Cyclosporiasis

Manitoba
Public Health Branch

Summary of Updates

December 2024

Minor updates to case definitions to align with national case definitions (include NAT-positive results), and reporting requirements.

1. Case Definition

1.1 Confirmed case

Laboratory confirmation of infection in a person with or without clinical illness[1] from an appropriate clinical specimen (e.g., stool, intestinal fluid, small bowel biopsy), with demonstration of:

- *Cyclospora* spp. oocysts;

OR

- *Cyclospora* spp. nucleic acid (e.g., by polymerase chain reaction (PCR) or other nucleic acid test (NAT)). (1)

Note: *Cyclospora cayetanensis* has been proposed to be divided into three species: *C. cayetanensis*, *C. ashfordi*, and *C. henanensis*. (1)

1.2 Probable case

Clinical illness[1] in a person who is epidemiologically linked to a confirmed case. (1)

Laboratory comments:

Untreated and unfixed (i.e., without formalin) clinical specimens are recommended for PCR and deoxyribonucleic acid (DNA)-based methodologies including molecular diagnostic testing and downstream molecular surveillance approaches. Formalin-based fixatives used for microscopy can interfere with nucleic acid detection and sequencing. (1)

Note: For molecular surveillance purposes, Cary Blair transport media is acceptable. (1)

2. Reporting Requirements

Laboratory:

All positive laboratory results noted in the case definition are reportable by laboratory to the Manitoba Health Surveillance Unit (MHSU) via secure fax or established electronic interface.

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.

[1] Clinical illness may be characterized by the following signs or symptoms: Watery diarrhea (most common symptom), loss of appetite, weight loss, abdominal pain, bloating and gas, nausea, fatigue (tiredness), and/or mild fever. Vomiting may also be noted. The severity of illness may vary. Relapses and asymptomatic infections may occur. Some evidence suggests that the disease may be more severe and long-lasting in immunocompromised individuals.

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Health Care Professional:

Probable (clinical) cases of cyclosporiasis are reportable to the MHSU using the *Clinical Notification of Reportable Diseases and Conditions form (MHSU-0013)* (found in MHSU's Surveillance Forms webpage at https://www.gov.mb.ca/health/publichealth/surveillance/forms.html) 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):

All case investigations are to be completed in the Public Health Information Management System (PHIMS). For public health providers without access to PHIMS, the *General Communicable Disease Investigation Form (MHSU-0002)* (found in MHSU's Surveillance Forms webpage at https://www.gov.mb.ca/health/publichealth/surveillance/forms.html) should be completed and submitted to Manitoba Health, Seniors and Long-Term Care (MHSLTC) by secure fax (204-948-3044). The critical data elements, which are required documentation for all case and contact investigation, are listed with an asterisk (*) on the investigation forms.

A complete investigation 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.

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 percent 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

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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, prepackaged 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. 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. This peak was noted regardless of travel or outbreak status. 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 MHSLTC. 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*. The susceptible populations in areas of endemicity, in contrast, are restricted to the very young and the very old. 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.

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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. 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.

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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. 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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