately three weeks after onset of cough but can be affected by age and treatment.

Exclusion/ Social Distancing

Social distancing of close contacts without symptoms of pertussis infection is not warranted.

Prophylaxis

Chemoprophylaxis:

Prophylaxis should be given to all household and other close contacts – regardless of immunization status and age – of confirmed or clinically diagnosed cases when there is a vulnerable person present. A vulnerable person is an infant less than 1 year of age (vaccinated or not) or a pregnant woman in her 3rd trimester.

Other individuals may also be considered as vulnerable persons at the discretion of the Medical Officer of Health and in consultation with physicians, such as:

- Persons with chronic respiratory, heart and neuromuscular conditions impairing respiration.

- Immunocompromised persons.
- Persons capable of transmitting the infection to others at risk of severe disease.

Prophylactic antibiotic therapy early in incubation period may prevent disease and stop infection among household members.

For pregnant woman in 3rd trimester, if chemoprophylaxis is not tolerated or not completed by the time of delivery, ensure appropriate chemoprophylaxis is given post delivery to both mother and newborn.

The regimen for chemoprophylaxis is the same as for treatment.

Recommended antimicrobial therapy for post-exposure chemoprophylaxis of pertussis[1]

DRUG	INFANTS < 6 months of age	INFANTS ≥ 6 months of age and CHILDREN	ADOLESCENTS > 12 years and ADULTS
Azithromycin	1-5 months: 10 mg/kg/day orally daily for 5 days <1 month of age: same as above and is the preferred choice for infants <1 month old	10 mg/kg/day orally on the first day (maximum 500 mg), 5 mg/kg once daily on days 2-5 (maximum 250 mg/day)	500 mg orally on the first day, 250 mg once daily on days 2-5
Clarithromycin Not recommended for use in pregnant women	1-5 months: 15 mg/kg/day orally divided into 2 doses/day for 7 days <1 month of age: not recommended	15 mg/kg/day orally divided into 2 doses/day for 7 days (maximum 1 g/day)	500 mg twice daily for 7 days
Erythromycin Estolate preparation preferred if available Estolate preparations are contraindicated in pregnancy and in patients with liver disease	1-5 months: 40mg/kg/day orally divided into 3 doses/day for 7 days <1 month of age: same as above, but should only be used as an alternate drug. Drug use is associated with elevated risk of IHPS (infantile hypertophicpyloric stenosis)	40mg/kg/day orally divided into 3 doses/day for 7 days (maximum 1 g/day)	1-2 g/day orally divided into 3-4 doses/day for 7 days

[1]Adopted and modified from Public Health Agency of Canada. National consensus conference on pertussis. *Canada Communicable Disease Report* 2003; Vol 29S3:1-39 and from Center for Disease Control and Prevention. Recommended antimicrobial agents for treatment and postexposure prophylaxis of pertussis: 2005 CDC guidelines. *MMWR Recommen Rep*. 2005;54(RR-14):1-16. Refer to the product monographs and/or the current version of the CPS for more information.

Trimethoprim-Sulfamethoxazole For those not able to tolerate macrolides or infected with macrolide resistant strain. Not recommended for use in pregnant or nursing women	contraindicated for use in children < 2 months of age; see children dose for infants ≥ 2 months of age	8 mg TMP/40 mg SMX/kg/day orally divided into 2 doses/day for 14 days (maximum 320mg TMP/1600mg SMX/ day)	320 mg TMP/1600 mg SMX per day orally divided into 2 doses/day for 14 days

Immunoprophylaxis:

Unimmunized/ partially immunized close contacts of a case are to be offered immunization according to the Routine Immunization Schedule. Adults with regular contact with infants under 12 months of age should receive one dose of pertussis containing vaccine as soon as possible if they have not already received a dose as an adult.

Outbreak Management

Activate the local outbreak plan when an outbreak is declared.

In communities where there is evidence of ongoing pertussis transmission or evidence of an outbreak of pertussis, the pertussis immunization schedule may be accelerated at the discretion of the Medical Officer of Health.

In outbreak situations parapertussis may be present. Parapertussis is not a reportable disease but may present with similar symptoms as pertussis. There is no vaccine available for parapertussis.