

## 4.8 Pertussis (Whooping Cough)

### Etiology

Pertussis is an acute bacterial infection of the respiratory tract caused by *Bordetella pertussis*. *B. pertussis* is a small, gram-negative rod.

### 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 two 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 two 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

### Clinical Presentation

The course of illness is typically divided into three stages. The first stage (catarrhal stage), is characterized by the insidious onset of coryza, sneezing, low-grade fever, and

a mild occasional cough. The cough gradually becomes more severe. After one to two weeks the second (paroxysmal) stage begins. This is when the diagnosis is most often suspected. The cough increases in severity with repetitive coughing spells followed by an inspiratory whoop or posttussive vomiting or both. In the final (convalescent) stage, symptoms gradually wane over weeks to months. Older children and adults, especially those who have been vaccinated, can have atypical manifestations of pertussis with prolonged cough with or without paroxysms and no whoop. Pertussis is an often unrecognized cause of chronic cough or respiratory illness in this population. These infected individuals are able to transmit the disease to others who may be susceptible including unimmunized and partially immunized infants. The most serious pertussis disease occurs in young infants, who may experience complications such as apnea, bacterial pneumonia, seizures (febrile and afebrile) and encephalitis, and who are at the greatest risk of dying from these complications.

## **Diagnosis**

Diagnosis is made by testing the nasopharyngeal specimens (nasopharyngeal swab) obtained during the catarrhal and early paroxysmal stages of illness. Bronchoscopy specimens are also acceptable. The organisms do not have to be viable. The organism can be recovered from the case during the first 3-4 weeks of illness. It is particularly difficult to isolate in individuals who have been previously immunized. For confirmation on laboratory specimens go to the public health laboratory web site [www.publichealthlab.ca](http://www.publichealthlab.ca) or call 709-777-6583.

## **Epidemiology**

### **Occurrence**

Pertussis occurs worldwide. There is no distinct seasonal pattern although there is evidence to suggest an increase in the summer and early fall. Outbreaks occur every two to five years. In Canada the introduction of pertussis vaccine in the 1940s dramatically decreased the prevalence of the disease in Canada by 99%. In the last two decades there has been an increase in pertussis incidence mainly in the adolescent and adult population. While infants over six months of age are well protected by acellular vaccines, young infants who are unimmunized or partially immunized are at highest risk of severe disease and death. Newfoundland and Labrador experienced outbreaks of pertussis in 1994-1996, 1999, and 2003. Prior to 2000, these outbreaks primarily involved those individuals aged one to nine years. The outbreak in 2003 mainly affected individuals aged 10 to 14 years. In 2014 and 2015, there have been 7 and 10 reported cases of pertussis, respectively.

### **Reservoir**

Humans

### **Transmission**

Transmission most commonly occurs by the respiratory route through contact with respiratory droplets or via airborne droplets of respiratory secretions.

## Incubation Period

The incubation is usually 7 to 10 days with a range of 5 to 21 days.

## Communicability

Infected individuals are most contagious during the catarrhal stage and the first two weeks after cough onset. Factors affecting the length of communicability include age, immunization status, previous episode of pertussis, and appropriate antimicrobial therapy. The person is no longer infectious after five days of appropriate antibiotic treatment.

## Control Measures

### Management of Case

#### *Investigations*

- Obtain a case history
- Estimate the dates for period of communicability
- Determine immunization history
- Identify the possible source of infection
- Identify contacts
- Collaborate with MOH regarding the follow-up plan

#### *Treatment*

- Young infants and older individuals with underlying medical conditions commonly require hospitalization
- Droplet Precautions are recommended for hospitalized cases until five days of antibiotics have been administered
- Antibiotics should be administered as soon as possible after the onset of illness.
  - Treatment eradicates *B. pertussis* from the nasopharynx but has little effect on the clinical symptoms or course of pertussis unless given in the early (incubation period, catarrhal or early paroxysmal) stages of infection.

#### *Immunization*

Immunize with pertussis containing vaccine as per age appropriate schedule as outlined in the Newfoundland and Labrador Immunization Manual available on web site  
[http://www.health.gov.nl.ca/health/publichealth/cdc/health\\_pro\\_info.html#immunization](http://www.health.gov.nl.ca/health/publichealth/cdc/health_pro_info.html#immunization)

#### *Exclusion*

- The case should be excluded from child care, school or work until five days after the start of antibiotic therapy
- If there is no treatment or treatment is incomplete, the case should be excluded for three weeks (21 days) from onset of the paroxysmal cough or until the end of the cough

## Management of Contacts

Contact tracing needs to begin immediately after identification of a case.

### **Definition Actions**

#### **Contact**

- An individual who has the following type of unprotected contact during the period of communicability:
  - face to face contact for > 5 minutes;

#### **OR**

- sharing the same confined air space for a prolonged period (e.g., 1 hours);

#### **OR**

- direct contact with the 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 the nose and throat examination

#### **High risk Contacts**

- Infants less than one year of age regardless of immunization status (due to the increased rate of mortality from pertussis in this age group)
- Pregnant woman in the third trimester (because of the risk of disease transmission from infected mother to neonate).

#### **Immunoprophylaxis**

- Review the immunization history of all contacts
- Provide pertussis containing vaccine as appropriate for age and immunization history

#### **Chemoprophylaxis**

- Post exposure prophylaxis is provided to prevent the development of disease (if given early in the incubation period) and to limit secondary transmission to vulnerable individuals
- Chemoprophylaxis is offered to **high risk contacts**, as soon as possible, and within 21 days of onset of cough in the case regardless of immunization status
- If the case is the **only** high risk person in the household, chemoprophylaxis is not required for household contacts
- 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 2-3 weeks prior to delivery have an extremely high risk of disease, therefore treatment for the mother and chemoprophylaxis for the newborn should be reviewed by the MOH (or designate)

**Exclusion**

No exclusion of contacts from routine activities. A contact with symptoms must be followed as a possible case.

***Management of Outbreaks***

An outbreak management team should be established to address infection prevention and control measures.

**Education and Preventive Measures**

- Contacts and parents of contacts should be instructed about disease transmission as well as signs and symptoms of pertussis so that early diagnosis and treatment can be initiated when needed.
- Educate the public, especially parents, that the primary strategy to prevent pertussis is immunization:
  - Immunization of pregnant women during the 27<sup>th</sup> to 32<sup>nd</sup> week of each pregnancy
  - Five doses of acellular pertussis before the 7th birthday
  - A pertussis containing vaccine booster in adolescence (14-16 years of age)
- Provide information on respiratory hygiene/cough etiquette, a fact sheet is available at:  
[http://www.health.gov.nl.ca/health/publichealth/cdc/infectioncontrol/pertussis\\_october\\_2012.pdf](http://www.health.gov.nl.ca/health/publichealth/cdc/infectioncontrol/pertussis_october_2012.pdf)  
**OR**  
<http://www.phac-aspc.gc.ca/im/vpd-mev/pertussis/professionals-professionnels-eng.php>

**Reporting Requirements and Procedures**

- The laboratory (hospital or public health laboratory) report case/s to the attending physician, the Chief Medical Officer of Health and the Medical Officers of Health (MOH)
- MOH office will notify, as required, local physicians, nurse practitioners, environmental health officers, community health nurses, communicable disease control nurses (CDCNs) and Infection control practitioners (ICP), in the particular region as required for follow-up and case investigation
- The CDCN in collaboration with the ICP (if necessary) will collect case details
- The CDCN will enter the case details into the electronic reporting system and utilize the Canadian Network of Public Health Intelligence (CNPHI) tool for alerts or outbreak summaries

**Provincial Disease Control**

- Reports the aggregate case data to Public Health Agency of Canada
- Provides an analysis of the case/s with reports in the Quarterly Communicable Disease Report (CDR), also posted on the Public Health website

- <http://www.health.gov.nl.ca/health/publichealth/cdc/informationandsurveillance.html>
- Coordinates the response if an outbreak occurs across RHAs

## References

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