

Appendix A: Disease-Specific Chapters

Chapter: Rabies

Rabies

- 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:	Rabies disease is caused by the rabies virus; an RNA virus classified in the <i>Rhabdoviridae</i> family (2) from the genus <i>Lyssavirus</i> (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 when establishing an outbreak case definition:</p> <ol style="list-style-type: none">1. Clinical, laboratory and/or epidemiological criteria;2. The time frame for occurrence;3. The geographic location(s) or place(s) where cases live or became ill/exposed, and4. Special attributes of cases (e.g. age, underlying conditions) and/or the aetiologic agent. <p>Cases may be classified by levels of probability (i.e. confirmed, probable or suspect).</p>
3) Identification:	
Clinical Presentation	<p>During the incubation period after exposure, the person does not experience disease symptoms and the wound from the bite may heal. The prodrome begins when the virus enters the peripheral nerves and spinal cord and can last 2 – 10 days. Onset of clinical symptoms is generally heralded by a sense of apprehension and excitability with headache, fever, malaise and indefinite sensory changes and pain at the site of the bite (1). The excitation phase that follows is characterized by hypertension, increased salivation and swallowing dysfunction (hydrophobia). This may be followed by generalized paralysis (3). The acute neurological phase of the disease is characterized by encephalomyelitis that almost always progresses to coma or death, often due to respiratory paralysis, if no medical intervention is given (1).</p>

Diagnosis	<p>See Appendix B</p> <p>Rabies is suggested by a history of animal exposure and or bite and confirmed by recovery of virus from saliva and salivary gland, CSF or CNS tissue of an infected person. It can also be confirmed by direct immunofluorescence to detect viral antigen in brain tissue.</p> <p>Presumptive diagnosis may be based on serological tests (1, 3).</p>
4) Epidemiology:	
Occurrence	<p>Rabies occurs worldwide, and continues to be a serious problem in India, Asia and Africa. Worldwide, there is an estimated 65,000-87,000 deaths a year almost all in developing countries (1). In the United States and Canada, rabies most commonly involves raccoons, skunks, foxes, coyotes and bats (4).</p> <p>Human rabies infection is very rare in Canada. The last reported cases of human rabies occurred in 2007 in Alberta, 2003 in BC and in 2000 in Quebec, all from bat rabies strain.</p>
Reservoir	<p>In North America the main reservoir species are wild animals such as foxes, coyotes, wolves, skunks, raccoons, and bats (1, 3).</p>
Modes of Transmission	<p>It is primarily a disease of animals, but can be transmitted to humans through the saliva of infected animals through bites, scratches or other contact with mucosal membranes or open skin (4). Person to person transmission is theoretically possible but rare and not well documented (1). Airborne spread has been demonstrated in caves where bats roost and in laboratory settings, but this occurs very rarely (1). Transmission through corneal, solid organ and blood vessel transplant from unsuspected rabies cases has occurred (2).</p>
Incubation Period	<p>Usually 3-8 weeks; rarely as short as 9 days or as long as 7 years (1). The incubation period depends on wound severity, wound site in relation to nerve supply and distance from the brain, the amount and strain of virus, protection provided by clothing and other factors such as adequate wound cleansing (1).</p>
Period of Communicability	<p>Rabid animals are infectious from the time the virus reaches the salivary glands and up until death. Death usually occurs within one week of onset of clinical signs. Different species may shed virus in saliva for different lengths of time prior to onset of clinical signs: dogs/cats/ferrets up to seven days; longer with wild-life (1).</p>
Susceptibility and Resistance	<p>All mammals are susceptible to rabies (1).</p> <p>Humans appear to be more resistant to infection as evidenced in a study where 40% of untreated individuals bitten by proven rabid animals developed the disease (1).</p>

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>The board of health, upon receiving a report of a suspected or confirmed human case of rabies, shall immediately telephone the PHD.</p> <p>Report only case classifications specified in the case definition to PHD using the integrated Public Health Information System (iPHIS), or any other method specified by the Ministry within one (1) business day of receipt of initial notification as per <i>iPHIS Bulletin</i> Number 17: Timely Entry of Cases (5).</p> <p>The minimum data elements to be reported for each case is specified in the following sources:</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.

6) Prevention and Control Measures:

Personal Prevention Measures	<p>Preventative measures: (1)</p> <ul style="list-style-type: none">• Avoid contact with stray, wild, sick or dead animals, as well as animals that appear to be acting abnormally.• Promote immunization of cats and dogs against rabies;• Promote the reporting of aggressive animals, or animals that have bitten people, to the local board of health;• Individuals who are at high risk of exposure such as veterinarians, wildlife and park personnel, or travellers to areas where rabies is endemic, should receive pre-exposure immunization;• Wash animal bite wounds immediately with soap and clean running water and seek medical attention promptly, and• Individual people should not try to capture bats found in their house and should bat proof their homes.
Infection Prevention and Control Strategies	Use routine practices for hospitalized cases for the duration of illness (2).
Management of Cases	Investigate all persons exposed to suspected rabid animals to determine source of infection. Refer exposed persons to their health care provider for assessment of rabies risk and provide rabies post-exposure prophylaxis to requesting physician if indicated.

	<p>Refer to the <i>Rabies Prevention and Control Protocol, 2008</i> (or as current) for the management of persons exposed to possible rabid animals.</p> <p>The following disease-specific information should also be obtained during the investigation:</p> <ul style="list-style-type: none"> • Determine the possible source including animal involved; • Identify other persons and animals exposed to the source animal; • Note the type of exposure (bite, scratch, other or provoked vs. unprovoked); • Note the geographic location of exposure, and • Determine the immunization status of animal (if possible) and of the person. <p>If the disease is traced to imported or domestic animals, contact the Canadian Food Inspection Agency (CFIA).</p> <p>In cases where clinical symptoms of rabies have developed, death is invariably the outcome.</p>
Management of Contacts	<p>In hospital, health care workers should be educated about the potential hazard of infection from saliva, and the use of personal protective equipment to avoid exposure.</p> <p>If indicated, refer to the Ontario guidelines listed below for post exposure prophylaxis information.</p>
Management of Outbreaks	<p>Provide public health management of outbreaks in order to identify the exposure and prevent other exposed persons from developing rabies.</p> <p>A single case of rabies in a person constitutes an outbreak and should be managed with urgency to identify other persons exposed to the same source or that came into contact with infected body fluids belonging to the case.</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>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. 552-9.</p> <p>(3) Acha PN, Szyfres B. Zoonoses and communicable diseases common to man and animals. 3rd ed. Washington: Pan American Health Organization; 2001.</p> <p>(4) Notifiable Diseases On-Line [Internet]. Ottawa: Public Health Agency of Canada; 2003. Rabies; 2003 Dec 11 [cited 2009 Feb 12]. Available from http://dsol-smed.phac-aspc.gc.ca/dsol-smed/ndis/diseases/rabies_e.html.</p> <p>(5) Ministry of Health and Long-Term Care. Timely entry of cases. iPHIS Bulletin. 2007 May 11;17.</p>
<p>8) Additional Resources</p>	<p>Ministry of Health and Long-Term Care. Rabies prevention and control protocol. Toronto: Queen's Printer for Ontario; 2008. Available from http://www.health.gov.on.ca/english/providers/program/pubhealth/oph_standards/ophs/progstds/protocols/rabies_prevention.pdf. (or as current)</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>Plotkin SA. Rabies. Clin Infect Dis. 2000 Jan;30(1):4-12.</p> <p>Gregg MB, editor. Field epidemiology. 2nd ed. New York: Oxford University Press; 2002.</p> <p>Middleton D. Submission & reporting procedures of human samples suspected of being infected with rabies virus. Toronto: Queen's Printer for Ontario; 2005.</p> <p>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)</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>Ministry of Health and Long-Term Care. Guidelines for management</p>

of suspected rabies exposures. Toronto: Queen's Printer for Ontario; 2007. Available from <http://www.pdhu.on.ca/documents/rabies3.pdf>.

Ministry of Natural Resources. Fish and Wildlife in Ontario [Internet]. Toronto: Ministry of Natural Resources; 2009. Rabies in Ontario; 2009 [cited 2009 Feb 7]. Available from <http://www.mnr.gov.on.ca/en/Business/Rabies/index.html>.

World Health Organization. WHO recommendations on rabies post-exposure treatment and the correct technique of intradermal immunization against rabies. Geneva: World Health Organization; 1997. Available from http://libdoc.who.int/hq/1996/WHO_EM_C_ZOO_96.6.pdf.

World Health Organization. RABNET: Human and Animal Rabies. An Interactive and Information Mapping System [Internet]. Geneva: World Health Organization; 2009 [cited 2009 Feb 17]. Available from <http://www.who.int/globalatlas/default.asp>.

Manning SE, Rupprecht CE, Fishbein D, et al. Human rabies prevention--United States, 2008: recommendations of the Advisory Committee on Immunization Practices. MMWR Recomm Rep. 2008;57(RR-3):1-28.

Public Health Agency of Canada, Travel Medicine Program. Travel Health [Internet]. Ottawa: Public Health Agency of Canada; 2008. Rabies; 2005 May 1 [cited 2009 Feb 2]. Available from <http://www.phac-aspc.gc.ca/tmp-pmv/info/rage-eng.php>.
