

Appendix A: Disease-Specific Chapters

Chapter: Verotoxin-producing *E. Coli* infection indicator conditions, including Hemolytic Uraemic Syndrome (HUS)

Verotoxin-producing *E. Coli* infection indicator conditions, including Hemolytic Uraemic Syndrome (HUS)

- 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**

<p>1) Aetiologic Agent:</p>	<p>Verotoxigenic <i>Escherichia coli</i> (VTEC) comprise a wide range of serotypes that produce a variety of closely related verocytotoxins, of which <i>E. coli</i> O157:H7 is most commonly associated with infection in humans.</p>
<p>2) Case Definition:</p>	
<p>Surveillance Case Definition</p>	<p>See Appendix B</p>
<p>Outbreak Case Definition</p>	<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 4. 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 and/or suspect).</p>
<p>3) Identification:</p>	
<p>Clinical Presentation</p>	<p>Self-limiting enteric disease in infants and adults; characterized by bloody or non-bloody diarrhea, abdominal cramping, vomiting, acidosis, prostration, malaise and dehydration; fever is not present in most cases and symptoms usually lasts fewer than 5 days (3).</p> <p>Most individuals recover without residual sequelae, however, complications such as hemorrhagic colitis and Hemolytic Uremic Syndrome (HUS) can occur. HUS occurs in about 8% of infected children as well as in a small number of adults, particularly the elderly (3).</p>

Diagnosis	<p>See Appendix B</p> <p><i>The diagnosis is confirmed by a positive stool culture for E. coli O157:H7 or other E. coli serotype causing VTEC (1).</i></p>
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4) Epidemiology:

Occurrence	<i>E. coli</i> was first recognized in 1982 when an outbreak of hemorrhagic colitis occurred in the U.S. (1). In Ontario, <i>E. coli</i> cases demonstrate seasonal increases in the summer months. During the years 2003 to 2007, an average of 330 cases of VTEC was reported annually.
Reservoir	The most important reservoir is infected dairy and beef cattle, but other animals such as sheep, pigs and goats can also be infected. Humans may serve as a reservoir for person-to-person spread (1).
Modes of Transmission	<p>Transmitted by the fecal-oral route mainly by ingestion of contaminated food. Ground beef is a common source of infection but other known sources include fermented meats, fresh produce such as lettuce, spinach, coleslaw, sprouts and melons and unpasteurized milk and beverages such as apple cider and orange juice.</p> <p>Waterborne transmission can occur through the ingestion of contaminated drinking water or recreational water.</p> <p>Animal to person transmission can occur at farms and petting zoos (4).</p> <p>Person to person transmission most frequently occur in settings where personal hygiene practices are inadequate.</p>
Incubation Period	2 – 10 days with a median of 3 – 4 days (1). HUS may develop up to 2 weeks after onset of diarrhea (2).
Period of Communicability	Variable, as long as organisms are excreted; the duration of excretion of the pathogen is typically 1 week or less in adults but can be 3 weeks in one third of children. Prolonged carriage is uncommon (1).
Susceptibility and Resistance	The infectious dose is very low (1). Little is known about differences in susceptibility and immunity, but infections occur in persons of all ages. Children under five years are most frequently diagnosed with infection and are at greatest risk of developing HUS. The elderly also appear to be at increased risk of complications (1).

5) Reporting Requirements:

To local Board of Health	Confirmed and suspected cases of VTEC and HUS 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.
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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 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.
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6) Prevention and Control Measures:

Personal Prevention Measures	<p>Preventative measures:</p> <ul style="list-style-type: none"> • Minimize cross contamination through the use of safe food handling techniques • Practice proper hand hygiene after using sanitary facilities, handling raw foods and farm animals (petting zoos) and before handling food • Thoroughly cook all food derived from animal sources, especially ground beef • Treat or boil water intended for consumption • Conduct routine bacteriological analysis of private drinking water supplies • Consume only pasteurized juices, milk and dairy products • Wash fresh fruits and vegetables under potable running water
Infection Prevention and Control Strategies	<p>Strategies:</p> <ul style="list-style-type: none"> • Contact precautions and routine practices are indicated for the duration of illness for hospitalized cases • Provide instructions on proper hand hygiene in institutional settings • Educate the public and food handlers about proper food and equipment handling and about personal hygiene, especially hand washing after using the washroom, and before food preparation
Management of Cases	<p>Investigate cases of <i>E. coli</i> 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 10 days prior to onset should also be obtained during case management:</p> <ul style="list-style-type: none"> • Symptoms and date of symptom onset • History of travel, including earliest and latest exposure dates • Food, water and other exposure histories such as animal

	<p>contact in the 10 days prior to symptom onset</p> <ul style="list-style-type: none"> • Contact with a known case or person with symptoms compatible with <i>E. coli</i> in the 10 days prior to symptom onset • History of occupation involving susceptible populations, food handling, childcare and healthcare <p>Provide education about disease transmission, appropriate personal hygiene and food handling practices (2).</p> <p>Obtain and test suspected food items and remove from consumption to avoid further exposure.</p> <p>Use of antibiotics is not recommended; treatment is usually fluid replacement and supportive (1).</p> <p>Exclusion criteria should be assessed in conjunction with an evaluation of personal hygiene practices.</p> <p>Exclude symptomatic food handlers and healthcare staff until diarrhea free for 24 hours.</p> <p>Return to work is not conditional upon submission of 2 negative specimens with the exception of:</p> <ul style="list-style-type: none"> • Day care staff and attendees, and • Consider requiring for health care workers that work with very high risk patients. <p>In these instances, 2 negative specimens collected at least 24 hours apart or 48 hours after the completion of antibiotic therapy must be submitted.</p>
<p>Management of Contacts</p>	<p>Contacts include household members, or other persons who have had close contact with the case or shared the suspected exposure.</p> <p>Contacts should be instructed about disease transmission, appropriate personal hygiene and contact precautions.</p> <p>Exclusion Criteria: Symptomatic contacts should be assessed by their physician, tested and excluded as above where applicable.</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>Two or more cases linked in time and place to a common exposure is suggestive of an outbreak</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;

	<ul style="list-style-type: none"> • 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.291 – 296.</p> <p>(3) Notifiable Diseases On-Line [Internet]. Ottawa: Public Health Agency of Canada; 2003. Verotoxic <i>E. coli</i>; 2003 Dec 11 [cited 2009 Feb 12]. Available from http://dsol-smed.hc-sc.gc.ca/dsol-smed/ndis/diseases/ecol_e.html</p> <p>(4) David ST et al. Petting zoo-associated <i>E. coli</i> 0157:H7 – Secondary transmission, asymptomatic infection and prolonged shedding in the classroom. Can Commun Dis Rep. 2004; 30(20): 173-180.</p> <p>(5) Ministry of Health and Long-Term Care. Timely entry of cases. <i>iPHIS Bulletin</i>. 2007 May 11;17.</p>
<p>8) Additional Resources</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><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. 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>Ministry of Health and Long-Term Care. Food safety protocol. Toronto: Queen’s Printer for Ontario; 2008. Available from</p>

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