

### **A. Agent:**

*Cyclospora cayetanensis* is a spore-forming, unicellular parasite<sup>1</sup> that causes intestinal illness by infecting the small intestine<sup>2</sup>. The oocysts, which are shed by infected persons, become infective after sporulating in the environment<sup>1,2</sup>. These oocysts must sporulate at temperatures between 22°C and 32°C for days to weeks before they are infectious<sup>3</sup>. The oocysts may take days to weeks to produce spores, which make fecal-oral transmission unlikely<sup>1-3</sup>.

### **B. Clinical Description:**

*Cyclospora* infects the small intestine and typically causes an illness characterized by watery diarrhea<sup>2,3,4</sup>. Other common symptoms include loss of appetite<sup>2,3,5</sup>, bloating<sup>5</sup>, increased flatus (gas)<sup>3,5</sup>, stomach cramps<sup>2,3</sup>, nausea<sup>2,3,5</sup>, tiredness<sup>2,3,5</sup>, muscle aches<sup>2,3</sup>, and weight loss<sup>2,3,5</sup>. Less common symptoms include fever<sup>2,3,5</sup>, and vomiting<sup>5</sup>. Some persons infected with *Cyclospora* do not develop any symptoms<sup>3,5</sup>. Other infectious organisms can cause illness similar to that caused by *Cyclospora*. Some infected persons do not have any symptoms<sup>5</sup>.

### **C. Reservoirs:**

Humans are the only known reservoir for *C. cayetanensis*<sup>2,3</sup>.

### **D. Mode of Transmission:**

Current knowledge of human cyclosporiasis suggests that it is not transmitted directly from person-to-person<sup>1-3</sup>. After being shed in human stool, the parasite must undergo developmental changes (taking days to weeks) before becoming infectious<sup>1-3</sup>. Humans become infected by consuming food or water that has been contaminated by *Cyclospora*<sup>1-3</sup>.

### **E. Incubation Period:**

The incubation period for cyclosporiasis is usually 1 week but can range from 2 days to 2 weeks or more<sup>3</sup>.

### **F. Period of Communicability:**

Oocysts may be shed at low levels, even by people with profuse diarrhea<sup>3</sup>. It is not known how long the parasite may be shed after symptoms have stopped<sup>5</sup>.

### **G. Susceptibility and Resistance:**

People living or traveling in tropical or subtropical regions of the world may be at increased risk for infection because cyclosporiasis is endemic in some countries in these zones. In the United States, foodborne outbreaks of cyclosporiasis have been linked to various types of imported fresh produce. People can get infected with *Cyclospora* more than once<sup>5</sup>.

### **H. Treatment:**

A 7-10 day course of trimethoprim-sulfamethoxazole (TMP-SMX) is the recommended treatment for cyclosporiasis<sup>2-3</sup>. If not treated, the illness may last for a month or longer and the patient may experience remitting or relapsing symptoms<sup>2,5</sup>.

**I. Clinical Case Definition<sup>7</sup>:**

An illness of variable severity caused by the protozoan parasite *Cyclospora cayentanensis* and commonly characterized by watery diarrhea. Other common symptoms include loss of appetite, weight loss, abdominal bloating and cramping, increased flatus, nausea, fatigue, and low-grade fever. Vomiting also may be noted. Relapses and asymptomatic infections can occur.

**J. Laboratory Criteria for Diagnosis<sup>7</sup>:**

Detection of *Cyclospora* organisms or DNA in stool, intestinal fluid/aspirate, or intestinal biopsy specimens.

Case Classification	
<b>Confirmed</b>	A case that meets the clinical description and at least one of the criteria for laboratory confirmation as described above.
<b>Probable</b>	A case that meets the clinical description and that is epidemiologically linked to a confirmed case.

**K. Classification of Import Status:**

N/A

**L. Laboratory Testing:**

ADHS requests all samples positive for *Cyclospora* be sent to ASPHL, where they are then forwarded on to CDC for genotyping. Commercial labs can test for *Cyclospora*. It is recommended that commercial laboratories are consulted regarding specimen collection, transfer, and testing.

**M. Assessing Laboratory Results:**

**Please consult the commercial laboratory performing the test.** More than one stool specimen may be necessary as *Cyclospora* oocysts may be shed intermittently. Laboratory-confirmed cyclosporiasis may be defined as the detection – in symptomatic or asymptomatic persons – of *Cyclospora*:

- Oocysts in stool by microscopic examination<sup>3,8</sup>, OR
- In intestinal fluid or intestinal biopsy specimens<sup>3</sup>, OR
- By PCR in stool, intestinal fluid/aspirates or intestinal biopsy specimens<sup>8</sup>.

**N. Outbreak Definition:**

- Diagnosis or detection of two or more individuals from different households and families who experience an illness clinically compatible with cyclosporiasis, at least one with laboratory-confirmed *Cyclospora* infection, after exposure to a common food or a shared experience.
- An unexplained, unexpected increase in cases of cyclosporiasis that is clustered by time, place, or person
- An outbreak investigation is triggered when *Cyclospora* isolates from two or more individuals collected within 60 days of each other are determined to be highly related by WGS.

**O. Time Frame<sup>9</sup>:**

All confirmed and probable cases are reportable to Local County Health Departments within one working day after a positive test result. Outbreaks should be entered into MEDSIS Outbreak Module within 24 hours of receipt of report.

#### P. Forms:

- Please refer to the [Department-provided formats for submitting Epidemiologic Investigation Reports](#) for guidance on the required fields and forms for each morbidity.
- ADHS Reporting & Investigation Forms:  
<http://www.azdhs.gov/phs/oids/investigations/forms.htm>

#### Q. Investigation Steps:

##### Confirm Diagnosis

- The current case definition should be used to confirm the diagnosis.
- Contact the health care provider if needed to confirm the diagnosis using the current case definition. The following information should be obtained:
  - Date and onset of each symptom: watery diarrhea, loss of appetite, bloating, increased flatus (gas), stomach cramps, nausea, tiredness, muscle aches, fever, vomiting, and weight loss.
  - Medical history and hospitalizations: immunodeficiency, liver disease, gastric surgery.
- Obtain information on any laboratory tests performed and results.

##### Conduct Case Investigation

- Confirmed cases will immediately be entered into MEDSIS and contacted by the investigator.
  - The investigator will attempt three phone calls, or text messages following unreturned voicemails, before sending a letter to the patient's address (depending upon local health department's protocols and capacity).
  - All interview attempts, even if unsuccessful (i.e., leaving a voicemail or text message), should be entered into the Case Contacted & Interviews table in MEDSIS as close to real time as possible.
  - If phone numbers appear invalid or non-functioning, contact [food@azdhs.gov](mailto:food@azdhs.gov) to request a LexisNexis search. This can be conducted for individuals 18 years and older. For those younger than 18, a parent/guardian name must be used to search in LexisNexis; otherwise, a search can be conducted in ASIIS for the individual under 18 years of age.
- The investigation should focus on potential sources of infection within the incubation period 2 weeks prior to illness onset (travel history; exposure to water; consumption of fresh fruits, vegetables, or herbs).
- **To conduct the case investigation, please refer to the following:**
  - Complete the Cyclospora investigation form (see Forms section P, above). Please reach out to [food@azdhs.gov](mailto:food@azdhs.gov) if you have any questions.
  - The investigator should facilitate positive samples to be forwarded to Arizona State Public Health Laboratory.

##### Conduct Contact Investigation

- Identify persons that may have had exposure to the source of infection.
- **Contacts of the infected patient are generally at very low risk for contracting the infection.**
  - Contacts should be referred to a health care provider if they have symptoms compatible with Cyclosporiasis.

##### Initiate Control and Prevention Measures

- Control and prevention measures mainly involve educating the public regarding:
  - Proper hand hygiene, particularly after using the toilet and prior to preparing food.
  - Washing produce thoroughly before eating. However, this will reduce the risk of exposure but will not eliminate *Cyclospora*.
  - Showering before entering public waters. Avoiding swallowing recreational water.
  - Avoiding recreational water activities when you have diarrhea.
  - Preventing exposure when traveling to endemic countries by:
    - Drinking only treated or boiled water.
    - Consuming only cooked, hot foods or fruits that the travelers peel themselves.
    - Additional food and water safety information for travelers can be found: <http://wwwnc.cdc.gov/travel/page/food-water-safety>

### Isolation, Work and Child Care Restrictions

Although direct person-to-person transmission is unlikely, people who have diarrhea should not be allowed to work as food handlers or attend child care as a general precaution.

### Case Management

Additional stool cultures may be needed to maximize the likelihood of detecting *Cyclospora*.

### Contact Management, including Susceptible Contacts

- Protection or prophylaxis: None.
- Symptomatic contact: Considered a probable case; initiate any restrictions. Encourage to seek medical evaluation.

### Notifications

- No special notifications or additional reporting unless the case is associated with an outbreak.
- As appropriate, use a notification letter and disease fact sheets to notify individuals or groups such as daycares.
- Report all cases to ADHS using established methods.

### R. Outbreak Guidelines<sup>10</sup>:

Refer to the Outbreak section of the Disease Investigation Manual. For complete guidelines to investigating foodborne outbreaks, consult the [ADHS Foodborne and Waterborne Disease Illness and Outbreak Investigation Resource Manual](#).

NOTE: See [Infectious Disease Outbreak Investigation and Management](#) webpage for additional information/guidance.

### S. Special Situations:

N/A

## Additional Information & Resources

**Epidemiology, Investigation and Control:** Heymann. D., ed., Control of Communicable Diseases Manual, 20th Edition. Washington, DC, American Public Health Association, 2015: 139-140.

### CDC Cyclosporiasis:

<http://www.cdc.gov/parasites/cyclosporiasis/>

## Foodborne and Waterborne Disease Outbreak Investigation Resource Manual:

<http://www.azdhs.gov/phs/oids/pdf/manuals/AZOutbreakManual.pdf>

## Arizona Regulations/Statutes Related to Infectious Disease:

[http://apps.azsos.gov/public\\_services/Title\\_09/9-06.pdf](http://apps.azsos.gov/public_services/Title_09/9-06.pdf)

## References

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