

Cyclosporiasis



Public Health Branch

1. Case Definition

1.1 Confirmed Case:

Laboratory confirmation of infection in a person with or without clinical illness*:

- Demonstration of *Cyclospora* oocysts in stool, duodenal/jejunal aspirate or small bowel biopsy (1).

1.2 Probable Case:

Clinical illness* in a person with evidence of:

- An epidemiologic link to a confirmed case either by consumption of the same food/drink or exposure to food/drink known to be handled by a confirmed case.

OR

- A history of travel to a *Cyclospora*-endemic area (the disease is not endemic in Canada) (1).

*Characterized by watery diarrhea, loss of appetite, weight loss, abnormal bloating and cramping, increased flatus, nausea, fatigue and low-grade fever. Vomiting may also be noted. Relapses and asymptomatic infections can occur. Some evidence suggests that symptoms may be more severe and long-lasting in immunocompromised individuals (1).

2. Reporting and other Requirements

Laboratory:

- All positive laboratory results are reportable to the Public Health Surveillance Unit by secure fax (204-948-3044).
- Clinical laboratories are required to submit only requested residual specimens from individuals who tested positive for *Cyclospora* species to Cadham Provincial

Laboratory (CPL) within seven days of request.

Health Care Professional:

- Probable (clinical) cases of cyclosporiasis are reportable to the Public Health Surveillance Unit using the *Clinical Notification of Reportable Diseases and Conditions* form (<http://www.gov.mb.ca/health/publichealth/cdc/protocol/form13.pdf>) ONLY if a positive lab result is not anticipated (e.g., poor or no specimen taken, person has recovered).
- Cooperation in Public Health investigations is appreciated.

Regional Public Health/First Nations Inuit Health Branch (FNIHB):

- Cases will be referred to Regional Public Health/FNIHB. Completion and return of the *Communicable Disease Control Investigation Form* is required when no travel is identified in the epidemiologic history, unless otherwise directed by a Medical Officer of Health. Cases without a travel history may indicate the beginning of a local outbreak linked to contaminated produce or water requiring further public health investigation and subsequent return of the completed form.

3. Clinical Presentation/Natural History

Cyclosporiasis is an infection of the upper small bowel that is usually self-limited (2, 3). Watery diarrhea is the most common symptom of cyclosporiasis and can be profuse and protracted (2). Anorexia, nausea, vomiting, substantial weight loss, flatulence, abdominal cramping, myalgia, and prolonged fever can also occur (2). Low-grade fever occurs in approximately 50% of

patients (2). Asymptomatic infection is common where cyclosporiasis is endemic (2).

Cyclosporiasis is a recognized opportunistic infection in those with HIV infection and other immunosuppressed conditions (4). Although cyclosporiasis is usually not life threatening, reported complications have included malabsorption, cholecystitis, and Reiter's Syndrome (reactive arthritis) (5).

4. Etiology

Cyclospora cayetanensis is a coccidian protozoan; oocysts (rather than cysts) are passed in stools and become infectious days to weeks following excretion (2).

5. Epidemiology

5.1 Reservoir and Source:

Humans are the only known hosts for *Cyclospora cayetanensis* (2). The oocysts are resistant to most disinfectants used in food and water processing and can remain viable for prolonged periods in cool, moist environments (2). The environmental factors that favour or hinder oocyst sporulation are unknown (6). The precise ways that food and water become contaminated with *Cyclospora* oocysts are not well understood (7).

5.2 Transmission:

Cyclosporiasis is acquired through drinking or swimming in water contaminated with *C. cayetanensis* or from ingestion of contaminated produce (3, 8). Sporulated oocysts are the infective form of the parasite (9). *Cyclospora* oocysts in freshly excreted stool are not infectious; they require days to weeks outside the host to sporulate and become infectious to a susceptible host (2, 3, 6, 10). Therefore, direct person-to-person transmission by the fecal-oral route is unlikely (3, 4). Fecal-contaminated soil may be an important mode of transmission in

environments with low hygiene levels (e.g., indiscriminate human defecation in agricultural fields) (11). Outbreaks of cyclosporiasis have been linked to fresh produce including basil, cilantro, pre-packaged salad mix, mesclun lettuce, snow peas and raspberries (8, 12-16). It cannot be ruled out that animals play a role in the dissemination of *Cyclospora* (6).

5.3 Occurrence:

General: *Cyclospora* is endemic in many developing countries (2). Cyclosporiasis appears to be most common in tropical and subtropical regions (17). The first documented cases of cyclosporiasis occurred in 1977 and 1978 in Papua, New Guinea (17). It has been associated with diarrhea in travelers to Asia, the Caribbean, and Latin America (2). In some regions, infection appears to be seasonal; however, seasonality varies in different settings and is not well understood (5). In the United States of America from 1997-2009, cases of cyclosporiasis were reported more frequently in June and July (17). This peak was noted regardless of travel or outbreak status (17). Overall, approximately half of the cases reported during 2004-2009 were associated with outbreaks, travel or both (17).

Canada: In 2013, 146 cases of cyclosporiasis were reported to the Public Health Agency of Canada (18).

Manitoba: During 2009-2014, 11 cases of cyclosporiasis were reported to Manitoba Health, Healthy Living and Seniors. No outbreaks were reported during this period. Five cases were reported in 2014 and two cases in 2013.

5.4 Incubation Period:

The incubation period is approximately seven days and ranges from two to 14 or more days (2, 5).

5.5 Host Susceptibility and Resistance:

In industrialized nations, most people are susceptible to infections with *Cyclospora* (6). The susceptible populations in areas of endemicity, in contrast, are restricted to the very young and the very old (6). In areas of endemicity, the severity of symptoms and duration of infection tend to be milder after repeated infections, which could be suggestive of acquired immunity (6). Individuals at risk for a longer or more severe illness include young children, older adults and individuals with weakened immune systems (8).

5.6 Period of Communicability:

Cyclospora is not thought to spread directly from person-to-person.

6. Laboratory Diagnosis

Diagnosis is made by identification of oocysts in stool, duodenal/jejunal aspirate or in intestinal biopsy specimens. Oocysts may be shed at low levels even by people with profuse diarrhea (2). Optimally, patients should submit a minimum of three stool specimens (taken 2-3 days apart in a 7-10 day time span) fully emulsified in SAF stool preservative for detection of *Cyclospora* oocysts by microscopy. Cadham Provincial Laboratory (CPL) routinely adds modified acid fast staining; therefore, no request for specific staining is required. Clinical information as well as travel history is important to include on the general CPL test requisition. In the context of an outbreak, the outbreak code (if known) must be provided on the requisition.

7. Key Investigations for Public Health Response

- Search for the source of infection of the case (e.g., food purchases and consumption, occupation, travel history, drinking water source) to identify other

exposed individuals that may be at risk of infection.

8. Control

8.1 Management of Cases:

- Education on food safety and personal hygiene. Refer to section 8.4 below.

Treatment:

- Preferred treatment is trimethoprim-sulfamethoxazole usually for 7-10 days (2, 6). People infected with human immunodeficiency virus may require long-term maintenance therapy (2).
- Ciprofloxacin can be used as an alternative therapy, especially in patients who are allergic to sulfa (4, 6).

Infection Prevention and Control Measures:

- Routine Practices are indicated for hospitalized cases (2).

8.2 Management of Exposed Individuals:

- When possible, instruct other potentially exposed individuals to seek medical attention should they develop symptoms.
- Education on food safety and personal hygiene. Refer to section 8.4 below.

8.3 Management of Outbreaks:

An outbreak is defined as the occurrence of case(s) in a particular area and period of time in excess of the expected number of cases.

- Outbreaks should be investigated to identify a common source of infection and prevent further exposure to that source. The extent of outbreak investigations will depend upon the number of cases, the likely source of contamination and other factors.
- Public Health Inspectors may be asked to assist the Medical Officer of Health in outbreak investigations, specifically in

regards to food recalls or product testing or drinking water.

- Public notification should occur. The level of notification will usually be at the discretion of regional Public Health and/or the provincial Public Health Branch for local outbreaks, but may be at the discretion of the Federal Government for nationally linked outbreaks.
- Public education on prevention. Refer to section 8.4 below.

8.4 Preventive Measures:

- Good agricultural practices (GAPs) and good manufacturing practices (GMPs) for fresh fruits and vegetables (7).
- Wash fresh produce thoroughly before it is eaten (2). This measure will reduce the risk of transmission but will not eliminate it (2).
- Scrub rough fruit such as oranges and cantaloupe so that the inside is not contaminated when the fruit is peeled or cut (8).
- Wash hands with soap and water before preparing, serving, or eating food and after using the toilet (8).
- Following safe food and water habits when traveling:
 - Eat food that is cooked and served hot and drink bottled and sealed beverages or water that has been boiled, filtered or treated (19).
 - Avoid unpasteurized dairy products, food from street vendors, unwashed or unpeeled raw fruits and vegetables, salads, bushmeat (e.g., monkeys, bats or other wild game), and drinks or ice made with tap or well water (19).

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