Appendix A: Disease-Specific Chapters

Chapter: Cyclosporiasis

Revised December 2014
Cyclosporiasis

☐ Communicable
☐ Virulent

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

1.0 Aetiologic Agent

*Cyclospora cayetanensis* is a coccidian protozoan; oocysts (rather than cysts) are passed in stools and become infectious days to weeks following excretion.¹

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. For example, 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);
- Further strain characterization and typing as appropriate, which may be used to support linkage;
- Outbreak cases may be classified by levels of probability (i.e., confirmed, probable and/or suspect).

3.0 Identification

3.1 Clinical Presentation

Watery diarrhea is the most common symptom and can be profuse and protracted. Anorexia, nausea, vomiting, substantial weight loss, flatulence, abdominal cramping, myalgia, and prolonged fatigue also can occur. Low grade fever occurs in approximately 50% of patients. Biliary tract disease also has been reported. Infection usually is self-limited, but untreated people may have remitting, relapsing symptoms for weeks to months. Asymptomatic infection has been documented most commonly in settings where cyclosporiasis is endemic.¹
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

*C. cayetanensis* is not endemic in Canada. Cyclosporiasis is most common in tropical and subtropical countries, where asymptomatic infections are not infrequent. It has also been associated with diarrhea in travelers to Asia, the Caribbean, and Latin America.²

Outbreaks in 2004 and 2010 in Ontario were caused by contaminated basil (used to make pesto). Spring mix & mesclun lettuce has also been implicated.²

In Ontario, cases of cyclosporiasis typically occur more often in the spring and summer. Previous clusters of cyclosporiasis have been associated with the consumption of imported fresh produce, including berries. Most sporadic cases have been associated with travel.

Between 2007 and 2011, an average of 123 cases of cyclosporiasis 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.³, ⁴ http://www.publichealthontario.ca/en/DataAndAnalytics/Pages/DataReports.aspx

4.2 Reservoir

Humans are the only known hosts for *C. cayetanensis*.²

4.3 Modes of Transmission

Both foodborne and waterborne outbreaks have been reported. Most of the outbreaks in the United States and Canada have been associated with consumption of imported fresh produce including Guatemalan raspberries and Thai basil.¹ Investigations done by the Canadian Food Inspection Agency in the early 2000’s indicated that fresh fruits and vegetables (berries, basil and mesclun lettuce) were sources of *Cyclospora* infection. *Cyclospora* is not naturally found in or on fresh fruits and vegetables, or any other foods. However, it is suspected that food contamination occurs during cultivation, harvest, packaging or transportation through contact with contaminated water or infected workers.⁵

Direct person-to-person transmission is unlikely, as excreted oocysts take days to weeks under favorable environmental conditions to sporulate and become infective. The oocysts are resistant to most disinfectants used in food and water processing and can remain viable for prolonged periods in cool, moist environments.¹
4.4 Incubation Period
Incubation period is approximately 7 days and ranges from 2 to 14 days.¹

4.5 Period of Communicability
Direct person-to-person transmission is unlikely. Low-level shedding of oocysts is common, even in persons who are symptomatic.⁶ Excreted oocysts take days to weeks under favorable environmental conditions to sporulate and become infective.¹

4.6 Host Susceptibility and Resistance
In immunocompromised individuals, diarrhea can last for months.²

5.0 Reporting Requirements

5.1 To local Board of Health
Individuals who have or may have cyclosporiasis shall be reported as soon as possible to the medical officer of health by persons required to do so under the Health Protection and Promotion Act, R.S.O. 1990 (HPPA).⁷

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 within one (1) business day of receipt of initial notification as per iPHIS Bulletin Number 17: Timely Entry of Cases.⁸

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

- Ontario Regulation 569 (Reports) under the HPPA;⁹, ⁷
- The iPHIS User Guides published by PHO; and,
- Bulletins and directives issued by PHO.

6.0 Prevention and Control Measures

6.1 Personal Prevention Measures
Prevention measures are similar to those for other enteric diseases.

- Wash hands after using sanitary facilities and before handling food
- Produce should be washed thoroughly before it is eaten, although this practice does not eliminate the risk of cyclosporiasis.²
- Thoroughly cooking or baking fruits and vegetables will eliminate the risk of infection.
- Travelers, especially to developing countries, should avoid any fruits and vegetables that cannot be peeled or cooked and should drink water from a safe (treated or boiled) source.
- Freezing fruits and vegetables may kill parasites.⁵
6.2 Infection Prevention and Control Strategies

Disseminate general public health education messages about hand hygiene and safe food handling.

Routine practices are recommended for hospitalized cases.

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

6.3 Management of Cases

Investigate cases of cyclosporiasis 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 including earliest and latest exposure dates
- Obtain detailed food history (inquire especially about fresh produce or herbs)

The disease is not endemic in Canada; therefore, cases should be investigated as most likely associated with imported food or travel.

Treatment is under the direction of the attending health care provider.

Provide education on hand hygiene, proper food handling practices and on preventing the spread of infection.

Exclusion Criteria:

- Exclude symptomatic food handlers, healthcare providers*, and day care staff and attendees until symptom free for 24 hours, OR symptom free for 48 hours after discontinuing use of anti-diarrheal medication.

The rationale for exclusion for 48 hours after discontinuing the use of anti-diarrheal medication is to ensure that diarrhea does not return after the anti-diarrheal medication has been discontinued. In the event that antibiotics are used, the person should be excluded until symptom free for 24 hours.

*If the healthcare setting is a hospital, use the “Enteric Diseases Surveillance Protocol for Ontario Hospitals” (OHA and OMA Joint Communicable Diseases Surveillance Protocols Committee, February 2014) for exclusion criteria: http://www.oha.com/Services/HealthSafety/Documents/Enteric%20Diseases%20Revised%20February%202014.pdf

Note: Treatment recommendations are under the direction of the attending health care provider.
6.4 Management of Contacts
Exclude symptomatic persons epidemiologically linked to the same potential source of *Cyclospora* from food handling as per the exclusion specified above for cases.

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.

Two or more cases linked by time, common exposure, and/or place is suggestive of an outbreak.

As per this Protocol, outbreak management shall be comprised of but not 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 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.

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


8.0 Additional Resources


# 9.0 Document History

## Table 1: History of Revisions

<table>
<thead>
<tr>
<th>Revision Date</th>
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| December 2014   | General                                 | New template.  
Title of Section 4.6 changed from “Susceptibility and Resistance” to “Host Susceptibility and Resistance”.  
Title of Section 5.2 changed from “To Public Health Division (PHD)” to “To the Ministry of Health and Long-Term Care (the ministry) or Public Health Ontario (PHO), as specified by the ministry”.  
Section 9.0 Document History added. |
| December 2014   | 1.0 Aetiologic Agent                    | Entire section revised.                                                                                                                                  |
| December 2014   | 2.2 Outbreak Case Definition            | Entire section revised.                                                                                                                                  |
| December 2014   | 3.1 Clinical Presentation               | Entire section revised.                                                                                                                                  |
| December 2014   | 3.2 Diagnosis                           | Addition of last paragraph: “For further information about human diagnostic testing…”                                                                         |
| December 2014   | 4.1 Occurrence                          | Entire section revised.                                                                                                                                  |
| December 2014   | 4.2 Reservoir                           | “Confirmed natural infection in animals and humans has not been documented” changed to “Humans are the only known hosts for *C. cayetanensis*.” |
| December 2014   | 4.3 Modes of Transmission               | Entire section revised.                                                                                                                                  |
| December 2014   | 4.4 Incubation Period                   | Changed from “…7 days with a range of 1 – 14 days” to “…7 days and ranges from 2 – 14 days”.                                                                           |
| December 2014   | 4.5 Period of Communicability           | Removal of: “The disappearance of symptoms and oocysts usually occurs simultaneously. The mean duration of organism shedding is 23 days.”  
Addition of: “Direct person-to-person transmission is unlikely. Low-level shedding of oocysts is common, even in persons who are symptomatic. Excreted oocysts take days to weeks under favorable environmental conditions” |
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| December 2014 | 4.6 Host Susceptibility and Resistance                      | Removal of: “Available evidence is limited.”  
Addition of: “In immunocompromised individuals, diarrhea can last for months.”                                                                                                                                         |
| December 2014 | 5.1 To Local Board of Health                                | At the beginning of the first paragraph, the following was deleted: “Confirmed and suspected cases...” and replaced with: “Individuals who have or may have cyclosporiasis…”  
Insertion of “…as soon as possible…”                                                                                                                |
| December 2014 | 5.2 To the Ministry of Health and Long-Term Care (the Ministry) or Public Health Ontario (PHO), as specified by the Ministry | The following removed from the end of the first sentence: “to PHD”.  
Under the second paragraph the second bullet changed from: “The disease-specific User Guides published by the Ministry” to “The iPHIS User Guides published by PHO”.  
Under the third paragraph the end of the last bullet changed from: “the Ministry” to “PHO”.                                                             |
| December 2014 | 6.1 Personal Prevention Measures                            | Entire section revised.                                                                                                                                                                                                  |
| December 2014 | 6.2 Infection Prevention and Control Strategies             | Addition of new paragraph: “Routine practices are recommended for hospitalized cases.”  
Addition of reference to PHO’s website for PIDAC best practices.                                                                                          |
| December 2014 | 6.3 Management of Cases                                     | Addition of new paragraph: “The disease is not endemic in Canada therefore, cases should be investigated as most likely associated with imported food or travel.”  
Removal of paragraph: “Exclude symptomatic cases from food handling until 24 hours after cessation of symptoms.”  
Addition of all content from “Exclusion Criteria” to end of section.                                                                                   |
<p>| December 2014 | 6.4 Management of Contacts                                  | Removal of “Not applicable” and addition of: “Exclude symptomatic persons epidemiologically linked to the same potential source of Cyclospora from food handling as per the exclusion specified above for cases.” |</p>
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| December 2014 | 6.5 Management of Outbreaks | Deletion of: “As with most enteric diseases, 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.”

Insertion of “Two or more cases linked by time, common exposure, and/or place is suggestive of an outbreak.”

Addition of reference to Ontario’s Foodborne Illness Outbreak Response Protocol (ON-FIORP). |
| December 2014 | 7.0 References         | Updated.                                                                                                                                                                                                                 |
| December 2014 | 8.0 Additional Resources | Updated.                                                                                                                                                                                                                 |