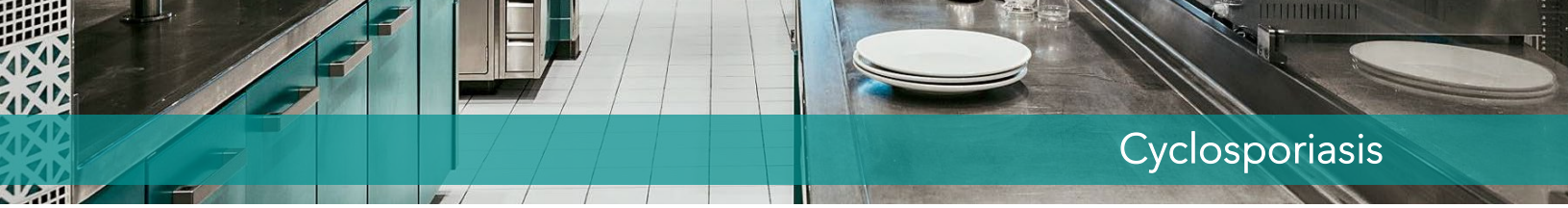

Cyclosporiasis

A. Agent:
Cyclospora cayetanensis is a spore-forming unicellular parasite[1] that causes intestinal illness by infecting the small intestine[2]. The oocysts, which are shed by infected persons, become infective after sporulating in the environment[1,2]. The oocysts may take days to weeks to produce spores, which make fecal-oral transmission unlikely[1-3].

B. Clinical Description:
Cyclospora infects the small intestine and typically causes an illness characterized by watery diarrhea[2,3], with an average of about 6 to 7 stools per day[4]. Other common symptoms include loss of appetite[2,3,5], bloating[5], increased flatus (gas)[3,5], stomach cramps[2,3], nausea[2,3,5], tiredness[2,3,5], muscle aches[2,3], and weight loss[2,3,5]. Less common symptoms include fever[2,3,5], and vomiting[5]. Some persons infected with *Cyclospora* do not develop any symptoms[3,5]. Other infectious organisms can cause illness similar to that caused by *Cyclospora*.

- Differential Diagnosis[6]:
  Giardia, *Cryptosporidium parvum*, *Salmonella*, *Shigella*, *Campylobacter*, and norovirus.

C. Reservoirs:
Humans are the only known reservoir for *C. cayetanensis*[2,3], although the epidemiology of human cyclosporiasis suggests the existence of animal reservoirs, possibly birds[6].

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

E. Incubation Period:
The incubation period for cyclosporiasis is usually 1 week but can range from 2 days to 2 weeks[3].

F. Period of Communicability:
People may shed *Cyclospora* parasites from days to over one month (while actively ill)[6]. It is not known how long the parasite may be shed after symptoms have stopped[6].

G. Susceptibility and Resistance:
There may be an increased risk of infection for people living in or traveling to tropical countries in Asia, the Caribbean, and Latin America[2]. Infection can reoccur in people who had previously been infected[7].

H. Treatment:
A 7-10 day course of trimethoprim-sulfamethoxazole (TMP-SMX) is the recommended treatment for cyclosporiasis[2-3]. If not treated, the illness may last for a month or longer and the patient may experience remitting or relapsing symptoms[2].

I. Clinical Case Definition[8]:
An illness of variable severity caused by the protozoan parasite *Cyclospora cayetanensis* 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[8]:
Detection of *Cyclospora* organisms or DNA in stool, intestinal fluid/aspirate, or intestinal biopsy specimens.

Case Classification	
Confirmed	A case that meets the clinical description and at least one of the criteria for laboratory confirmation as described above.
Probable	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:
Arizona State Public Health Laboratory and CDC do not offer routine *Cyclospora* testing. 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[3,9], OR
- In intestinal fluid or small-bowel biopsy specimens[3], OR
- Demonstration of sporulation[9], OR
- By PCR in stool, duodenal/jejunal aspirates or small bowel biopsy specimens[3].

N. Outbreak Definition:

- Diagnosis or detection of 2 or more cases, not from the same household or family, with exposure to the same food or water source within a two week time period; OR
- An unexpected increase in cases clustered by time, place, or person

O. Time Frame[10]:
All confirmed and probable cases are reportable to Local County Health Departments within five (5) working days. Reports must be submitted 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:
- CDC Cyclosporiasis Case Report Form: http://www.cdc.gov/parasites/cyclosporiasis/resources/pdf/cyclo_report_form.pdf
- A more detailed form may be requested during summer months when outbreaks are common: https://www.azdhs.gov/documents/preparedness/epidemiology-disease-control/disease-investigation-resources/cyclosporiasis-investigation-form.pdf
- ADHS Reporting & Investigation Form: 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.
  - If tests were not performed then coordinate testing for case confirmation.

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 patient's address.
  - 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 to request a LexisNexis search. This can be conducted for individuals 18 years and older. For those younger than 18, please have a parent/guardian name available.
- 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).
- **Please refer to the Cyclosporiasis Surveillance Case Report Form to conduct the case investigation.**

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[11]:

Please refer to Foodborne Disease Outbreaks section in the ADHS Foodborne and Waterborne Disease Outbreak Investigation Resource Manual.

S. Special Situations:

N/A

Additional Information & Resources

Treatment / Differential Diagnosis: American Academy of Pediatrics. 2015 Red Book: Report of the Committee on Infectious Diseases, 30th Edition. Illinois, Academy of Pediatrics, 2015: 316-317.

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/

ADHS Case Definitions for Reportable Communicable Morbidities, 2018:
http://www.azdhs.gov/documents/preparedness/epidemiology-disease-control/disease-investigation-resources/case-definitions.pdf

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

References

1. Centers of Disease Control and Prevention. Cyclosporiasis – Biology [Internet]. Centers of Disease Control and Prevention. Centers for Disease Control and Prevention; 2015 [cited 2017May 11]. Available from: https://www.cdc.gov/parasites/cyclosporiasis/biology.html

2. Bridges CB, Mounts A, Besselaar T, Fitzner J, Vandemaele K, Shindo N, Tam JS. Cyclosporiasis. In: Heymann DL, editor. Control of communicable diseases manual. 20th ed. Washington, DC: American Public Health Association; 2015. p. 139-140.

3. Kimberlin DW, Brady MT, Jackson MA, Long SS. Cyclosporiasis. In: Red Book: 2015 report of the committee on infectious diseases. 30th ed. Elk Grove, IL: American Academy of Pediatrics; 2015. p. 316-317.

4. Utah Department of Health. Cyclospora [Internet]. Utah Department of Health; 2001 [cited 2017May11]. Available from: http://health.utah.gov/epi/diseases/cyclospora/factsheet.pdf

5. Centers of Disease Control and Prevention. Cyclosporiasis – Disease [Internet]. Centers of Disease Control and Prevention. Centers for Disease Control and Prevention; 2013 [cited 2017May 11]. Available from: https://www.cdc.gov/parasites/cyclosporiasis/disease.html

6. Utah Department of Health. Cyclosporiasis – Disease Plan [Internet]. Utah Department of Health; 2015 [cited 2017May11]. Available from: http://health.utah.gov/epi/diseases/cyclospora/plan.pdf

7. Centers of Disease Control and Prevention. Cyclosporiasis – Cyclosporiasis FAQs for Health Professionals [Internet]. Centers of Disease Control and Prevention. Centers for Disease Control and Prevention; 2014 [cited 2017May 11]. Available from: https://www.cdc.gov/parasites/cyclosporiasis/health_professionals/hp-faqs.html

8. Arizona Department of Health Services. Cyclosporiasis. In: Case Definitions for Reportable Communicable Morbidities: 2017. 2017 [cited 2017May11]; Available from: http://azdhs.gov/documents/preparedness/epidemiology-disease-control/disease-investigation-resources/case-definitions.pdf. p. 52.

9. Centers of Disease Control and Prevention. DPDx – Laboratory Identification of Parasitic Diseases of Public Health Concern [Internet]. Centers of Disease Control and Prevention. Centers for Disease Control and Prevention; 2014 [cited 2017May 11]. Available from: https://www.cdc.gov/dpdx/cyclosporiasis/dx.html

10. Arizona Administrative Code. 2013Sep30 [cited 2017May11]. Available from: http://apps.azsos.gov/public_services/Title_09/9-06.pdf

11. Arizona Department of Health Services. Foodborne and Waterborne Disease Outbreak Investigation Resource Manual [Internet]. Arizona Department of Health Services; 2010 [cited 2017May11]. Available from: http://azdhs.gov/documents/preparedness/epidemiology-disease-control/disease-investigation-resources/outbreak-investigation-resource-manual.pdf