

Cyclosporiasis

PROTOCOL CHECKLIST

- Enter available information into Merlin upon receipt of initial report
- Review background on disease ([see page 2](#)), case definition ([see page 3](#)), and laboratory testing ([see page 4](#))
- Contact provider ([see page 5](#))
- Interview patient(s)
 - Review disease facts ([see page 2](#))
 - Modes of transmission
 - Incubation period
 - Symptoms
 - Ask about exposure to relevant risk factors ([see page 6](#))
 - Travel
 - Consumption of imported produce
 - Provide education on possible sources of contamination ([see page 6](#))
 - Wash fruits and vegetables thoroughly before consumption
 - Avoid drinking or swallowing untreated surface water
 - Address case-patient's questions or concerns
- Follow-up on special situations, including outbreaks ([see page 7](#))
- Enter additional data obtained from interview into Merlin ([see page 6](#))

Cyclosporiasis

1. DISEASE REPORTING

A. Purpose of reporting and surveillance

To identify the source of transmission (e.g., commercially distributed food product, untreated water) and to stop transmission from such a source.

B. Legal reporting requirements

Laboratories and physicians are required to report cases to the local county health department within one working day of identification/diagnosis.

C. County health department investigation responsibilities

1. Begin the investigation as soon as possible but no longer than two business days after receiving report from a provider or laboratory.
2. Administer appropriate measures to control further spread. **See Section 6 for recommendations on controlling further spread.**
3. Report all confirmed and probable cases in Merlin.

A cyclosporiasis case report form is available to assist in follow-up and investigation: http://www.doh.state.fl.us/Disease_ctrl/epi/topics/crforms.html

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic agent

Cyclosporiasis is caused by a unicellular protozoan (parasite), *Cyclospora cayetanensis*, which infects the small bowel.

B. Description of illness

Cyclosporiasis is a gastrointestinal illness which can persist intermittently for weeks and can be characterized by watery diarrhea (~6 stools/day), nausea, anorexia, abdominal cramping, loss of appetite, marked fatigue, vomiting, and weight loss; low-grade fever is seen in approximately 50% of patients. Not endemic to the United States, *Cyclospora* is a reported cause of traveler's diarrhea. The disease is usually self-limiting but episodes of relapse have been noted. Asymptomatic infections are known to occur, usually in countries where *Cyclospora* is endemic (Peru, Guatemala, Haiti, Nepal, and Indonesia [note: 2011 data]).

C. Reservoirs

Humans are the only reservoirs for *Cyclospora cayetanensis*.

D. Modes of transmission

Cyclosporiasis is spread by ingestion of food or water contaminated with feces that contain infective oocysts. Not immediately contagious once passed through the bowel, it takes days or weeks for the oocysts to sporulate and become infective in the proper environmental conditions. Therefore, person-to-person transmission and transmission by eating food or drinking water that has just been contaminated with feces is unlikely to occur. Raspberries, lettuce, basil and other imported produce have been implicated in outbreaks in the United States and Canada. Domestically-acquired, travel-associated, and documented United States outbreaks have occurred

year-round, with the highest case counts in the spring and summer months. Although some countries with endemic cyclosporiasis have shown seasonal variability, no consistent pattern has been discerned with respect to time of year and environmental conditions.

E. Incubation period

Incubation is usually around seven days (range: two days to greater than two weeks) after ingestion of sporulated oocyst. Infection can be asymptomatic.

F. Period of communicability

Cyclospora cayetanensis is not immediately contagious, which is what differentiates it from *Cryptosporidium*. Unsporulated oocysts are released into the environment via the stool where it may take days or weeks for the oocysts to become infective. The oocysts are probably highly resistant to most disinfectants and can remain viable for prolonged periods in cool, moist environments.

G. Treatment

Cyclosporiasis is usually a self-limiting disease, but relapse can occur for weeks to months after infection. Seven to ten days of trimethoprim-sulfamethoxazole is the treatment of choice. Persons infected with HIV may need long-term maintenance therapy.

H. Prophylaxis

None indicated.

I. Cyclosporiasis in Florida

With the exception of a large outbreak of cyclosporiasis in 2005, the incidence rate for cyclosporiasis has remained stable in recent years. A repeated peak in late spring and early summer may reflect the seasonal variation of endemic cyclosporiasis in countries that export fruits and vegetables to the United States.

3. CASE DEFINITION

A. Clinical description

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

B. Laboratory criteria for diagnosis

Demonstration of *Cyclospora* oocysts (by morphologic criteria or by sporulation) in stool, duodenal/jejunal aspirates, or small-bowel biopsy.

OR

Demonstration of *Cyclospora* DNA (by polymerase chain reaction) in stool, duodenal/jejunal aspirate, or small-bowel biopsy.

C. Case classification

Confirmed: a case that is laboratory confirmed.

Probable: a clinically compatible case that is epidemiologically linked to a confirmed case.

D. Comment

Persons being investigated for *Cyclospora* must have permanent slides or specimens sent to the Bureau of Laboratories for confirmation. A copy of laboratory test results must accompany the paper case report form.

4. LABORATORY TESTING

A. Criteria for Diagnosis

Diagnosis of cyclosporiasis is made by examination of stool samples. Because detection of *Cyclospora cayetanensis* can be difficult, patients may be asked to submit several stool samples over several days. Most often, stool specimens are examined microscopically using different techniques (e.g., acid-fast staining, direct fluorescent antibody [DFA], and/or enzyme immunoassays for detection of *Cyclospora* sp. antigens).

Molecular methods (e.g., polymerase chain reaction – PCR) are increasingly used in reference diagnostic labs, since they can be used to identify *Cyclospora* spp. at the species level. Tests for *Cyclospora cayetanensis* are not routinely done in most laboratories; therefore, health care providers should specifically request testing for this parasite.

B. Services available at BOL

The Bureau of Laboratories- Jacksonville uses acid-fast staining of formalinized stool smears to determine the presence or absence of *Cyclospora* sp.

C. Testing requests

1. Submitting specimens/isolates to BOL
 - a. All submissions should be accompanied by Clinical Lab Submission Form 1847 (http://www.doh.state.fl.us/lab/addpages/BOL_Forms.html).
 - b. Electronic Laboratory Ordering (ELO) may also be used by entering request into the HMS State Laboratory System, placing bar coded label on the O&P vial, and writing the date collected on the vial.
2. Specimen collection
 - a. A small portion (acorn size) of formed stool or equal portion of liquid stool should be transferred aseptically to an O&P transport vial that is properly labeled (name, date of birth, date collected).

Note: please write “suspect *Cyclospora* for confirmation and speciation” in the comment section of the Clinical Lab Submission Form 1847.
3. Packaging and shipping
 - a. All specimens and isolates for *Cyclospora* testing should be sent to the Jacksonville BOL laboratory.
 - b. Place labeled vial in the proper inner/outer container (aluminum screw-cap inner container with spill absorber holds the primary vial and that is then placed in an outer cardboard screw-cap container). Please place the Clinical Lab Submission Form 1847 in a plastic Ziploc bag between the inner and outer container. Package according to International Air Transport Association

- (IATA) regulations, labeling the outer shipping container: *UN3373, Biological Substance Category B*.
- c. Specimens and isolates should be sent at ambient temperature or cooler, but cool packs should not be in direct contact with vials.
 - d. Packaging and Shipping of Diagnostic Specimens Flowchart:
http://www.doh.state.fl.us/lab/PDF_Files/Packaging_Flowchart_0422051.pdf
 - e. Packaging and Shipping of Diagnostic Specimens Flowchart Notes:
http://www.doh.state.fl.us/lab/PDF_Files/Packaging_Flowchart_notes_0422051.pdf
4. Contact the regional laboratory with questions:
http://www.doh.state.fl.us/lab/addpages/BOL_Contacts.html.

D. Interpretation of results:

Results will indicate that oocysts are present or not present.

5. CASE INVESTIGATION

A. Contact the physician or hospital

1. Confirm that a *Cyclospora cayetanensis* infection has been diagnosed in the reported case.
2. Obtain the following:
 - a. Date of onset
 - b. Signs and symptoms (especially watery diarrhea, loss of appetite, weight loss, abdominal bloating, and cramping)
 - c. Predisposing conditions (e.g., immunosuppression)
 - d. Tests performed (O&P, PCR)
 - e. Treatment (especially antibiotics)
3. Ask what information has been given to the patient, including whether the patient knows about the diagnosis.
4. Obtain as much demographic information as possible, including contact information (home, cellular, pager and/or work numbers). Ask how and where the patient can be contacted (i.e., at hospital or home).
5. Notify the physician that you will be contacting the case as DOH follows-up on all cases of cyclosporiasis to assess risks factors and to identify potential means for preventing further illness. It may also be appropriate at this point to determine if the physician has any concerns in regards to the health department contacting the case.

B. Interview the case

1. Contact the case by telephone, home visit, or visit to the hospital. Interviews should be completed as soon as possible after being reported to optimize recall.
 - a. Make at least three phone call attempts to reach the case.
 - b. Calls should be made at different times of the day, with at least one attempt in the evening.
2. Cyclosporiasis Case Report Form (required)
This form can be used to guide the interview and can be completed during the interview. The case report form is available at:
http://www.doh.state.fl.us/Disease_ctrl/epi/topics/crforms.html
3. Items to cover during interview include:

- a. Provide brief background on disease, including possible modes of transmission, incubation period, symptoms, etc.
- b. Document exposures during exposure period (two weeks before onset):
 - i. Travel outside Florida or the United States. Determine dates of travel.
 - ii. Consumption of imported produce and where produce was purchased.
 - iv. Restaurant meals. Obtain the name of the restaurant(s), date(s), and location(s) of the meal(s).
 - v. Public gathering where food was consumed (e.g., birthday parties, picnics, etc.). Obtain the date, location, and sponsor of the event.
- c. Determine if others (e.g., family, friends, coworkers, customers, patients, etc.) are known or thought to be ill with similar symptoms. If so, inquire about possible common source exposures. Obtain the name, phone number or address and clinical information of the ill person. Anyone meeting the probable case definition should be reported and investigated in the same manner as a confirmed case.
- d. Provide basic instruction to cases and potentially exposed contacts about thoroughly washing all produce, travel safety and avoiding untreated drinking water. **See Section 6 for recommendations on controlling further spread.**

C. Environmental evaluation

During routine case investigations of Cyclosporiasis, if a commercial food facility is involved, the CHD investigator should complete the Tri-Agency Foodborne Illness Survey/Complaint Form (http://www.foodandwaterdisease.com/forms/Tri-Agency_Foodborne_Illness_Form_Electronic_2-16-2011.pdf). If a food or waterborne outbreak is suspected, contact the Regional Environmental Epidemiologist. Food workers should be excluded from work until asymptomatic. At least three specimens that are processed and examined with sensitive methods should be tested before a negative result is reported.

D. Merlin data entry

Create a case in Merlin under disease code **CYCLOSPORIASIS – 00720**. Enter the data collected into Merlin, being sure to include all required fields on the Basic Data screen, complete the Case Symptoms screen, and attach all relevant labs. Please attach **ALL** labs received via electronic laboratory reporting (ELR) to the case. Attach the completed case report form on the Case Documents screen.

6. CONTROLLING FURTHER SPREAD

A. Patient/household education on prevention recommendations

Wash fruits and vegetables thoroughly before consumption.

B. Travel recommendations

1. Avoid drinking or swallowing untreated surface water. Untreated water should be boiled before consumption. ***Cyclospora* is unlikely affected by iodine and chlorine.**
2. When traveling in endemic countries (Peru, Guatemala, Haiti, Nepal, and Indonesia [note: 2011 data]), do not drink surface or untreated water.

C. Isolation of cases

Not necessary.

D. Management of contacts

Symptomatic contacts: if the probable case definition is met, the contact should be reported, investigated, and managed in the same manner as a confirmed case to determine if the symptomatic contact had the same exposures as the originally reported case.

E. Laboratory testing during outbreaks

Same as for a single case of cyclosporiasis.

F. Food or water is implicated as the source of an outbreak

Imported produce is often associated with outbreaks of *Cyclospora*. Raspberries, basil, lettuce and snow peas have all been implicated in previous outbreaks. Contact your Regional Environmental Epidemiologist for investigation guidance. (http://www.doh.state.fl.us/environment/medicine/foodsurveillance/about_us.htm).

7. IMPORTANT LINKS**A. Cyclosporiasis Case Report Form:**

http://www.doh.state.fl.us/Disease_ctrl/epi/topics/crforms.html

B. Investigation of a Foodborne Outbreak:

http://www.doh.state.fl.us/Disease_ctrl/epi/surv/CDC_52.13_foodborne.pdf

C. Waterborne Disease Outbreak Form:

http://www.doh.state.fl.us/Disease_ctrl/epi/surv/CDC_52.12_waterborne.pdf

D. Food worker Exclusion Guidelines:

http://www.doh.state.fl.us/Environment/medicine/foodsurveillance/pdfs/Foodworker_Exclusion_Guidelines.pdf

E. CDC Cyclosporiasis Website:

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

F. CDC *MMWR* April 8, 2011, Cyclosporiasis 1997-2008:

<http://www.cdc.gov/mmwr/preview/mmwrhtml/ss6002a1.htm>

G. Laboratory Diagnosis

http://www.dpd.cdc.gov/dpdx/HTML/PDF_Files/cyclospora_benchaid.pdf

H. APHA Media Advocacy Manual:

http://www.apha.org/NR/rdonlyres/A5A9C4ED-1C0C-4D0C-A56C-C33DEC7F5A49/0/Media_Advocacy_Manual.pdf

8. REFERENCES

American Academy of Pediatrics. (2009). *Red Book: 2009 Report of the Committee on Infectious Diseases* (28th ed.). Grove Village, IL: American Academy of Pediatrics.