

# Appendix A: Disease-Specific Chapters

Chapter: Pertussis (Whooping Cough)

Revised January, 2012

## Pertussis (Whooping Cough)

- Communicable  
 Virulent

**Health Protection and Promotion Act:  
Ontario Regulation 558/91 – Specification of Communicable Diseases**

**Health Protection and Promotion Act:  
Ontario Regulation 559/91 – Specification of Reportable Diseases**

<b>1) Aetiologic Agent:</b>	Pertussis is caused by, a Gram-negative, pleomorphic bacillus, <i>Bordetella pertussis</i> , ( <i>B. pertussis</i> ) (1, 2).
<b>2) Case Definition:</b>	
Surveillance Case Definition	<a href="#">See Appendix B</a>
Outbreak Case Definition	<p>The outbreak case definition varies with the outbreak under investigation. Consideration should be given to the following in establishing an outbreak case definition:</p> <ol style="list-style-type: none"><li>1. Clinical, laboratory and/or epidemiological criteria;</li><li>2. A time frame for occurrence;</li><li>3. A geographic location(s) or place(s) where cases live or became ill/exposed, and</li><li>4. Special attributes of cases (e.g. age, underlying conditions).</li></ol> <p>Cases should also be classified by levels of probability (i.e. confirmed, probable or suspect).</p>
<b>3) Identification:</b>	
Clinical Presentation	<p>This acute bacterial infection attacks the tracheobronchial tree of the respiratory tract. It is divided into three stages:</p> <ol style="list-style-type: none"><li>1) Catarrhal Stage is characterized by mild upper respiratory tract symptoms with a mild occasional cough that lasts approximately 1-2 weeks and then progresses to the next stage;</li><li>2) Paroxysmal Stage presents with an increase in the severity and frequency of the cough; paroxysms are characterized by repeated violent coughs and this is where the high pitched inspiratory whoop may occur commonly followed by vomiting and can last 1 to 2 months; fever is absent or minimal, and</li><li>3) Convalescent Stage is the gradual recovery period where the cough becomes less paroxysmal and disappears. This may take weeks to months.</li></ol>

	Complications among adolescents and adults include syncope, sleep disturbance, incontinence, rib fractures and pneumonia. Pertussis is most severe when it occurs during the first 6 months of age (2).
Diagnosis	<a href="#">See Appendix B</a>

#### 4) Epidemiology:

Occurrence	<p>Pertussis is endemic worldwide; outbreaks occur periodically regardless of geographic location and this could be because of a change in the number of susceptible persons in the population due to waning immunity, particularly in older children and adults (1, 2).</p> <p>Whooping cough occurs frequently in Ontario, with an average of 860 cases reported each year from 1998-2007. Cases are most common among children.</p>
Reservoir	Humans are the only known reservoir (1); adolescents and adults are considered to play a major role in the transmission of infection to infants and children (2).
Modes of Transmission	Transmission occurs by direct contact with discharges from respiratory secretions of infected persons via droplets (1).
Incubation Period	Usually 7-10 days, can range from 5-21 days (2).
Period of Communicability	<p>Highly communicable in the early catarrhal stage and beginning of the paroxysmal stage (first 2 weeks) and then communicability gradually decreases and becomes negligible in about 3 weeks (1).</p> <p>No longer communicable after 5 days of effective treatment (1).</p>
Susceptibility and Resistance	Non-immunized or partially immunized individuals are susceptible to pertussis. Previously immunized adolescents and adults (due to waning immunity) may also be susceptible. These individuals often are a source of infection for young children. Infection does not induce long term immunity. Secondary attack rates can occur, of up to 90% in non-immune household contacts (1).

#### 5) Reporting Requirements:

To local Board of Health	Confirmed and suspected cases shall be reported to the medical officer of health by persons required to do so under the <i>Health Protection and Promotion Act</i> , R.S.O. 1990.
To Public Health Division (PHD)	<p>Report only case classifications specified in the case definition to PHD.</p> <p>Cases shall be reported using the integrated Public Health Information System (iPHIS), or any other method specified by the Ministry <b>within one (1) business day of receipt of initial</b></p>

	<p><b>notification</b> as per <i>iPHIS Bulletin</i> Number 17: Timely Entry of Cases (6).</p> <p>The minimum data elements to be reported for each case is specified in the following:</p> <ul style="list-style-type: none"> <li>• <i>Ontario Regulation 569</i> (Reports) under the Health Protection and Promotion Act (HPPA);</li> <li>• The disease-specific User Guides published by the Ministry, and</li> <li>• Bulletins and directives issued by the Ministry.</li> </ul>
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## 6) Prevention and Control Measures:

<p>Personal Prevention Measures</p>	<p>Immunization with acellular pertussis vaccine is the mainstay for the control of pertussis. Refer to the current Publicly Funded Immunization Schedules for Ontario for information on routine childhood immunization with pertussis vaccine.</p> <p>The Provincial Infectious Diseases Advisory Committee (PIDAC) recommends the following:</p> <ul style="list-style-type: none"> <li>• Ensure vaccine providers are aware that the tetanus-diphtheria-acellular pertussis vaccine (Tdap) can be safely administered after a recent tetanus-diphtheria-acellular pertussis containing vaccine. This will ensure that unnecessary delays in administering Tdap are avoided due to unsubstantiated concerns about recent tetanus-diphtheria boosters.</li> <li>• Note: As per PIDAC Subcommittee on Immunization, a recent National Advisory Committee on Immunization (NACI) statement has indicated that the tetanus-diphtheria-acellular pertussis vaccine can be safely administered regardless of the interval from the last tetanus-diphtheria booster for adolescents.</li> </ul> <p>Provide education to the public about the risk of pertussis infection especially to infants and educate the public about respiratory etiquette that is, coughing into tissues and sleeves and about proper hand hygiene.</p>
<p>Infection Prevention and Control Strategies</p>	<p>For hospitalized cases, in addition to routine practices, droplet precautions are recommended for five days after the initiation of effective therapy (3).</p>
<p>Management of Cases</p>	<p>Refer to ON Regulation 569 under the HPPA for relevant data to collect and ensure to include the following:</p> <ul style="list-style-type: none"> <li>• Immunization history of the reported case;</li> <li>• Identifying the possible source of infection, and</li> <li>• Identify vulnerable contacts (see definition below).</li> </ul>

	<p>Apply case definition to confirm the report.</p> <p>Investigate risk factors for disease transmission including:</p> <ul style="list-style-type: none"> <li>• work with vulnerable populations;</li> <li>• daycare attendees or workers;</li> <li>• health care providers, and</li> <li>• those who have direct contact with immunocompromised patients and infants less than one year of age.</li> </ul> <p>Treatment with antibiotics and follow up is under the direction of the attending health care provider. Antibiotics should be administered as soon as possible after onset of illness; there is no limit to the start date for treatment of symptomatic, untreated cases of pertussis whose culture or PCR results are positive (4). Cases are no longer considered infectious after 5 days of treatment.</p> <p>Provide education about transmission of infection and proper respiratory etiquette. Advise cases to avoid contact with young children, infants, and women in their 3rd trimester of pregnancy, especially those who have not been immunized, until the completion of 5 days of appropriate antibiotic therapy or 21 days post cough onset. Advise symptomatic individuals to remain at home until they are well.</p> <p>Refer to the OHA/OMA Surveillance Protocol on pertussis when dealing with cases that work in health care settings.</p> <p>Exclusion is not a proven effective strategy; however, in high-risk situations (where there are vulnerable persons) exclusion until five days after the start of antibiotic therapy, or if no treatment is given, until after 21 days with negative results from culture or PCR, should be at the discretion of the Medical Officer of Health (4).</p>
<p>Management of Contacts</p>	<p>There is no evidence that antibiotic prophylaxis of contacts changes the epidemic course of pertussis in the community, therefore, it is only recommended for the following contacts of confirmed pertussis cases who are (4):</p> <ul style="list-style-type: none"> <li>• household contacts (including attendees at family day care centers) where there is a vulnerable person defined as an infant &lt; 1 year of age [vaccinated or not] or a pregnant woman in the third trimester</li> <li>• for out of household exposures, vulnerable persons, defined as infants less than one year of age regardless of immunization status and pregnant women in their third trimester who have had face-to-face exposure and/or have shared confined air for &gt; 1 hour</li> </ul> <p>The local health unit will identify persons who meet the contact definition above and advise them about chemoprophylaxis and refer them to their physician for prescriptions. Prophylaxis is the same as treatment and should be given within 21 days after exposure (4).</p> <p>Prophylaxis:</p>

	<p>Macrolide antibiotics such as azithromycin and erythromycin may prevent or moderate clinical pertussis when given during the incubation period or in the early catarrhal stage. During the paroxysmal phase of the disease, antibiotics may not shorten the clinical course but may reduce the possibility of complications. Antibiotics eliminate the organism after a few days of use and thus reduce transmission.</p> <p>The following antimicrobials are indicated (as per the Public Health Agency of Canada. <i>National consensus conference on pertussis</i>. Canada Communicable Disease Report 2003; Vol 29S3: 1-39) (6).</p> <p>Azithromycin</p> <ul style="list-style-type: none"> <li>• Children: 10 mg/kg (maximum 500 mg) once daily for one day, then 5 mg/kg (maximum 250 mg) once daily for four days</li> <li>• Adults: 500 mg on day one, then 250 mg once daily for four days</li> </ul> <p>Clarithromycin</p> <ul style="list-style-type: none"> <li>• Children: 15 mg/kg per day (maximum one g/day) orally, in two divided doses for seven days</li> <li>• Adults: 500 mg twice daily for seven days</li> </ul> <p>Erythromycin</p> <ul style="list-style-type: none"> <li>• Children: 40-50 mg/kg per day, orally in four divided doses for 7-10 days</li> <li>• Adults: 500mg orally four times daily for 7 days</li> </ul> <p>For exposed health care workers refer to the OHA/OMA reference listed below.</p>
<p>Management of Outbreaks</p>	<p>An outbreak is defined by the usual epidemiological principles of a greater than expected number of cases that are spatially and temporally linked.</p> <p>Vaccination is not recommended for outbreak management, but the opportunity should be taken to update the immunization status of contacts if required (4). As well, recommend immunization to all those who are not up to date in their pertussis immunization.</p> <p>As per this protocol, outbreak management shall comprise of but not be limited to the following general steps :</p> <ul style="list-style-type: none"> <li>• Confirm diagnosis and verify the outbreak;</li> <li>• Establish an outbreak team;</li> <li>• Develop an outbreak case definition;</li> <li>• Implement prevention and control measures;</li> <li>• Implement and tailor communication and notification plans depending on the scope of the outbreak;</li> <li>• Conduct epidemiological analysis on data collected;</li> <li>• Conduct environmental inspections of implicated premise where applicable;</li> </ul>

	<ul style="list-style-type: none"> <li>• Coordinate and collect appropriate clinical specimens where applicable;</li> <li>• Prepare a written report, and</li> <li>• Declare the outbreak over in collaboration with the outbreak team.</li> </ul>
<p><b>7) References</b></p>	<p>(1) Heymann D, editor. Control of communicable diseases manual. 18th ed. Washington: American Public Health Association; 2004.</p> <p>(2) Pickering LK, Baker CJ, Long SS, McMillan JA, editors. Red book: 2006 report of the Committee on Infectious Diseases. 27<sup>th</sup> ed. Elk Grove Village, IL: American Academy of Pediatrics; 2006. Section 3, Summaries of infectious diseases; p. 498-520.</p> <p>(3) Steering Committee on Infection Control Guidelines. Prevention and control of occupational infections in health care. An infection control guideline. Can Commun Dis Rep. 2002 Mar;28 Suppl 1:1-264. Available from <a href="http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/02pdf/28s1e.pdf">http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/02pdf/28s1e.pdf</a>.</p> <p>(4) National consensus conference on pertussis, Toronto, May 25-28, 2002. Can Commun Dis Rep. 2003 Apr;29 Suppl 3:1-33. Available from <a href="http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/03pdf/29s3e.pdf">http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/03pdf/29s3e.pdf</a>.</p> <p>(5) Loeffelholz MJ. Bordetella. In: Murray PR, Baron JH, Jorgenson M, Pfaller A, Tenover FC, Tenover FC, editors. Manual of clinical microbiology. 8th ed. Washington: ASM Press; 2003. p. 780-9.</p> <p>(6) Ministry of Health and Long-Term Care. Timely entry of cases. iPHIS Bulletin. 2012 January;14.</p>
<p><b>8) Additional Resources</b></p>	<p>National Advisory Committee on Immunization. Canadian immunization guide. 7<sup>th</sup> ed. Ottawa: Public Health Agency of Canada; 2006. Available from: <a href="http://www.phac-aspc.gc.ca/publicat/cig-gci/index-eng.php">http://www.phac-aspc.gc.ca/publicat/cig-gci/index-eng.php</a>.</p> <p>National Advisory Committee on Immunization. Prevention of pertussis in adolescents and adults. Can Commun Dis Rep. 2003 Sep 1;29:1-9. Available from <a href="http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/03pdf/acs-dcc-29-5-6.pdf">http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/03pdf/acs-dcc-29-5-6.pdf</a>.</p> <p>National Advisory Committee on Immunization. Interval between administration of vaccines against diphtheria, tetanus and pertussis. Can Commun Dis Rep. 2005;31(ACS-9):1-24. Available from <a href="http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/05vol31/acs-dcc-8-9/9-eng.php">http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/05vol31/acs-dcc-8-9/9-eng.php</a>.</p> <p>Ontario Hospital Association; Ontario Medical Association. Pertussis surveillance protocol for Ontario hospitals. Toronto: Ontario Hospital Association; 2008. Available from <a href="http://www.oha.com/Client/OHA/OHA_LP4W_LND_WebStation.nsf/resources/Communicable+Disease+Surveillance+Protocols/\$file/Pertussis+Protocol+Oct+2007.pdf">http://www.oha.com/Client/OHA/OHA_LP4W_LND_WebStation.nsf/resources/Communicable+Disease+Surveillance+Protocols/\$file/Pertussis+Protocol+Oct+2007.pdf</a>.</p>

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