

CYCLOSPORIASIS

✓ DISEASE AND EPIDEMIOLOGY

Clinical Description:

Cyclospora infects the small intestine and typically causes an illness characterized by watery diarrhea, with an average of about 6 to 7 stools per day. Other symptoms can include loss of appetite, bloating, low grade fever, increased flatus (gas), stomach cramps, vomiting, tiredness, muscle aches, and weight loss. Other infectious organisms can cause illness that is very similar to that caused by *Cyclospora*. Some persons infected with *Cyclospora* do not develop any symptoms.

Causative Agent:

Cyclospora cayetanensis is a coccidian protozoan parasite. The first known cases of *Cyclospora* infection were diagnosed in 1977 (reported in the medical literature in 1979). Many questions remain about this tiny organism.

Differential Diagnosis:

The differential diagnosis for *Cyclospora* includes *Giardia*, *Isospora*, microsporidia, *Cryptosporidium parvum*, *Clostridium difficile*, *Salmonella*, *Shigella*, *Campylobacter*, *Mycobacterium avium* complex, cytomegalovirus, rotavirus, norovirus, and adenovirus.

Laboratory identification:

Cyclospora can be identified by modified acid-fast staining or by direct smear examination. Identification of this parasite in stool requires special kinds of laboratory techniques that are not routinely used. Therefore, physicians should specifically request testing for this parasite. More than one stool sample may need to be checked to find the organism. *Cyclospora* can be identified through PCR testing; however, this method is not available in Utah.

USL:PH: The Unified State Laboratories: Public Health does not test for *Cyclospora*. ARUP does perform laboratory testing for *Cyclospora*.

Treatment:

TMP-SMX is the recommended treatment for cyclosporiasis. If not treated, the illness may last for a month or longer and the patient may experience remitting or relapsing symptoms.

Case fatality:

The case fatality rate is unknown, but thought to be very low.

Reservoir:

Humans are the only known reservoir for *C. cayetanensis*, although the epidemiology of human cyclosporiasis suggests the existence of animal reservoirs, possibly birds.

Transmission:

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

Susceptibility:

Persons of all ages are at risk for infection. Although travelers to tropical countries may be at increased risk, infection can be acquired in such countries as the United States and Canada. The risk may vary with season; some evidence suggests that infection is most common in spring and summer. Persons who have previously been infected with *Cyclospora* can become infected again.

Incubation period:

The incubation period for cyclosporiasis is about 1–2 weeks, with an average of 1 week.

Period of communicability:

People may shed *Cyclospora* parasites from days to over one month (while actively ill). It is not known how long the parasite may be shed after symptoms have stopped.

Epidemiology:

Cyclosporiasis was first recognized in 1979. The parasite appears to be widely distributed throughout the world. Cases have been reported with increased frequency since the mid-1980's, in part because of the availability of better techniques for detecting the parasite in samples of stool. The largest documented outbreaks of cyclosporiasis in the US occurred during the summers of 1996 and 1997; a majority of those cases had consumed imported raspberries that were presumed to be contaminated.

PUBLIC HEALTH CONTROL MEASURES

Public health responsibility:

- Investigate all suspect cases of disease and fill out and submit appropriate disease investigation forms.
- Provide education to the general public, clinicians, and first responders regarding disease transmission and prevention
- Identify clusters or outbreaks of this disease and determine the source.
- Identify cases and sources to prevent further transmission.

Prevention:

Personal Preventive Measures/Education

To avoid infection with *Cyclospora*, persons should:

- Avoid swallowing recreational water.
- Avoid swallowing pool or bath water, chlorination may not eliminate the parasite.
- Avoid drinking unboiled or untreated water when hiking, traveling in developing countries, or visiting areas where water quality is unknown. Bringing water to a full, rolling boil is sufficient to kill *Cyclospora*.

- Avoid swimming while ill with diarrhea and for at least 2 weeks after diarrhea.
- Thoroughly wash all fresh fruits and vegetables prior to consumption.

Chemoprophylaxis:

None.

Vaccine:

None.

Isolation and quarantine requirements:

Isolation: Food handlers with cyclosporiasis must be excluded from work until diarrhea has resolved. Persons diagnosed with cyclosporiasis should not use recreational waters for 2 weeks after symptoms resolve.

NOTE: A food handler is any person directly preparing or handling food. This can include a patient care or childcare provider.

Hospital: Standard and contact precautions.

Quarantine: Contacts with diarrhea who are food handlers shall be considered the same as a case and should be handled in the same fashion. Otherwise, no restrictions.

NOTE: In certain circumstances, cases, ill contacts, and/or asymptomatic contacts who are food handlers may be required to have negative stool samples prior to returning to work. The local health department will decide which cases and/or contacts will need negative stool samples prior to returning to work and whether 1 or 2 negative samples is necessary. If a case or contact has been treated with an antimicrobial agent, the stool specimen should not be collected until at least 48 hours after cessation of therapy. If 2 negative stool samples are determined to be necessary they should be taken at least 24 hours apart.

CASE INVESTIGATION

Reporting: All cases of Cyclosporiasis should be reported to public health.

Case definition:

Cyclosporiasis (1998)

Clinical description

An illness of variable severity caused by the protozoan *Cyclospora cayetanensis* and commonly characterized by watery diarrhea, 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.

Laboratory criteria for diagnosis

Laboratory-confirmed cyclosporiasis shall be defined as the detection – in symptomatic or asymptomatic persons – of *Cyclospora*:

- Oocysts in stool by microscopic examination, **or**
- In intestinal fluid or small-bowel biopsy specimens, **or**

- Demonstration of sporulation, **or**
- By PCR in stool, duodenal/jejunal aspirates or small bowel biopsy specimens.

Case classification

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

Confirmed: a laboratory-confirmed case associated with one of the symptoms described above.

Case Investigation Process:

- Food handlers should be excluded from work until diarrhea has resolved. Negative stool specimens may also be required.

Outbreaks:

CDC defines a food-borne outbreak as, “an incident in which two or more persons experience a similar illness resulting from the ingestion of a common food”. An outbreak of cyclosporiasis is confirmed by the demonstration of the organism in the stool of 2 or more ill persons. *Cyclospora* is most likely chlorine-resistant; therefore swimming in chlorinated pools may not protect against transmission.

Identification of case contacts and management:

Daycare and School

Current knowledge of human cyclosporiasis suggests that it is not transmitted directly from person to person. After being shed in stool, the parasite must undergo developmental changes (taking days to weeks) before becoming infectious. Humans become infected by consuming food or water that has been contaminated with feces containing *Cyclospora*. Therefore, non-food handling students, teachers, and daycare attendees can continue to attend their programs as long as they feel well enough to do so. However, since most staff in childcare programs are considered to be food handlers, those with *Cyclospora* in their stools can remain on site but must not prepare food or feed children until their diarrhea has resolved. Negative stool specimens may be required.

REFERENCES

Centers for Disease Control, Case Definitions for Infectious Conditions Under Public Health Surveillance. MMWR 46 (RR-10), 1997.1

Control of Communicable Diseases Manual (18th Edition), Heymann, D.L., Ed; 2004.

Red Book: 2003 Report of the Committee on Infectious Diseases (26th Edition), Larry K. Pickering MD, Ed; 2003.

Principles and Practice of Infectious Disease (6th Edition), Gerald L. Mandell, John E. Bennett, and Raphael Dolin Eds; 2005.

Massachusetts Department of Public Health, Guide to Surveillance, Reporting and Control, 2006.

Food and Drug Administration. The Bad Bug Book.

<http://vm.cfsan.fda.gov/~mow/intro.html>

Council of State and Territorial Epidemiologists Position Statements

<http://www.cste.org/ps2009/09-ID-04.pdf>