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Cyclosporiasis

Case Definition - [Cyclosporiasis – 2010 Case Definition](#)

Overview

- **Agent** - *Cyclospora cayetanensis* (a sporulating coccidian protozoan).
- **Reservoir** - Humans are the only known host.
- **Environment** - *Cyclospora* can be stable in the environment for months. *Cyclospora* oocysts are relatively resistant to most disinfectants used in food and water processing and can remain viable for long periods of time in cool, moist environments. Sporulation must occur at temperatures between 22°C and 32°C (71.6°F and 89.6°F) for 7-13 days outside the human host in order to become infective.
- **Occurrence** – Cyclosporiasis is found in many resource-limited countries worldwide and is known to cause travelers’ diarrhea. It is endemic in tropical and subtropical regions, particularly South America, Africa, and Southeast Asia. In the United States, outbreaks of foodborne-related infections have been linked to imported fresh produce such as basil, cilantro, raspberries, sugar snap peas, and lettuce. These outbreaks mainly occur between May and August.
- **Risk Factors** – Individuals who have visited countries where cyclosporiasis is prevalent or those who consume contaminated food or water are susceptible to infection. The level of sanitation also affects transmission.
- **Mode of Transmission** – Oocysts must sporulate to become infective. Transmission happens when an individual ingests contaminated food or water, and the oocysts present in them have sporulated. As a result, direct person-to-person contact or ingestion of freshly contaminated food or water is not likely to result in transmission.
- **Period of Communicability** – Direct person-to-person transmission is unlikely because *Cyclospora* oocysts are not infectious at the time of excretion.
- **Incubation Period** - Approximately 7 days (in moderate temperatures, sporulation occurs within 7-13 days).
Clinical Illness – An upper small bowel infection with symptoms that typically include watery diarrhea, nausea, anorexia, abdominal cramps, fatigue, myalgia, and weight loss. Fever is rarely present. In some cases, diarrhea can often follow an influenza-like illness. Though cyclosporiasis is a self-limiting illness, symptoms may persist for several weeks. In untreated cases, relapsing symptoms are common, lasting for weeks or even months. Individuals with weakened immune systems, such as due to HIV/AIDS, cancer, or taking immunosuppressive medications, are at risk of severe infections and may experience prolonged illness. Asymptomatic infections can occur.
- **Laboratory Testing** – Testing for cyclosporiasis includes the detection of *Cyclospora* through microscopic examination or molecular diagnosis by polymerase chain reaction

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(PCR) in stool, intestinal fluid/aspirate or intestinal biopsy specimens. Oocysts in stool may be visualized using a modified acid-fast stain.

- **Treatment** – Trimethoprim-sulfamethoxazole (TMP-SMX) is the recommended treatment for cyclosporiasis given for a duration of 7-10 days. Individuals that cannot be treated with TMP-SMX may be treated with Ciprofloxacin (500 mg orally twice daily for 7 days). HIV-infected patients may need longer courses of therapy. See the RedBook or visit [Clinical Overview of Cyclosporiasis \(CDC\)](#) for additional information.
- **Priority** – Prompt investigation and implementation of control measures required.

Quick References / Factsheets


- Public - [Cyclosporiasis Fact Sheet \(CDC\)](#)
- Providers – [Provider Fact Sheet \(CDC\)](#)

Forms

- Disease Case Report (CD-1) [PDF format](#) [Word format](#)
- [Record of Investigation of Enteric Infection \(CD-2C\)](#)
- [Cyclosporiasis National Hypothesis Generating Questionnaire](#) (CDC 0920-1198)
- [Missouri Outbreak Report Form \(MORF\)](#)
- [National Outbreak Reporting System \(NORS\) Form](#)

Notifications

- Contact the [District Epidemiologists](#) or the Missouri Department of Health and Senior Services (MDHSS) – Bureau of Communicable Disease Control and Prevention (BCDCP), phone (573) 751-6113, or for afterhours notification contact the MDHSS - Emergency Response Center (ERC) at (800) 392-0272 (24/7) immediately if an outbreak of cyclosporiasis is suspected.
- If a case(s) is associated with a child care center, BCDCP or the local public health agency (LPHA) will contact the Bureau of Environmental Health Services (BEHS), phone (573) 751-6095, Fax (573) 526-7377 and Missouri Department of Elementary & Secondary Education (DESE) Office of Childhood/Child Care Compliance, phone (573) 751-2450, Fax (573) 526-5345.
- If a case(s) is associated with a food handler, BCDCP or the LPHA will contact BEHS, phone (573)751-6095, Fax (573) 526-7377.
- If a case(s) is associated with a long-term care facility, BCDCP or the LPHA will contact the Section for Long Term Care Regulation, phone (573) 526-8505, Fax (573) 751-8493.
- If a case(s) is associated with a hospital or hospital-based long-term care facility, or ambulatory surgical center, BCDCP or the LPHA will contact the Bureau of Health Services Regulation, phone (573) 751-6303, Fax (573) 526-3621.

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Reporting Requirements

- Cyclosporiasis is a Category 3 disease and shall be reported to the local health authority or to the MDHSS within three (3) calendar days of first knowledge or suspicion; for afterhours notification contact the MDHSS - ERC at (800) 392-0272 (24/7).
- Cyclosporiasis is a nationally notifiable condition in the standard reporting category. The MDHSS reports confirmed and probable cyclosporiasis cases to the CDC by routine electronic transmission.
- Cyclosporiasis reporting includes the following:
 1. Complete a “[Disease Case Report](#)” (CD-1).
 2. For confirmed and probable cases, complete the “[Cyclosporiasis National Hypothesis Generating Questionnaire](#)” (CNHGQ) (CDC 0920-1198). Enter the information into WebSurv and attach the completed form to the record.
 3. If food is suspected to be the source of the illness, collect the case’s food history for the fourteen days prior to onset of the illness and attach or enter the information in WebSurv.
 4. All outbreaks or "suspected" outbreaks must be reported as soon as possible (by phone, fax or e-mail) to the [District Epidemiologists](#).
 5. Within 90 days from the conclusion of an outbreak, submit the MORF or a final outbreak report to the [District Epidemiologists](#).

Laboratory Testing and Diagnosis


Testing for cyclosporiasis includes the detection of *Cyclospora* organisms or DNA by PCR in stool, intestinal fluid/aspirate or intestinal biopsy specimens. Unpreserved stool collected in enteric transport media (e.g., Cary-Blair) is commonly used for culture-independent diagnostic tests (CIDTs) and can be used for confirmatory testing by microscopy and/or PCR if needed. Unpreserved specimens should be refrigerated and sent to the diagnostic laboratory as rapidly as possible.

Cyclospora oocysts can be excreted intermittently and in small numbers. Thus a single negative stool specimen does not rule out the diagnosis; three or more specimens at 2- or 3-day intervals may be required.

Microscopic examination

The sediment can be examined microscopically with the following techniques:

- [Wet mounts](#) (by conventional light microscopy, which can be enhanced by [UV fluorescence microscopy](#) or differential interference contrast [[DIC](#), [Nomarsky](#)])
- [Stained smears](#) (using [modified acid-fast stain](#) or a [modified safranin stain](#)). Both modified acid-fast stains and modified safranin staining will stain *Cyclospora* cysts from a pink to brilliant red. Staining may be more variable using modified acid-fast.
- Other common stains including Giemsa and trichrome are not adequate for the reliable detection of *Cyclospora*.

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Molecular Diagnosis (PCR)

Several conventional and real-time PCR protocols have been developed to specifically detect *Cyclospora cayetanensis* in stool. The Missouri State Public Health Laboratory (MSPHL) does perform BioFire PCR testing of stool specimens for *Cyclospora cayetanensis*. Commercial, FDA-approved panels (that include other enteric pathogens) are available and are highly sensitive. Testing for *Cyclospora* at MSPHL should be coordinated through the [District Epidemiologists](#) and the Microbiology Unit (573) 751-3334 before specimen submission.


Conducting the Investigation

1. **Verify the diagnosis.** Contact the provider and/or laboratory as needed to obtain the demographic, clinical and laboratory information needed to verify the diagnosis and confirm if the current case definition is met.
2. **Identify potential sources of exposure.**
 - Has the case traveled out of the country to an endemic area?
 - Had the case consumed imported fruits or vegetables up to two weeks prior to becoming ill?
 - Have there been other cases linked by time, place or person (persons who drink from the same water supply, consumed fresh fruit or vegetables)?
 - Has the case ingested untreated water from a lake or stream?
 - Had the case participated in water recreational activities in a pool, water park, lake or stream?
3. **Establish the extent of illness.** Determine if other close contacts are, or have been ill, by contacting the health care provider, patient or family member. Ask about illnesses among household, child care, hospital or long-term care, sexual and other contacts. Ill contacts should be interviewed and advised to contact their medical provider.
4. **Provide information regarding prevention of cyclosporiasis to the case and persons at risk for infection.**
5. **Review surveillance data.** Determine whether there have been other cases in the same geographic area or institution. When cases are related by person, place, or time, efforts should be made to identify a common source. If cases are epidemiologically associated with a public water supply, notify the District Epidemiologists and BEHS, prior to sample collection.

Control Measures (General Setting)

Cyclospora oocysts in freshly excreted stool are not infectious. They require days to weeks outside the host to sporulate before becoming infectious. To prevent and reduce the risk of getting cyclosporiasis:

- Maintain good hygiene. Properly wash your hands and surfaces with soap and hot water.

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- Avoid eating or drinking anything that may have been contaminated with feces.
 - Make sure to wash your produce well and remove any damaged parts.
 - To store cut or cooked produce, keep it in the fridge and separate it from raw meat.
- Be cautious when traveling to countries with limited water treatment and sanitation systems, particularly in tropical and subtropical regions.
 - Avoid tap water, fountain drinks, ice, and raw foods like fresh produce.

Control Measures (Special Settings)

Cyclospora Case in a Food Handler:

There is little risk for transmission from food handlers who may be infected. Food handlers without diarrhea may return to work. Scrupulous hand washing should be maintained.

Cyclospora Case in a Child Care Center:

There is little risk for transmission from children or staff in child care who may be infected. However, in addition to standard precautions, contact precautions are recommended for diapered or incontinent children that are infected. Children and staff without diarrhea may return to work/child care. Scrupulous hand-washing and thorough cleaning of the facility should be maintained.

Cyclospora Case in Health Care Center:


There is little risk for transmission from health care workers who may be infected. However, in addition to standard precautions, contact precautions are recommended for diapered or incontinent patients who are infected. Health care workers without diarrhea may return to work. Scrupulous hand washing should be maintained.

Cyclospora Case in Schools:

There is little risk for transmission from students or staff who may be infected. Students and staff without diarrhea may return to school. Scrupulous hand washing should be maintained.

Resources

1. American Academy of Pediatrics. Cyclosporiasis. In: Kimberlin DW, Brady MT, Jackson MA, Long SS, eds. *Red Book: 2018 Report of the Committee on Infectious Diseases*. 32nd ed. Itasca, IL: American Academy of Pediatrics; 2018:292-293.
2. American Public Health Association. Cyclosporiasis. In: Heymann DL (ed), *Control of Communicable Diseases Manual*. 21st ed. Washington, D.C. American Public Health Association, 2022:142-143.
3. Bennett, JE, Dolin R, Blaser, MJ. and Bennett (ed.). *Cyclospora cayentanensis*. In: *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases*. 9th ed. Philadelphia PA: Elsevier Saunders, 2015:3422-3423.

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4. Centers for Disease Control and Prevention. (n.d.). Parasites - Cyclosporiasis (cyclospora infection). Retrieved August 30, 2023, from <https://www.cdc.gov/parasites/cyclosporiasis/index.html>
5. Ortega, Y.R., and Sanchez, R. (2010). Update on Cyclospora cayetanensis, a Food-Borne and Waterborne Parasite. *Clinical Microbiology Reviews*, 23(1), 218-234.