





# Cyclospora

## Investigation Guideline

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**Revision History:**

<b>Date</b>	<b>Replaced</b>	<b>Comments</b>
09/2014	01/2010	Added notification section and table of contents; fixed minor typos. Updated Laboratory Analysis Section. More details added to Investigators Responsibilities and Data Management. Reformatted Standard Case Investigation section to assist with EpiTrax system data entry. Reformatted fact sheet.
05/2018	09/2014	Notification Section modified with requirements of new reporting regulations. Surveillance indicators added to Responsibilities. Laboratory analysis section updated. Updated web links.
07/2021	05/2018	Updated web links. Updated factsheet with link to CDC provided resources.

# Cyclospora

## Disease Management and Investigative Guidelines

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### CASE DEFINITION (CDC 2010)

#### Clinical Description for Public Health Surveillance:

An illness of variable severity caused by the protozoan parasite *Cyclospora cayetanensis*. The most common symptom is watery diarrhea. Other common symptoms include loss of appetite, weight loss, abdominal cramps/bloating, nausea, body aches, and fatigue. Vomiting and low grade fever also may be noted.

#### Laboratory Criteria for Case Classification:

Laboratory-confirmed cyclosporiasis shall be defined as the 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.

### LABORATORY ANALYSIS

Testing for *Cyclospora* is not routinely conducted in most U.S. laboratories, even when stool is tested for parasites. Similarly, not all gastrointestinal panels include a target for *Cyclospora*. Therefore, if indicated, health care providers should specifically request testing for *Cyclospora*.

Contact KDHE (877-427-7317) to seek approval for multiplex PCR testing at the Kansas Health and Environment Laboratory (KHEL). Only after approval will specimens that were collected as part of public health investigations be tested by multiplex PCR. If screening results are negative and a parasite pathogen is still suspected, specimens for microscopy should then be collected.

#### 1. Multiplex PCR testing

- Specimen: ½ dollar to ping pong ball sized amount of stool placed and emulsified in a Cary-Blair transport vial.
- Must be received by KHEL within 4 days of collection.

#### 2. Microscopy with Modified Acid-Fast stain

- Specimen: ½ dollar to ping pong ball sized amount of stool placed and emulsified in 10% a Formalin vial and a PVA vial.
- Must be received by KHEL within 7 days of collection.

- Timing of specimens: Collect three specimens within a 10-day period while a person is symptomatic or within 2 weeks after diarrhea resolves.
- Do not refrigerate the preserved samples. Once preserved, the specimens can be stored and transported at room temperature.
- If there is a delay in obtaining the preservatives, refrigerate untreated stool specimens at 4°C (do not freeze) for up to 48 hours.

## EPIDEMIOLOGY

Cyclospora is acquired by ingesting infectious oocysts found in contaminated drinking water and/or on fresh fruits or vegetables. After infection and reproduction in the small bowel within a human host, oocysts are produced and excreted in the stool. Excreted oocysts are not immediately infectious as they must sporulate outside the host. This may take weeks to months; therefore, direct human-to-human infection does not occur. Cyclosporiasis is common in many developing countries with an increase incidence noted during the spring and summer months. Outbreaks have been reported in the United States and have been associated with the ingestion of imported produce, including: raspberries, basil, and lettuce.

## DISEASE OVERVIEW

### A. Agent:

The protozoan parasite *Cyclospora cayetanensis*.

### B. Clinical Description:

Symptoms typically include: diarrhea, abdominal cramps, nausea, fatigue, and anorexia. Vomiting and fever are uncommon. Without treatment, symptoms may last several days to weeks and typically last longer in immune-compromised individuals. Significant weight loss may occur.

### C. Reservoirs:

Humans are the only known reservoir; however, animal reservoirs are suspected.

### D. Mode(s) of Transmission:

Direct person-to-person transmission does not occur. Noninfectious unsporulated oocysts are passed in stools; these oocysts take days to weeks, under favorable environmental conditions, to sporulate and become infectious. (The time required for sporulation to occur, under laboratory conditions, is 14 days). Humans become infected by consuming food or water that has been contaminated with human feces containing *C. cayetanensis* that has then had time to sporulate in the environment into an infectious form.

### E. Incubation Period:

Range 1-14 days; average 7 days.

### F. Period of Communicability:

Case person(s) shed unsporulated oocysts while actively ill. It is not known how long oocysts may be shed after symptoms have stopped.

### G. Susceptibility and Resistance:

Susceptibility is universal and reinfection may occur.

### H. Treatment:

Trimethoprim-sulfamethoxazole is the pharmacologic therapy of choice.

## NOTIFICATION TO PUBLIC HEALTH AUTHORITIES

Suspected cases of cyclosporiasis shall be reported within 24 hours, except if the reporting period ends on a weekend or state-approved holiday, the report shall be made by 5:00 p.m. on the next business day after the 24-hour period:

1. Health care providers and hospitals: report to the local public health jurisdiction or KDHE-BEPHI (see below)
2. Local public health jurisdiction: report to KDHE-BEPHI (see below)
3. Laboratories: report to KDHE-BEPHI (see below)

**Kansas Department of Health and Environment (KDHE)  
Bureau of Epidemiology and Public Health Informatics (BEPHI)  
Phone: 1-877-427-7317 Fax: 1-877-427-7318**

### **Further responsibilities of state and local health departments to the CDC:**

*As a nationally notifiable condition, cyclosporiasis cases require a ROUTINELY NOTIFIABLE report to the Center of Disease Control and Prevention (CDC).*

- **Local public health jurisdiction** will report information requested on the disease reporting forms provided by KDHE as soon as possible, completing the forms within 5 days of receiving a notification of a report.
- KDHE-BEPHI will file an electronic case report the next regularly scheduled electronic transmission.

(KDHE-BEPHI files electronic reports weekly with CDC.)

## INVESTIGATOR RESPONSIBILITIES

- 1) [Report](#) all confirmed, probable and suspect cases to the KDHE-BEPHI.
- 2) Contact medical provider to collect additional information and confirm diagnosis using current [case definition](#).
  - Collect all information requested in [Step 1](#)) of case investigation
  - Ensure that case is aware of his/her diagnosis.
- 3) Continue the [case investigation](#) within 3 days of receiving a report
  - Complete the case investigation within 5 days of receiving a report.
  - Focus on travel outside of the United States
  - With no travel, inquire on fresh produce that may have been imported.
- 4) Conduct [contact investigation](#) to identify additional cases.
  - Those exposed to a common source are considered contacts.
- 5) Identify whether the source of infection is major public health concern.
  - [Outbreak situations](#) involving imported food.
- 6) Initiate control and prevention measures to prevent spread of disease.
  - Work with state and national officials during outbreaks.
  - Educate those at risk of acquiring illness
- 7) [Record](#) data, collected during the investigation, in the KS EpiTrax system under the data's associated [\[tab\]](#) in the case morbidity report (CMR).
- 8) As appropriate, use the notification letter(s) and the disease [fact sheet](#) to notify the case, contacts and other individuals or groups.

## STANDARD CASE INVESTIGATION AND CONTROL METHODS

### Case Investigation

- 1) Contact the medical provider who ordered testing of the case and obtain the following information. (This includes medical records for hospitalized patients.)
  - Obtain clinical information on symptoms, including diarrhea, weight loss, fever, fatigue, anorexia (appetite loss), nausea, vomiting, abdominal cramps, or any other symptoms [Notes].
  - Record onset date (approximate if exact date is not known) [Clinical]
  - Record hospitalizations: location and duration of stay [Clinical]
  - Record outcomes: survived or date of death [Clinical]
  - Examine the treatment prescribed; specifically, trimethoprim/ sulfamethoxazole (e.g. Bactrim, Septra, Cotrim) or other antibiotic treatment, include date started/ended, and any reason why sulfa drugs may not have been used. [Clinical]
  - Examine the laboratory testing that was reported. If needed, obtain copies of laboratory reports that are needed to confirm the case. [Laboratory]
  - Collect case's demographics and contacting information (address, birth date, gender, race/ethnicity, primary language, and phone number(s)) [Demographic]
- 2) Interview the case to determine source, risk factors and transmission settings:
  - At least 3 phone attempts at different times of day should be made before considering the case closed as lost to follow-up.
  - Focus on incubation period 2 weeks prior to onset, collect epidemiological information that helps to establish risks of acquiring infection: [Epidemiological]
    - Note travel dates and locations to record where the infection was most likely imported from. (Indigenous / out-of-county, state, or U.S.)
      - Record any pertinent travel history in [Notes] including travel:
        - Outside of KS; list states visited; date visited
        - Outside of U.S.; list country; date of departure and return
      - If case was indigenous, examine epidemiological information to determine indigenous source, include:
        - Case's occupation: food handler, group living arrangements, daycare attendee or worker [Epidemiological]
        - Inquire about attendance at group events during the 2 weeks before onset.
        - Record any Place Exposure(s) (where illness could have been acquired) include restaurants, large group events, and group living. [Epidemiological]
        - Collect information on the case's food history a period of 2 weeks before illness onset; focus on type of fresh fruits, vegetables or herbs. [Notes]
          - The [CDC Case Report](#) Form or a KDHE provided survey (based on most cyclospora investigations) may be used to assist with produce inquiries.
    - Collect information from case for the [Contact Investigation](#). (See below.)

- 3) Investigate epi-links among cases (clusters, household, co-workers, etc).
  - Inquire about others with similar symptoms.
  - Investigate highly suspected local sources; see [Environmental Measures](#).
  - For suspected [Outbreaks](#) to Managing Special Situations section.

### Contact Investigation

- 1) Contacts are defined as those with possible exposure to the source of infection. Contacts are not just persons in close proximity to a case.
- 2) Identify persons who participated with the case in any of the potential at-risk activities and contact them, as well as any acquaintance or household member with similar illness.
- 3) ONLY if a risk of transmission exists, create a line listing of contacts at-risk of developing disease. [\[Contact\]](#)

### Isolation, Work and Daycare Restrictions

Cyclospora infection is not a disease considered for quarantine or isolation under Kansas Administrative Code.

### Case Management

None

### Contact Management

- 1) If a contact listing was created because of the high possibility of disease, follow-up with the listed contacts to determine if illness occurred [\[Contact\]](#)
  - Collect information on each contact's health status, noting any symptoms
  - Inform ill contact of possible exposure to facilitate proper diagnosis and therapy.
- 2) A symptomatic contact is considered a probable case requiring investigation and [reporting](#) to KDHE-BEPHI [\[Contact\]](#)  
*(On the Contact Tab of the CMR, click 'Show' beside the symptomatic contact on the listing. When View Contact Event opens in show mode, select 'Promote to CMR')*
- 3) In outbreak situations, stool collections for [laboratory analysis](#) to confirm epi-linked cases may be warranted.
- 4) As needed, provide education on avoiding further exposures and to ensure proper medical care is obtained and precautions taken if symptoms develop.

### Environmental Measures

If a commercial food service facility, food distributor or public water supply is implicated in transmission. Activities should be coordinated through the proper regulatory agency, including:

- Inspection of the facility.
- Collection of food, drink or water samples and, if necessary, human stool specimens for testing.
- Possible detailed trace-back investigation of any suspect food products.

The agency involved in traceback and inspections will depend on the source of infection.

## Education

- 1) As needed, inform of communicability, incubation period and symptoms.
- 2) Provide basic instruction to cases and potentially exposed contacts about:
  - Avoid water or food that may be contaminated with feces.
  - Uncooked fruits and vegetables should be washed thoroughly before eaten.
  - Always thoroughly wash hands with soap and water before handling food, after using the toilet or changing diapers, after handling animal stools (feces), and after gardening or other direct contact with soil.
  - Do not drink water directly from streams, lakes, springs or swimming pools.
  - Boil water for 1 minute at a rolling boil whenever you are unsure of the safety of the water.
- 3) Use the public health [fact sheet](#) to assist with education.

## MANAGING SPECIAL SITUATIONS

### A. Outbreak Investigation:

- 1) A single case is actively pursued to identify any outbreaks with unidentified cases associated to the same source.
- 2) The situation should be treated as a public health emergency until the investigation of additional cases and the possibility of an unidentified contaminated source have been ruled out.
  - Foodborne disease outbreak is defined in the following ways:
    - Two or more individuals (from different households) who experience similar illness after eating a common food or in a common place.
    - An unexplained, unexpected increase of a similar illness and food is a likely source.
  - Waterborne disease outbreak is defined as an incident in which two or more epidemiologically-linked persons experience a similar illness after exposure to the same water source and epidemiologic evidence implicates the water as the likely source of the illness.
  - Other outbreaks may be defined as unexplained, unexpected increase in cases that are clustered in person, place, or time.
- 3) Notify KDHE immediately, 1-877-427-7317 of suspected outbreaks.
- 4) KDHE-BEPHI may provide a specific survey for data collection.
- 5) Active case finding will be an important part of any investigation.

### B. Reported Incidence Significantly Higher than Usual

- 1) If you suspect an outbreak, investigate to determine the potential source of infection and mode of transmission.
- 2) Consult with the KDHE epidemiologist on-call at 877-427-7317 to help determine a course of action to prevent additional cases and to execute surveillance for additional cases across jurisdictional boundaries that would be difficult to detect at a local level.



## DATA MANAGEMENT AND REPORTING TO THE KDHE

- A. Accept the case assigned to the LHD and record the date the LHD investigation was started on the [\[Administrative\]](#) tab.
- B. Organize and collect data collection tools:
  - Investigators can enter all required information directly into EpiTrax [\[Clinical\]](#), [\[Demographics\]](#), [\[Epidemiological\]](#) and [\[Notes\]](#) tabs.
  - The [CDC Cyclospora Case](#) Report Form can assist with some data collection and can be scanned and attached to the CMR. [\[Add Attachment\]](#)
  - During outbreak investigations, refer to guidance from a KDHE epidemiologist for appropriate collection tools.
- C. Report data collected during the investigation via EpiTrax.
  - Verify that all data requested in this guideline has been recorded on an appropriate EpiTrax [\[tab\]](#), or that actions are completed for a case lost to follow-up as outlined below.
  - Some data that cannot be reported on an EpiTrax [\[tab\]](#) may need to be recorded in [\[Notes\]](#) or scanned and attached to the record.
  - Paper report forms do not need to be sent to KDHE after the information is recorded in EpiTrax. The forms should be handled as directed by local administrative practices.
- D. If a case is lost to follow-up, after the appropriate attempts to contact the case have been made:
  - Indicate 'lost to follow-up' on the [\[Administration\]](#) tab with the number of attempts to contact the case recorded.
  - Record at least the information that was collected from the medical records.
  - Record a reason for 'lost to follow-up' in [\[Notes\]](#).
- E. After the requirements listed under [Case Investigation](#) have been completed, record the "Date LHD investigation completed" field located on the bottom of the [\[Administrative\]](#) tab.
- F. After the requirements listed under [Case Investigation](#) have been completed, record the "Date LHD investigation completed" field located on the [\[Administrative\]](#) tab.
  - Record the date even if the local investigator's [Case](#) or [Contact Management](#) for the contact is not "Complete".
- G. Once the entire investigation is completed, the LHD investigator will click the "Complete" button on the [\[Administrative\]](#) tab. This will trigger an alert to the LHD Administrator so they can review the case before sending to the state.
  - The LHD Administrator will then "Approve" or "Reject" the CMR.
  - Once a case is "Approved" by the LHD Administrator, BEPHI staff will review the case to ensure completion before closing the case.(Review the [EpiTrax User Guide, Case Routing](#) for further guidance.)


## ADDITIONAL INFORMATION / REFERENCES

- A. Treatment / Differential Diagnosis:** American Academy of Pediatrics. Red Book: Report of the Committee on Infectious Disease, 30th Edition. Illinois, Academy of Pediatrics, 2015.
- B. Epidemiology, Investigation and Control:** Heymann. D., ed., Control of Communicable Diseases Manual. Washington, DC, American Public Health Association, 2015.
- C. Case Definitions:** [wwwn.cdc.gov/nndss/](http://wwwn.cdc.gov/nndss/)
- D. Quarantine and Isolation:** Kansas Community Containment Isolation/ Quarantine Toolbox Section III, Guidelines and Sample Legal Orders  
[www.kdheks.gov/cphp/operating\\_guides.htm#coc](http://www.kdheks.gov/cphp/operating_guides.htm#coc)
- E. Kansas Regulations/Statutes Related to Infectious Disease:**  
[www.kdheks.gov/epi/regulations.htm](http://www.kdheks.gov/epi/regulations.htm)
- F. KDHE Foodborne Illness Resources:** [www.kdheks.gov/epi/foodborne.htm](http://www.kdheks.gov/epi/foodborne.htm)
- G. Additional Information (CDC):** [www.cdc.gov/health/default.htm](http://www.cdc.gov/health/default.htm)

## ATTACHMENTS

- Fact Sheet
- CDC Case Report Form

To view attachments in the electronic version:

1. Go to <View>; <Navigation Pane>; <Attachments> – OR – Click on the “Paper Clip”  icon at the left.
2. Double click on the document to open.