



Health and  
Wellness

# Prince Edward Island Guidelines for the Management and Control of Pertussis

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**Department of Health and Wellness**  
**Chief Public Health Office**



# Pertussis

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## 1. General Guidelines

The purpose of these guidelines is to provide information and guidance on the surveillance, management and control of pertussis in accordance with the Prince Edward Island Public Health Act (1), and Notifiable Diseases and Communicable Disease Regulations (2). Prompt identification of pertussis and reporting to public health facilitates appropriate investigation and follow-up aimed at preventing further spread of disease. Confirmed cases of pertussis are recorded in the CPHO Communicable Disease Database in order to monitor pertussis rates and determine the burden of illness in Prince Edward Island.

### Duty to Report

Physicians and nurse practitioners are required to report cases of pertussis to the Chief Public Health Office (CPHO) within 24 hours of case identification. The Provincial Microbiology Laboratory is required to report cases of pertussis to the CPHO as soon as a positive test is confirmed. The notification by the lab occurs on a 24/7 basis and therefore physicians and nurse practitioners need to be particularly diligent about reporting probable and suspect cases.

### Case Management

The CPHO refers all cases to Public Health Nursing (PHN), Health PEI, for follow-up which includes: contact tracing, counseling regarding testing and treatment, prevention of transmission, exclusion recommendations, appropriate immunization and referral to other services as required.

**Table 1** outlines the standard timeline for pertussis infection notification, referral and investigation.

<b>Table1: Standard Timeline for Pertussis Infection Notification, Referral and Investigation</b>			
<b>Notification to CPHO by the Provincial Microbiology Lab</b>	<b>Notification to the CPHO by Physician or Nurse Practitioner</b>	<b>CPHO Referral to PHN</b>	<b>PHN investigation and contact tracing</b>
On lab confirmation	Within 24 hours of clinical diagnosis (probable and suspect cases)	Within 24 hours of receipt of notification	Within 24 hours of referral by the CPHO or when practical based on availability of client

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## 1.1 Clinical Presentation (3; 4)

Pertussis is a respiratory infection caused by the bacterium *Bordetella pertussis* (*B. pertussis*). The disease interferes with the normal transfer of mucus from the airways to the mouth, leading to spasmodic coughing.

Pertussis may present in three stages:

- 1) **Catarrhal stage**; the first stage begins about 7 to 10 days after exposure to the infectious agent 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 cough will eventually become paroxysmal.
- 2) **Paroxysmal stage**; 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 may be followed by a crowing or high-pitched inspiratory whoop, thus the term “whooping cough”. 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.
- 3) **Convalescent stage**; in this stage recovery is gradual and protracted with the cough becoming less paroxysmal and disappearing within 2-6 weeks or longer. During the recovery period, superimposed viral respiratory symptoms can trigger a recurrence of paroxysms.

The clinical course of pertussis can vary depending on the age of the individual. Older children and adults can have atypical manifestations of pertussis with prolonged cough with or without paroxysms and no whoop. Infants may present with apnea. Apnea is defined as an unexplained episode of cessation of breathing for 20 seconds or longer, or a shorter respiratory pause associated with bradycardia, cyanosis, pallor, and/or marked hypotonia (low muscle tone).

The most common complication of pertussis, and the cause of most pertussis-related deaths, is secondary bacterial pneumonia. Unvaccinated or incompletely vaccinated infants aged <12 months have the highest risk for severe and life-threatening complications and death.

A typical pertussis illness lasts 6 to 12 weeks in total; treatment may shorten period of communicability, however symptoms may persist until the disease runs its course.

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## 1.2 Epidemiology (5)

### Reservoir

Humans are the only known reservoir for *B. pertussis*. Adolescents and adults are considered to play a major role in the transmission of pertussis to infants and children.

### Transmission

Transmission occurs by direct contact with respiratory secretions or large droplets from the respiratory tract of an infected person. Indirect contact spread occurs rarely if at all.

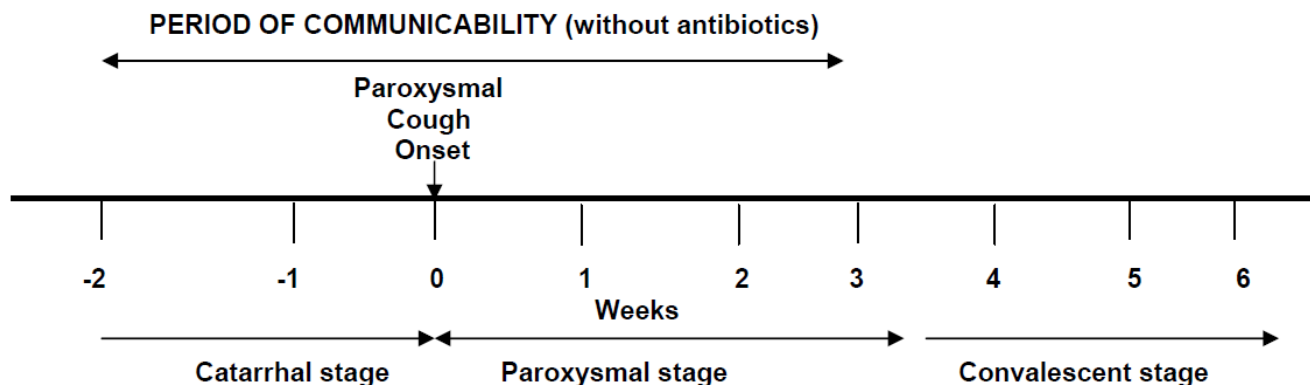
### Incubation period

The incubation period, or time interval between invasion by the infectious agent to the appearance of the first sign or symptom, is commonly between 7-10 days with a range of 6 up to 21 days.

### Period of communicability (also called infectious period)

Pertussis is highly communicable. 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 (21 days) 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.

Figure 1: Disease Timeline for Typical Pertussis Clinical Presentation



### Host susceptibility

Infants appear to be the most susceptible; however cases occur in all age groups. Recent evidence suggests that immunity from *B. pertussis* infection may not be permanent.

## 2. Diagnosis (6)

### **Specimen collection**

The best specimens for pertussis testing are nasopharyngeal (NP) swabs and nasopharyngeal aspirates. Swabs directed to Polymerase Chain Reaction (PCR) should be dry with a Rayon or Dacron tip. Submission of a PCR specimen using the wrong kind of swab or with a transport media could cause the specimen to be rejected by the laboratory. Information regarding supplies and submission instructions are available from Health PEI Laboratory.

Nasal pharyngeal aspirates may be collected in the Physician's office (supplies available from the lab) or arrangements made with the local hospital.

Specimens are sent from both the QEH and PCH labs to the IWK Children's Hospital for processing. A positive PCR result may take 2- 7days to be confirmed (A. Dowling, personal communication). The lab is responsible for reporting all results to the ordering physician and for reporting positive results to the CPHO according to Prince Edward Island's *Public Health Act*.

### **PCR (Polymerase Chain Reaction)**

The most common test for *B. pertussis* diagnosis is PCR testing which detects bacterial DNA in a clinical specimen. PCR testing is considered faster and more sensitive than microbial culture as it can detect non-viable bacteria. The PCR test is done on a nasopharyngeal aspirate. Early specimen collection (from the onset of cough) is recommended, however the PCR test can still be done during the first 3-4 weeks of illness.

### **Microbial culture**

The microbial culture is done on a nasopharyngeal swab specimen. The specimen for microbial culture should be collected in the first 1-2 weeks of illness.

## 3. Case Definitions (7)

### Confirmed Case

Laboratory confirmation of infection:

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

OR

- Detection of *B. pertussis* DNA (e.g., PCR) 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

- A person who is epidemiologically linked to a laboratory-confirmed case with one or more of the following symptoms for which there is no other known cause:
  - paroxysmal cough of any duration
  - cough with inspiratory “whoop”
  - cough ending in vomiting, 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, associated with apnea.

### Considerations

The following are considered when applying the case definitions: An epidemiological link can be established when a symptomatic, non-laboratory confirmed case has experienced one of the following during their exposure period:

1. Direct contact with a lab confirmed case; AND/OR
2. Presence in the same location (e.g. work, school, community activities, church) at or around the same time as the lab confirmed case.



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- The exposure period of the non-laboratory confirmed case will have to be considered along with the infectiousness of the laboratory confirmed case.
- The infectiousness of the laboratory confirmed case can be influenced by a number of factors including period of communicability, antibiotic uptake, treatment and age.
- Refer to Appendix 1 regarding Outbreak Management.

## 4. Disease Control Measures (4)

### Treatment of Cases

Antibiotics should be administered as soon as possible after onset of illness/suspicion of pertussis to reduce the infectious period and limit ongoing transmission.

Treatment and chemoprophylaxis is recommended for pregnant women in their third trimester at the time of diagnosis or contact with a case.

Pregnant women who are near the end of pregnancy and who have confirmed pertussis or who are close household contacts of confirmed cases of pertussis are a potential source of pertussis for newborns.

Infants less than 1 month of age are at increased risk of acquiring severe pertussis and life threatening complications from the disease.

If not treated, infants with pertussis remain culture positive with *B. Pertussis* for longer periods of time than older children or adults (up to 6 weeks).

Refer to Appendix 2 for treatment options.

### Identify Contacts

Identify individuals who had the following types of contact with the case during the period of communicability:

- Face to face contact for a period of more than 5 minutes.
- Sharing the same confined space for a prolonged period of time (e.g. 1 hour).
- Direct contact with respiratory secretions of the infected person (e.g., an explosive cough or sneeze in the face, sharing food or eating utensils, mouth to mouth resuscitation or conducting a medical exam which includes nose and throat examination, without using appropriate personal protective equipment (PPE).

### High Risk Contacts - Chemoprophylaxis recommended

- Infants < 1 year of age.
- Pregnant women in their third trimester.
- All household contacts of the case **IF** there is an infant, 1 year of age or a pregnant woman in the 3<sup>rd</sup> trimester in the household.
- All those who reside in, work at or attend a group or family daycare **IF** there is an infant < 1 year of age or a pregnant woman in the 3<sup>rd</sup> trimester who also resides in, works at, or attends the daycare.

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Refer all symptomatic contacts for medical examination and testing for *B. Pertussis*. Medical examination and testing should be done prior to starting chemoprophylaxis; however there is no need to wait for the test result prior to starting treatment. In the case of a pregnant woman, if treatment is not tolerated or not completed by time of delivery, ensure appropriate chemoprophylaxis is given post- delivery to both the mother and newborn.

Educate asymptomatic contacts about the symptoms of pertussis and advise them to follow up with their family physician for examination and possible testing and treatment should they become symptomatic within the incubation period.

## **Contacts - Chemoprophylaxis not recommended**

The following contacts are not considered high risk; however notification and information sharing may be warranted:

- Household contacts when there are no infants less than 1 year or pregnant women in the 3rd trimester in the household.
- Family or group day care centers that do not have infants less than 1 year of age or pregnant women in the 3<sup>rd</sup> trimester
- School classrooms
- Health care settings ( refer to Appendix 3 regarding Health care workers)
- Work places.

If contacts are identified and notified, the following information should be provided:

- Notification that a case of pertussis has been diagnosed and explain their possible exposure
- A brief description of pertussis, including symptoms, incubation period, and period of communicability
- Advice to seek medical attention if symptoms develop
- Request to notify public health nursing if symptoms occur
- Education on infection control practices including hand hygiene and respiratory etiquette.

## 5. Immunization Recommendations (8)

### General Population

- Ensure the Routine Childhood Immunization Schedule is checked and offer immunization to those who are not appropriately immunized. Special attention should be paid to those requiring the 4 year old booster immunization.
- Immunize adults who have not received one lifetime dose of pertussis containing vaccine in adulthood (after 18 years of age). Those adults who are in close contact with pregnant women in the third trimester and infants less than 1 year of age should be immunized as a priority.
- For adults who have been immunized with a pertussis containing vaccine in adulthood, further booster doses are not recommended as the duration of protection induced by acellular pertussis vaccine is unknown.
- Parents and families in close contact with newborns are encouraged to participate in the cocooning strategy and should be vaccinated as soon as possible during the pregnancy and at least 2 weeks prior to the infant's birth.
- During an outbreak situation, pregnant women may be vaccinated at 26 weeks or greater gestation (9). This direction will be provided by the CPHO at the time of the outbreak.

### Cases and Contacts:

The initiation of immunization following exposure to disease may not prevent infection but may protect the individual against future exposures.

Unimmunized/partially immunized pertussis cases should be offered immunization after recovery according to PEI's Childhood or Adult Immunization Schedules. Persons who have had pertussis infection should receive pertussis-containing vaccines as recommended because infection does not confer long term immunity.

If immunization is incomplete, all contacts should be offered the necessary doses of pertussis containing vaccine according to the PEI's Childhood or Adult Immunization Schedules.

## **6. Exclusion** (3; 4)

Exclusion is recommended for clients with confirmed or probable pertussis until they have been adequately treated or have passed the period of communicability. Suspected cases should avoid close contact with other individuals, particularly vulnerable persons (e.g. infants under 1 year of age and pregnant women in the 3rd trimester) until 5 days of appropriate antimicrobial treatment has been completed or until 21 days from the onset of a paroxysmal cough if no antibiotic treatment has been taken.

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## Appendix 1

### Outbreak Management

An outbreak is defined as an increase in the number of cases of pertussis over that which is normally expected in a defined area or time period. An outbreak may be described as a small localized cluster of cases of a condition, usually an infectious disease (10).

The goals of outbreak management are to limit further transmission and to provide protection against disease for those at highest risk of severe disease and its complications. Outbreak management may evolve as an outbreak progresses. The Chief Public Health Office (CPHO) is responsible for the identification, declaration and management of pertussis outbreaks on PEI.

Role	Action
CPHO/Vaccine Preventable Disease Coordinator(VPD)	<ul style="list-style-type: none"> <li>• Initiate use of Pertussis Case Report form(CRF)</li> <li>• Initiate outbreak management team</li> <li>• Enhanced surveillance for cases and collection of appropriate epidemiological and microbiological information</li> <li>• Notify appropriate health care professionals and administration</li> <li>• Specific notification to schools of lab confirmed cases and or recreational activities/ communal activity / daycares/ work places and health settings</li> <li>• Develop Incident Action Plan</li> </ul>
PHN	<ul style="list-style-type: none"> <li>• Complete CRF</li> <li>• Review immunization status on all cases and contacts including primary series and boosters of pertussis containing vaccine</li> <li>• Offer immunization to all contacts/ cases who are well</li> <li>• Document immunizations in ISM</li> <li>• Advise symptomatic contacts to follow up with their physician or nurse practitioner and avoid contact with vulnerable populations (infants less than 1 year and pregnant women in the 3<sup>rd</sup> trimester)</li> <li>• Discuss exclusion protocol</li> <li>• Develop lists of communal contacts such as recreational groups, school/bus lists.</li> <li>• Report findings to Clinical Leader/CPHO</li> </ul>
PHAS	<ul style="list-style-type: none"> <li>• Contribute to Situation Reports</li> <li>• Update CPHO during outbreak management meetings</li> <li>• Conduct any required Inter-jurisdictional notification</li> <li>• Liaise with PHAC as needed</li> <li>• Prepare CNPHI postings as needed</li> </ul>

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## Appendix 2

### Pertussis Treatment and Chemoprophylactic Agents – Dosage Summary (4)

AGE	AZITHROMYCIN	ERYTHROMYCIN	CLARITHROMYCIN	TRIMETHOPRIM - SULFAMETHOXAZOLE (alternative agent)
<1 month	<b>Recommended agent.</b> 10 mg/kg per day po once daily for 5 days	<b>Not preferred.</b> Erythromycin is associated with infantile hypertrophic pyloric stenosis. Use if azithromycin is unavailable: 40 mg/kg/day po (maximum 1 g/day) divided in 3 doses for 7 days	<b>Not recommended</b> (safety data unavailable).	<b>Contraindicated for infants aged &lt; 2 months</b> (risk for kernicterus).
1–5 months	10 mg/kg per day po once daily for 5 days	40 mg/kg/day po (maximum 1 g/day) divided in 3 doses for 7 days	15 mg/kg/day po (maximum 1 g/day) divided in 2 doses for 7 days	<b>Contraindicated for infants aged &lt; 2 months</b> (risk for kernicterus) <b>Children 2 months to 12 years of age:</b> Trimethoprim 4 mg/kg and Sulfamethoxazole 20 mg/kg po twice a day for 14 days (maximum Trimethoprim 160mg and Sulfamethoxazole 800mg twice daily)
6 months to ≤12 years	10 mg/kg/day po (maximum 500 mg) once for 1 day, <b>then</b> 5 mg/kg/day po (maximum 250 mg/day) once daily for 4 days	40 mg/kg/day po (maximum 1 g/day) divided in 3 doses for 7 days	15 mg/kg/day po (maximum 1 g/day) divided in 2 doses for 7 days	<b>Children 2 months to 12 years of age:</b> Trimethoprim 4 mg/kg and Sulfamethoxazole 20 mg/kg po twice a day for 14 days (maximum Trimethoprim 160mg and Sulfamethoxazole 800mg twice daily)
<b>Adults and children ≥12 years</b>	500mg po once for one day <b>then</b> 250mg po once daily for 4 days	40 mg/kg/day po (maximum 1 g/day) divided in 3 doses for 7 days	1 g/day divided in 2 doses for 7 days <b>Not recommended in pregnancy</b>	<b>Adults and children over 12 years of age:</b> Trimethoprim 160 mg and Sulfamethoxazole 800 mg po twice a day for 14 days <b>Not recommended in pregnancy</b>

Adapted from BC Centre of Disease Control



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## Notes:

### **Treatment and Chemoprophylaxis of Pregnant Women (9)**

Azithromycin and Erythromycin are not contraindicated for pregnant women; however erythromycin may be poorly tolerated during pregnancy due to gastrointestinal side effects.

For pregnant women who may be allergic to the treatment/chemoprophylaxis options, please contact the Chief Public Health Office to discuss the situation.

## Appendix 3

### Management of Health Care Workers (8)

All health care workers should be encouraged to have all adult immunizations up to date, including one dose of pertussis containing vaccine as an adult. This is to prevent and contain the spread of pertussis among health care workers and to protect vulnerable and susceptible individuals for whom they provide care. All health care workers should use routine infection prevention and control practices when in contact with clients who have a respiratory infection.

Previous childhood immunization history of pertussis containing vaccine or a history of naturally acquired pertussis infection does not mean the person has lifelong immunity. There is no routine antibody testing available to determine immune status to pertussis. Adults are encouraged to have one lifetime dose of pertussis containing vaccine after 18 years of age.

Health care workers who have lab confirmed *B. pertussis* should remain off work for a period of 5 days if treated with an appropriate antibiotic and up to 21 days after the onset of the paroxysmal cough if they have not been treated.

Health care workers with confirmed pertussis should undergo case follow-up and contact tracing as per section 4.0.

Health care workers who are contacts of a pertussis case:

- should be considered high risk if pregnant and in the 3<sup>rd</sup> trimester and should receive appropriate chemoprophylaxis (Appendix 1);
- who are asymptomatic should receive education to ensure an awareness of early symptoms of pertussis and the required follow-up;
- who are symptomatic should be assessed by their physician or nurse practitioner and be tested for pertussis prior to the commencement of treatment (Appendix 1).