

# Appendix A: Disease-Specific Chapters

Chapter: Salmonellosis

## Salmonellosis

- 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>	<p>Salmonellosis is caused by the bacterium, <i>Salmonella</i>, a Gram-negative non-spore forming bacillus that has more than 2,000 serotypes, belonging to the <i>Enterobacteriaceae</i> family (1, 2).</p> <p>The new nomenclature for Salmonella is <i>Salmonella enterica</i> subsp <i>enterica</i>. Serovars include Typhimurium, Enteritidis, etc. (1).</p>
<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 when establishing an outbreak case definition:</p> <ol style="list-style-type: none"><li>1. Clinical, laboratory and/or epidemiological criteria</li><li>2. The time frame for occurrence</li><li>3. The geographic location(s) or place(s) where cases live or became ill/exposed</li><li>4. Special attributes of cases (e.g. age, underlying conditions) and/or the aetiologic agent</li></ol> <p>Cases may be classified by levels of probability (i.e. confirmed, probable and/or suspect).</p>
<b>3) Identification:</b>	
Clinical Presentation	<p>Symptoms can occur within 6-72 hours, however usually appear 12-36 hours after consumption of contaminated food or beverage. Symptoms include sudden onset of headache, fever, abdominal pain, diarrhea, nausea and sometimes vomiting. Dehydration especially among the young, the elderly, and those with impaired immune systems can be severe, resulting in hospitalization. In these patients, the infection may spread to the bloodstream; occasionally, the bacteria may localize in any tissue of the body, producing abscesses and other systemic complications. Death is uncommon except in the very old, the very young, and in persons with compromised immune systems (1, 2, 3).</p>

Diagnosis	<p><a href="#">See Appendix B</a></p> <p>Diagnosis is made through the isolation of <i>Salmonella</i> organisms from stool, rectal swabs, urine, blood or any other sterile site.</p>
<b>4) Epidemiology:</b>	
Occurrence	<p>Occurrence is worldwide. It is estimated that only 1% of all infections are ever clinically recognized. The incidence rate of infection is highest among infants and young children. About 60-80% of all cases occur sporadically; however, large outbreaks in hospitals, institutions for children, restaurants, nursing homes, and the community, are common, and usually arise from food contaminated at source or during handling by an ill person or carrier, although person-to-person transmission can occur (3).</p> <p>Salmonellosis is the second most common enteric infection in Ontario, with an average of almost 2,500 cases occurring per year. The number of cases typically peaks in the summer months. <i>S. Typhimurium</i> and <i>S. Enteritidis</i> are the leading causes of salmonellosis in Ontario.</p>
Reservoir	<p>Domestic and wild animals, including poultry, swine, cattle, rodents, and pets such as iguanas, tortoises, turtles, terrapins, snakes, chicks, dogs and cats (1).</p> <p>Acute cases, convalescent carriers and mild and unrecognized cases constitute an important source of illness (1).</p>
Modes of Transmission	<p>Most types of <i>Salmonella</i> live in the intestines of animals and birds. Infection is acquired by the ingestion of organisms in food contaminated by the stool of an infected animal or person.</p> <p>The most common food vehicles include poultry and poultry products, raw milk and raw milk products, contaminated water, meat and meat products, raw and undercooked eggs and egg products, and raw fruits and vegetables.</p> <p>Pets are another common source of infection. The bacteria can be carried by iguanas, turtles, tortoises, chicks, and sometimes cats and dogs. Farm animals may become infected by contaminated feeds and fertilizers.</p> <p>Fecal-oral transmission from person-to-person can also occur when diarrhea is present, and can be a concern, especially in institutional settings (3).</p>
Incubation Period	From 6-72 hours, usually about 12-36 hours (1).
Period of Communicability	Throughout the course of infection; extremely variable, usually several days to several weeks (1). A temporary carrier state occasionally continues for months, especially in infants. Depending

	on the serotypes, approximately 1% of infected adults and 5% of children less than 5 years of age may excrete the organism for more than one year (1).
Susceptibility and Resistance	Susceptibility is general and usually increased by achlorhydria, antacid treatment, gastrointestinal surgery, prior or current broad-spectrum antibiotic therapy, neoplastic disease, and other immunosuppressive conditions including malnutrition (1).
<b>5) Reporting Requirements:</b>	
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 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 notification</b> as per <i>iPHIS Bulletin</i> Number 17: Timely Entry of Cases (4).</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>
<b>6) Prevention and Control Measures:</b>	
Personal Prevention Measures	<p>Preventive measures (1):</p> <ul style="list-style-type: none"> <li>• Minimize cross contamination by washing cutting boards and utensils with warm soapy water between uses, and especially after contact with raw poultry, meat, fruits and vegetables, and ready-to-eat foods</li> <li>• Wash hands after using sanitary facilities, after handling raw foods, pets and other animals, and before handling other foods</li> <li>• Thoroughly cook all food derived from animal sources, especially poultry, eggs and other poultry products and meats</li> <li>• Avoid preparing or serving food while ill</li> <li>• Treat or boil water intended for consumption</li> <li>• Consume only pasteurized milk and dairy products made from pasteurized milk</li> </ul>
Infection Prevention and Control Strategies	<p>Strategies:</p> <ul style="list-style-type: none"> <li>• Implement routine practices and contact precautions for incontinent and diapered cases for the duration of hospitalization (2)</li> </ul>

	<ul style="list-style-type: none"> <li>Educate food handlers and the general public about the importance of hand washing before, during and after food preparation; proper food handling and storage especially avoiding cross contamination between raw and cooked foods; maintaining a sanitary kitchen (1)</li> </ul>
<p>Management of Cases</p>	<p>Investigate cases of salmonellosis to determine the source of infection. Refer to Section 5: <i>Reporting Requirements</i> above for relevant data to be collected during case investigation. The following disease-specific information pertaining to the 3 days prior to onset of symptoms should also be obtained during case management:</p> <ul style="list-style-type: none"> <li>Symptoms and date of symptom onset;</li> <li>History of out-of-province or international travel, including earliest and latest exposure dates;</li> <li>Food and other exposure histories for the 3 day period prior to symptom onset;</li> <li>Known exposure to a carrier or unreported case in the 3 days before symptom onset;</li> <li>History of occupation involving vulnerable populations, food handling, childcare and healthcare, and</li> <li>History of farm visits.</li> </ul> <p>For uncomplicated enterocolitis, no treatment is generally indicated except rehydration and electrolyte replacement (1). Antibiotic therapy does not shorten the duration of disease, can prolong the duration of fecal excretion, may not eliminate the carrier state, and may lead to resistant strains or more severe infections. Exceptions for treatment include infants up to 2 months, the elderly, the debilitated, those with sickle cell disease, persons with HIV, or patients with continued high fever or manifestations of extraintestinal infection (1, 2).</p> <p>Note any treatment prescribed including name of medication, dose, and duration of treatment, start and finish dates.</p> <p>Provide education about transmission of infection, proper hand hygiene, and safe food handling.</p> <p>If available, collect and test suspected food items and prevent further consumption by recalling, holding or otherwise disposing of the suspected items.</p> <p>Exclusion Criteria:</p> <ul style="list-style-type: none"> <li>Exclude symptomatic individuals from food handling, and from direct care of infants, elderly, immunocompromised and institutionalized patients until symptom free for 24 hours</li> <li>Return to work is not conditional upon submission of stool specimens or results of stool examination with the exception of health care workers (HCW) who work with high risk patients such as nursery personnel</li> <li>For these HCW cases, refer them to their respective</li> </ul>

	<p>occupational health or the infection control practitioner for follow up (will be managed as per the Ontario Hospital Association, OHA/OMA Enteric Diseases Surveillance Protocol, Revised September 2007)</p> <ul style="list-style-type: none"> <li>• Exclude symptomatic cases from attending or working in day nurseries until symptom free for 24 hours</li> </ul>
<p>Management of Contacts</p>	<p>Consider household members as close contacts of a case. Provide education about transmission of infection and proper hand hygiene.</p> <p>Symptomatic contacts that work in high risk settings should be assessed by their health care provider to determine if infected, and should be excluded as above.</p>
<p>Management of Outbreaks</p>	<p>Provide public health management of outbreaks or clusters in order to identify the source of illness, stop the outbreak and limit secondary spread.</p> <p><b>Two or more unrelated cases of the same serotype of salmonellosis with a common exposure is suggestive of an outbreak.</b></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> <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. 579 - 584</p> <p>(3) Notifiable Diseases On-Line [Internet]. Ottawa: Public Health Agency of Canada; 2003. Salmonellosis. 2003 Dec 11 [cited 2009 Feb 12]. Available from <a href="http://dsol-smed.phac-aspc.gc.ca/dsol-smed/ndis/diseases/salm_e.html">http://dsol-smed.phac-aspc.gc.ca/dsol-smed/ndis/diseases/salm_e.html</a>.</p>

	<p>(4) Ministry of Health and Long-Term Care. Timely entry of cases. <i>iPHIS Bulletin</i>. 2007 May 11;17.</p>
<p><b>8) Additional Resources</b></p>	<p>Ministry of Health and Long Term Care, Advisory Committee on Communicable Diseases, <i>Enteric Disease Screening Recommendations and Case Management Guidelines on Foodhandlers and Patient Care Workers</i>, 1990 (Currently being revised as “<i>Guidelines for the Management of Enteric Diseases in Healthcare Workers, Food Handlers and Day care Staff and Attendees</i>”)</p> <p>Ministry of Health and Long-Term Care. Food safety protocol. Toronto: Queen’s Printer for Ontario; 2008. Available from <a href="http://www.health.gov.on.ca/english/providers/program/pubhealth/oph_standards/ophs/progstds/protocols/food_safety.pdf">http://www.health.gov.on.ca/english/providers/program/pubhealth/oph_standards/ophs/progstds/protocols/food_safety.pdf</a>. (or as current)</p> <p>Ministry of Health and Long-Term Care. Infectious diseases protocol. Toronto: Queen’s Printer for Ontario; 2009. Available from <a href="http://www.health.gov.on.ca/english/providers/program/pubhealth/oph_standards/ophs/infdispro.html">http://www.health.gov.on.ca/english/providers/program/pubhealth/oph_standards/ophs/infdispro.html</a> (or as current)</p> <p>Ontario Hospital Association; Ontario Medical Association. Enteric disease surveillance protocols for Ontario hospitals. Toronto: Ontario Hospital Association; 2007. Available from <a href="http://www.oha.com/Client/OHA/OHA_LP4W_LND_WebStation.nsf/resources/Communicable+Disease+Surveillance+Protocols/\$file/Enteric+Diseases.pdf">http://www.oha.com/Client/OHA/OHA_LP4W_LND_WebStation.nsf/resources/Communicable+Disease+Surveillance+Protocols/\$file/Enteric+Diseases.pdf</a></p> <p><i>Health Protection and Promotion Act</i>, R.S.O. 1990, c. H.7. Available from <a href="http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90h07_e.htm">http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90h07_e.htm</a>.</p> <p>Gregg MB, editor. <i>Field epidemiology</i>. 2<sup>nd</sup> ed. New York: Oxford University Press; 2002.</p>

