Appendix A: Disease-Specific Chapters

Chapter: Cryptosporidiosis

Revised April 2015
Cryptosporidiosis
☐ Communicable
☐ Virulent

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

1.0 Aetiologic Agent

*Cryptosporidium* are oocyst-forming coccidian protozoa. Oocysts are excreted in feces of an infected host. The most common species causing disease in humans are *C. hominis*, which only infects humans, and *C. parvum*, which infects humans, cattle and other mammals.\(^1\)

Oocysts may survive for 2 to 6 months in a moist environment. *Cryptosporidium* is resistant to most disinfectants including 3% hypochlorite, iodophors, and 5% formaldehyde and can survive for days in treated recreational water venues.\(^2\,^3\)

The infectious dose is low; studies have demonstrated that the ingestion of ≤10 *C. hominis* or *C. parvum* oocysts can cause infection in healthy persons.\(^4\)

2.0 Case Definition

2.1 Surveillance Case Definition

See Appendix B

2.2 Outbreak Case Definition

Outbreak case definitions are established to reflect the disease and circumstances of the outbreak under investigation. Confirmed outbreak cases must at a minimum meet the criteria specified for the provincial surveillance confirmed case classification. Consideration should also be given to the following when establishing outbreak case definitions:

- Clinical and/or epidemiological criteria;
- The time frame for occurrence (i.e., increase in endemic rate);
- A geographic location(s) or place(s) where cases live or became ill/exposed;
- Special attributes of cases (e.g., age, underlying conditions); and
- Cases may be classified by levels of probability (e.g., confirmed, probable and/or suspect).

3.0 Identification

3.1 Clinical Presentation

Cryptosporidiosis is a parasitic infection that commonly presents as gastroenteritis. The major symptom is diarrhea associated with cramping and abdominal pain. In children, diarrhea can be watery and profuse preceded by anorexia and vomiting. General malaise,
fever, anorexia, nausea and vomiting occur less often. Symptoms often wax and wane but remit in less than 30 days in most immunologically healthy people. Asymptomatic infections are common and constitute a source of infection for others.\(^5\), \(^4\)

In immunodeficient persons, especially those infected with HIV, who may be unable to clear the parasite, the disease has a prolonged and fulminant clinical course contributing to death. Patients with AIDS who have cryptosporidiosis have a wide spectrum of disease depending on the site of infection and the CD4+ T-cell count. Among the immunocompromised (e.g., those who are HIV positive or have AIDS), symptoms can also relapse.\(^4\), \(^6\)

This parasite can also cause extraintestinal complications involving the gallbladder, biliary tree, and pancreatic ducts.\(^7\)–\(^10\)

3.2 Diagnosis

See Appendix B for diagnostic criteria relevant to the Case Definition.

For further information about human diagnostic testing, contact the Public Health Ontario Laboratories or refer to the Public Health Ontario Laboratory Services webpage: http://www.publichealthontario.ca/en/ServicesAndTools/LaboratoryServices/Pages/default.aspx.

4.0 Epidemiology

4.1 Occurrence

Worldwide. Outbreaks have been associated with exposure to recreational water (e.g., splash parks, wave pools, and swimming pools) and lakes, and with drinking unfiltered water and contaminated beverages.\(^5\) Outbreaks have occurred in childcare facilities and in at least one correctional facility setting.\(^5\), \(^11\) In Ontario, cases of cryptosporidiosis tend to increase during the summer and early fall. Exposure to recreational water is often associated with cryptosporidiosis outbreaks in Ontario.

Between 2007 and 2011, an average of 338 cases of cryptosporidiosis were reported per year in Ontario.

Please refer to the Public Health Ontario Monthly Infectious Diseases Surveillance Reports and other infectious diseases reports for more information on disease trends in Ontario, available at:


4.2 Reservoir

Humans, cattle and other domesticated and feral animals.\(^5\)

4.3 Modes of Transmission

Fecal-oral, which includes person-to-person, animal-to-person, waterborne (recreational or drinking water) and foodborne transmission.\(^5\)
4.4 Incubation Period
Not known precisely; 1 to 12 days is the likely range with an average of about 7 days.\textsuperscript{5}

4.5 Period of Communicability
Oocysts, the infectious components of the parasites life cycle, appear in stool at the onset of symptoms and are infectious immediately upon excretion; duration of post-symptomatic oocyst excretion varies from several weeks to up to 60 days.\textsuperscript{1} The duration of oocyst infectiousness in the environment under suitable soil conditions can range from 2 to 6 months.\textsuperscript{5}

Symptoms can last for 30 days or less in healthy hosts, or longer in immunocompromised.\textsuperscript{5} Mean duration has been reported as 12.7 days or up to a month in healthy adults, relapse/recurrence can occur after an asymptomatic period.\textsuperscript{4, 14} Among the immunocompromised (e.g., those who are HIV positive or have AIDS), symptoms can be chronic/relapsing.\textsuperscript{4, 6}

4.6 Host Susceptibility and Resistance
Persons with intact immune function usually have asymptomatic or self-limiting illness. It has been estimated that 10 to 20\% of AIDS patients develop infection at some time during their illness.\textsuperscript{5}

Those who are particularly prone to infection include children under two, animal handlers, travelers, men who have sex with men and close personal contacts of infected individuals (family, healthcare and daycare workers).\textsuperscript{5}

5.0 Reporting Requirements

5.1 To local Board of Health
Individuals who have or may have cryptosporidiosis shall be reported as soon as possible to the medical officer of health by persons required to do so under the \textit{Health Protection and Promotion Act}, R.S.O. 1990 (HPPA).\textsuperscript{15}

5.2 To the Ministry of Health and Long-Term Care (the ministry) or Public Health Ontario (PHO), as specified by the ministry
Report only case classifications specified in the case definition using the integrated Public Health Information System (iPHIS), or any other method specified by the ministry \textit{within five (5) business days of receipt of initial notification} as per iPHIS Bulletin Number 17: Timely Entry of Cases.\textsuperscript{16}

The minimum data elements to be reported for each case are specified in the following sources:

- \textit{Ontario Regulation 569} (Reports) under the HPPA;\textsuperscript{17, 15}
- The iPHIS User Guides published by PHO; and
- Bulletins and directives issued by PHO.
6.0 Infection Prevention and Control (IPAC) Measures

6.1 Personal Prevention Measures

Practice proper hand hygiene after using sanitary facilities, toileting and diapering, handling pets/livestock and before and after handling food.

**Consume Safe Drinking Water**

Where water might be contaminated, travelers, campers and hikers should be advised of methods to make water safe for drinking.16

- Water should be brought to a full boil for one minute.5
- Filters designed to remove *Cryptosporidium* oocysts should be used.18
- Oocysts are resistant to chlorine.1

**Recreational Water Use**

- Avoid using public recreational waters such as swimming pools and splash pads for 2 weeks after symptoms have resolved.1
- Babies and toddlers should wear special swim diapers or pants when using public recreational waters.

**Food Safety**

- Use potable water to wash or rinse fresh fruit and vegetables before consumption.19
- Thoroughly cook and reheat all food derived from animal sources to the appropriate temperatures. For temperatures, see the ministry’s ‘Food Safety: Cook’ publication available at:
- Consume only pasteurized milk and dairy products.20

6.2 IPAC Strategies

- A safe water supply is of primary importance.
- Educate the public about hand hygiene, washing produce, and the risks involved with sexual contact.
- Routine and contact practices are recommended for incontinent and/or diapered hospitalized/institutionalized cases.1
- Increased public awareness of acceptable practices at swimming venues can help avoid acquiring or transmitting the disease.
- Recreational water operators should be effectively trained in procedures for the management of fecal accidents and in proper filtration methodology.21
- Where recreational water (e.g., pool, spa, hot tub, wave pool, splash pad, water park) is determined to be the confirmed or suspect source of cryptosporidiosis, boards of health should refer to the *Recreational Water Protocol, 2008* (or as current). Operators may be
advised to take action, including, but not limited to, closing the premises to the public and performing hyperchlorination.22

Refer to Public Health Ontario’s website at www.publichealthontario.ca to search for the most up-to-date Provincial Infectious Diseases Advisory Committee (PIDAC) best practices on IPAC. PIDAC best practice documents can be found at: http://www.publichealthontario.ca/en/BrowseByTopic/InfectiousDiseases/PIDAC/Pages/PIDAC_Documents.aspx.

6.3 Management of Cases

Investigate cases of cryptosporidiosis to determine the source of infection. Refer to Section 5: Reporting Requirements above for relevant data to be collected during case investigation. The following disease-specific information should also be obtained during case management:

- Symptoms and date of symptom onset;
- History of out-of-province or international travel;
- History of exposure or risk behaviours such as exposure to farm animals, petting zoos or public recreational water;
- Earliest and latest exposure dates; and
- Residency/attendance/occupation at a facility or institution.

Exclude food handlers, healthcare workers, daycare staff and attendees who are symptomatic until 24 hours after cessation of symptoms.5

Provide education about the illness and how to prevent spread, emphasizing strict hand hygiene.

There is no specific treatment except rehydration when indicated.5

6.4 Management of Contacts

Investigate household and close contacts who may have shared a common source exposure (e.g., water supply, food, etc.).

Symptomatic contacts that are food handlers, healthcare workers, daycare staff and attendees should be assessed by their healthcare provider to determine if infected, and should be excluded as above.

6.5 Management of Outbreaks

Provide public health management of outbreaks or clusters in order to identify the source of illness, stop the outbreak and limit secondary spread.

An outbreak is defined as the occurrence of two or more cases of enteric illness linked by time, common exposure, or source, and most often location.

As per this Protocol, outbreak management shall comprise of, but not be limited to, the following general steps:

- 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 premises 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.

Refer to Ontario’s Foodborne Illness Outbreak Response Protocol (ON-FIORP) for multi-jurisdictional foodborne outbreaks which require the response of more than two Parties (as defined in ON-FIORP) to carry out an investigation.

7.0 References


21. Centers for Disease Control and Prevention. Fecal incident response recommendations for pool staff [Internet]. Atlanta, GA: Centers for Disease Control and Prevention; 2010 [cited 2014 Dec 5]. Available from:


8.0 Additional Resources


9.0 Document History

Table 1: History of Revisions

<table>
<thead>
<tr>
<th>Revision Date</th>
<th>Document Section</th>
<th>Description of Revisions</th>
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<tr>
<td>April 2015</td>
<td>General</td>
<td>New template.</td>
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<tr>
<td></td>
<td></td>
<td>Section 9.0 Document History added.</td>
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<tr>
<td>April 2015</td>
<td>1.0 Aetiologic Agent</td>
<td>Entire section revised.</td>
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<tr>
<td>April 2015</td>
<td>2.2 Outbreak Case Definition</td>
<td>Changed “The outbreak case definition varies with the outbreak under investigation” to “Outbreak case definitions are established to reflect the disease and circumstances of the outbreak under investigation. Confirmed outbreak cases must at a minimum meet the criteria specified for the provincial surveillance confirmed case classification.” Removed “or aetiologic agent” from “Special attributes of cases (e.g. age, underlying conditions) and/or aetiologic agent”</td>
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<tr>
<td>April 2015</td>
<td>3.1 Clinical Presentation</td>
<td>Entire section revised.</td>
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<tr>
<td>April 2015</td>
<td>3.2 Diagnosis</td>
<td>Revised to include URL for the Public Health Ontario Laboratory Services website.</td>
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<tr>
<td>April 2015</td>
<td>4.1 Occurrence</td>
<td>Revised and updated with additional information on number of cases reported and reference to PHO monthly infectious diseases surveillance reports website.</td>
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<tr>
<td>April 2015</td>
<td>4.2 Reservoir</td>
<td>Revised to include “other domesticated and feral animals”.</td>
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<td>April 2015</td>
<td>4.3 Modes of Transmission</td>
<td>Entire section revised.</td>
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<td>4.5 Period of Communicability</td>
<td>Entire section revised.</td>
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<td>April 2015</td>
<td>4.6 Host Susceptibility and Resistance</td>
<td>Added “Host” to title. Added: “Those who are particularly prone to infection include children under two, animal handlers, travelers, men who have sex with men and close personal contacts of infected individuals (family, healthcare and daycare workers).”</td>
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<td>April 2015</td>
<td>5.1 To local Board of Health</td>
<td>Entire section revised.</td>
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<tr>
<td>April 2015</td>
<td>5.2 To the Ministry of Health and Long-Term Care (the ministry) or Public Health Ontario (PHO), as specified by the ministry</td>
<td>Title revised from “To Public Health Division”. Revised the list of sources that include the minimum data elements to be reported.</td>
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<tr>
<td>April 2015</td>
<td>6.1 Personal Prevention Measures</td>
<td>Revised and updated to include specific sections for: Consume Safe Drinking Water; Recreational Water Use; and Food Safety.</td>
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<td>April 2015</td>
<td>6.2 Infection Prevention and Control Strategies</td>
<td>Entire section revised.</td>
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<tr>
<td>April 2015</td>
<td>6.3 Management of Cases</td>
<td>Removed: “More detailed information on exclusion is available in the resource “Guidelines for the Management of Enteric Diseases in Healthcare Workers, Food Handlers and Daycare Staff and Attendees”. “</td>
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<tr>
<td>April 2015</td>
<td>6.4 Management of Contacts</td>
<td>First Sentence: Added “and close” and “(e.g., water supply, food, etc.)” to “Investigate household and close contacts who may have shared a common source exposure (e.g., water supply, food, etc.).”</td>
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