

Appendix A: Disease-Specific Chapters

Chapter: Measles

Measles

- 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**

1) Aetiologic Agent:	The measles virus is a member of the genus Morbillivirus of the family Paramyxoviridae (1).
2) Case Definition:	
Surveillance Case Definition	See Appendix B
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">1. Clinical, laboratory and/or epidemiological criteria;2. A time frame for occurrence;3. A geographic location(s) or place(s) where cases live or became ill/exposed, and4. Special attributes of cases (e.g. age, underlying conditions). <p>Cases should also be classified by levels of probability (i.e. confirmed, probable or suspect).</p>
3) Identification:	
Clinical Presentation	Symptoms of measles begin 7 to 18 days after exposure to a case of measles and include fever, runny nose, cough, drowsiness, irritability and red eyes (conjunctivitis). Small white spots (known as "Koplik's spots") appear on the inside of the mouth and throat. Then, 3 to 7 days after the start of the symptoms a red, blotchy (maculopapular) rash appears on the face and then progresses down the body. Complications include diarrhea, respiratory problems, pneumonia, otitis media and encephalitis (1, 5). Sub-acute sclerosing panencephalitis (SSPE) develops very rarely as a late sequela (2).
Diagnosis	See Appendix B

4) Epidemiology:

Occurrence	<p>Measles cases occur worldwide and year round. In temperate climates the majority of cases occur in late winter and early spring. Since the introduction of the measles vaccine, the number of cases has dropped by as much as 99% in developed countries with effective immunization programs. In developing countries, measles continues to be the leading killer of children < 5 years of age (5). In developed countries, one case in every 1,000-3,000 results in death. In developing countries, the case fatality rate is estimated to be 3-5% (1).</p> <p>The incidence of measles has declined in Ontario since a two-dose MMR vaccination program was administered in 1996. From 1998-2007, an average of 5 cases were reported per year. Most cases occur due to importation or importation spread.</p>
Reservoir	Humans (1)
Modes of Transmission	<p>The virus is highly contagious and is spread by airborne droplet nuclei, close personal contact or direct contact with the respiratory secretions of a case. Articles of clothing or bedding freshly soiled with infectious discharge occasionally transmit the disease (5). Measles virus can remain active and contagious in the air or on infected surfaces for up to two hours. Measles is one of the most highly communicable infectious diseases (1).</p>
Incubation Period	About 10 days, but may be 7-18 days from exposure to onset of fever, usually 14 days until rash appears; rarely as long as 19-21 days (1).
Period of Communicability	Usually about 4 days before the rash to 4 days after the onset of rash (1).
Susceptibility and Resistance	After infection, immunity is generally life long (1). Immunization with 2 valid doses of measles containing vaccine provides almost 100% protection against measles. In Ontario, cases are most common among un-immunized and under immunized children and adults.

5) Reporting Requirements:

To local Board of Health	<p>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.</p> <p>Note: Laboratory confirmed cases are to be reported by phone to the local public health unit as soon as identified.</p>
To Public Health Division	<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</p>

	<p>Ministry within one (1) business day of receipt of initial notification 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"> • <i>Ontario Regulation 569</i> (Reports) under the Health Protection and Promotion Act (HPPA) • The disease-specific User Guides published by the Ministry, and • Bulletins and directives issued by the Ministry
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6) Prevention and Control Measures:

<p>Personal Prevention Measures</p>	<p>Under the Immunization of School Pupils Act, all students must have documented receipt of 2 doses of the measles vaccine, generally given as MMR after the 1st birthday and the second dose can be given at 18 months or at least 28 days after the first dose (refer to the current publicly funded immunization schedules for Ontario).</p> <p>Healthcare workers should have proof of adequate protection prior to or upon employment (refer to the Ontario Hospital Association; Ontario Medical Association. Measles surveillance protocol for Ontario hospitals. Toronto: Ontario Hospital Association; 2008).</p>
<p>Infection Prevention and Control Strategies</p>	<p>Strategies:</p> <ul style="list-style-type: none"> • For hospitalized cases, in addition to routine practices, airborne transmission precautions are indicated for 4 days after onset of rash in otherwise healthy persons and for the duration of illness in immunocompromised persons (2) • All suspect cases of measles will be investigated immediately in order to confirm the diagnosis, identify the source of infection, identify other cases and protect susceptible contacts in the community
<p>Management of Cases</p>	<p>Confirm the diagnosis and ensure that appropriate specimens have been collected for diagnosis according to case definition.</p> <p>Investigate the case to determine source of infection. Collect data as per <i>Ontario Regulation 569</i>. Investigate and follow-up with possible contacts.</p> <p>There is no specific treatment for persons with measles infection. Treatment is supportive with particular attention to the possible complications of measles, particularly pneumonia and encephalitis (2).</p> <p>Persons with measles should be excluded from day nurseries, schools, and health care settings for 4 days after appearance of rash.</p>

<p>Management of Contacts</p>	<p>A contact of a measles case is considered to be:</p> <ul style="list-style-type: none"> • Any susceptible person who shared the same air space for any length of time, including two hours after the case left the air space (e.g. home, school, day care, school bus, doctor's office, emergency room, etc) during the period of communicability <p>Susceptible persons are all individuals who were born in or after 1970, if they do not have the following:</p> <ol style="list-style-type: none"> a) documented evidence of two doses of measles-containing vaccine (the first dose given on or after the first birthday and at least an interval of one month between the two doses) or b) history of physician or iPHIS documented measles infection or c) laboratory evidence of immunity. <p>Immunization with MMR vaccine of susceptible contacts within 72 hours after exposure may prevent measles. Measles immune globulin (Ig) may be given to specified high risk persons in the first 3 days after exposure and may be given within 6 days of exposure to prevent or modify infection (1). Quarantine is not generally recommended in a highly immunized population.</p>
<p>Management of Outbreaks</p>	<p>An outbreak is defined as greater than the expected number of confirmed cases that are spatially and temporally linked.</p> <p>Public Health Division provides support in the management of an outbreak when the Health Unit requires additional MMR vaccine, requests assistance or if the outbreak spans more than one Health Unit.</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"> • Confirm diagnosis and verify the outbreak; • Establish an outbreak team; • Develop an outbreak case definition; • Implement prevention and control measures; • Implement and tailor communication and notification plans depending on the scope of the outbreak; • Conduct epidemiological analysis on data collected; • Conduct environmental inspections of implicated premise where applicable; • Coordinate and collect appropriate clinical specimens where applicable; • Prepare a written report, and • Declare the outbreak over in collaboration with the outbreak team. <p>For an outbreak in a school, susceptible students can be excluded under Section 12 of <i>the Immunization of School Pupils Act</i>.</p>
<p>7) References</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. 27th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2006. Section 3, Summaries of infectious diseases; p. 441-52.</p> <p>(3) Plotkin SA, Orenstein WA, Offit PA, editors. Vaccines. 5th ed. Philadelphia: Saunders; 2008.</p> <p>(4) Bellini W, Icenogle J. Measles and rubella viruses. 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. 1389-1403.</p> <p>(5) Notifiable Diseases On-Line [Internet]. Ottawa: Public Health Agency of Canada; 2003. Measles; 2003 Dec 11 [cited 2009 Feb 12]. Available from http://dsol-smed.phac-aspc.gc.ca/dsol-smed/ndis/diseases/meas_e.html.</p> <p>(6) Ministry of Health and Long-Term Care. Timely entry of cases. iPHIS Bulletin. 2007 May 11;17.</p>
<p>8) Additional Resources</p>	<p><i>Health Protection and Promotion Act</i>, R.S.O. 1990, c. H.7. Available from http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90h07_e.htm.</p> <p><i>Immunization of School Pupils Act</i>, R.S.O. 1990, c. I.1. Available from http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90i01_e.htm.</p> <p>National Advisory Committee on Immunization. Canadian immunization guide. 7th ed. Ottawa: Public Health Agency of Canada; 2006. Available from: http://www.phac-aspc.gc.ca/publicat/cig-gci/index-eng.php.</p> <p>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 http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/02pdf/28s1e.pdf.</p> <p>Guidelines for control of measles outbreaks in Canada (revised 1995). Advisory Committee on Epidemiology. Can Commun Dis Rep. 1995 Nov 15;21(21):189-95. Available from http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/95pdf/cdr2121e.pdf.</p> <p>Ontario Hospital Association; Ontario Medical Association. Measles surveillance protocol for Ontario hospitals. Toronto: Ontario Hospital Association; 2008. Available from http://www.oha.com/Client/OHA/OHA_LP4W_LND_WebStation.nsf/resources/Communicable+Disease+Surveillance+Protocols/\$file/MEASLES+Revised+June+2008.pdf.</p> <p>Gregg MB, editor. Field epidemiology. 2nd ed. New York: Oxford</p>

University Press; 2002.

Ministry of Health and Long-Term Care. Infectious diseases protocol. Toronto: Queen's Printer for Ontario; 2009. Available from http://www.health.gov.on.ca/english/providers/program/pubhealth/oph_standards/ophs/infdispro.html (or as current)
