Washington State Department of Health

Cryptosporidiosis

Signs and Symptoms	• Mild to severe watery diarrhea, abdominal cramps, nausea, vomiting, low-grade fever, weight loss; may be no symptoms • May be more severe and prolonged if immunocompromised (untreated AIDS, medication, inherited immunoglobulinopathies)	
Incubation	Usually 5 – 8 days, range 2-12 days	
Case classification	**Clinical criteria**: one or more of: diarrhea lasting 72 hours or longer, abdominal cramping, vomiting or anorexia	
	Confirmed: detection of organism or DNA in stool, intestinal fluid, tissue, biopsy, or other sample by DFA, PCR, EIA, or microscopy	**Probable**: clinically consistent with detection of antigen by immunochromatographic card /rapid card test; or unknown laboratory test
Differential diagnosis	Giardiasis, amebiasis, viral gastroenteritis, bacterial enteritis, celiac disease, Crohn disease, inflammatory bowel disease, irritable bowel syndrome, lactose intolerance	
Treatment	If symptomatic nitazoxanide; other drugs used are atovaquone and paromomycin	
Duration	1-2 weeks; may be intermittent and prolonged, particularly with immunocompromise	
Exposure	Spread is fecal-oral (including sexual) or through contaminated water (particularly children's water parks) and food, or contact with infected persons or animals. Reservoirs are humans (*C. hominis* and *C. parvum*), livestock (particularly calves and lambs) and other animals (mainly *C. parvum*).	
Laboratory testing	Local Health Jurisdiction (LHJ) and Communicable Disease Epidemiology (CDE) can arrange testing if an outbreak is suspected (facility or water system) • Washington State Public Health Laboratories uses a DFA test on stool. Diagnostic testing should be done by a commercial laboratory with **specific request** for cryptosporidiosis since it may not be included in a routine O&P examination. • **Best specimens**: 3 stools collected 48 or more hours apart, in parasite collection vial • Keep all specimens **cold, ship cold** with Microbiology form http://www.doh.wa.gov/Portals/1/Documents/5230/302-013-Micro.pdf • Specimen Collection and Submission Instructions http://www.doh.wa.gov/Portals/1/Documents/5240/SCSI-Para-Intest-Conf-V1.pdf	
Public health actions	LHJ can consult with CDE 877-539-4344 for testing in outbreak investigations • Identify potential exposures from people, animals, food, drinking water or recreational water, travel • Identify potential outbreaks from common sources • Educate about ways to prevent fecal-oral transmission including hand washing • Exclude from sensitive occupation or setting such as daycare attendance or work, food handling, and health care until diarrhea ends • Recommend no use of public swimming areas until 2 weeks after diarrhea ends • Persons with diarrhea should avoid close contact with immunocompromised persons • Recommend standard and contact precautions to control institutional outbreaks *Infection Control:* standard precautions with added contact precaution for diapered or incontinent persons	

Cryptosporidiosis

1. DISEASE REPORTING

A. Purpose of Reporting and Surveillance

1. To identify outbreaks and potential sources of ongoing transmission.
2. To prevent further transmission from such sources.
3. To educate people about how to reduce their risk of transmission.

B. Legal Reporting Requirements

1. Health care providers: notifiable to local health jurisdiction within 3 business days
2. Health care facilities: notifiable to local health jurisdiction within 3 business days
3. Laboratories: *Cryptosporidium* notifiable to local health jurisdiction within 2 business days. Specimen submission is on request only.
4. Local health jurisdiction: notifiable to the Washington State Department of Health Office of Communicable Disease Epidemiology (CDE) within 7 days of case investigation completion or summary information required within 21 days of original report.

C. Local Health Jurisdiction Investigation Responsibilities

1. Begin investigation within 3 business days.
2. Report all *confirmed* and *probable* cases to CDE. Complete the cryptosporidiosis case report form (http://www.doh.wa.gov/Portals/1/Documents/5100/210-022-ReportForm-Crypto.pdf) and enter the data into the Washington Disease Reporting System (WDRS).

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Cryptosporidium is a protozoan parasite. Most human illness is caused by two species: *C. hominis* which only infects humans and C. *parvum* which infects humans, cattle and other mammals. Other cryptosporidial species (*C. felis*, *C. meleagridis*, *C. canis*, and *C. muris*) cause rare human cases. Infected animals and people can excrete huge numbers of oocysts in stool which are immediately infective to other susceptible hosts. The infectious dose can be very low.

Oocysts are relatively hardy in the environment, and can survive for weeks or months. They are resistant to the concentrations of chlorine and other disinfectants commonly used for water treatment. They can be killed by heat (e.g., bringing water to a rolling boil), removed by adequate filtration, or inactivated by prolonged disinfection processes.

B. Description of Illness

Persons with symptoms generally experience mild to severe watery diarrhea, usually accompanied by abdominal cramps. Nausea, vomiting, and low-grade fever are common. Symptoms usually last 1 to 2 weeks, but illness can be intermittent and prolonged.

Infection can be severe and persistent in persons who are immunocompromised (e.g., chemotherapy, untreated AIDS). Asymptomatic infections also occur.

Cryptosporidiosis may not be identified on a routine stool microscopy exam for ova and parasites (O&P) if there is no specific request for *Cryptosporidium* testing. Some laboratories now use immunodiagnostic methods instead of microscopy.

C. Cryptosporidiosis in Washington State

Since cryptosporidiosis became reportable in 2000, the number of reported cases has ranged between 60 and 140 cases per year. Small outbreaks of cryptosporidiosis in Washington have been associated with wells, recreational water facilities, calves and raw dairy products.

D. Reservoirs

Humans, cattle and a wide variety of other animals are hosts for this parasite, which is shed in feces. Young livestock, notably calves and lambs, are commonly infected and may excrete large numbers of oocysts.

E. Modes of Transmission

Transmission is fecal-oral. Most recognized outbreaks have been waterborne, both recreational (including splash parks) and potable water. Risk factors for infection include:

1. Contact with infected persons (i.e., those in the same household or child care facility) or infected animals;
2. Drinking fecally contaminated and inadequately treated water;
3. Ingesting fecally contaminated recreational water (rivers, lakes, pools, etc.);
4. Eating food contaminated by animals or food handlers (rarely documented); and
5. Certain types of sexual contact (e.g., oral-anal contact).

F. Incubation Period

The incubation period ranges around 2–12 days but is typically 5–8 days.

G. Period of Communicability

People are communicable as long as oocysts are being shed, typically days to weeks. Shedding may persist after symptoms resolve, although the concentration of oocysts (and hence infectivity) declines.

H. Treatment

Nitazoxanide is approved by the FDA for treatment of diarrhea caused by *Cryptosporidium* species in people ≥ 1 year of age with healthy immune systems.

For additional information regarding nitazoxanide treatment, see:
http://www.cdc.gov/parasites/crypto/health_professionals/tx.html

3. CASE DEFINITION

A. Clinical description

A gastrointestinal illness characterized by diarrhea and one or more of the following: diarrhea lasting 72 hours or longer, abdominal cramping, vomiting or anorexia.

B. Laboratory criteria for diagnosis

Confirmed: evidence of *Cryptosporidium* organisms or DNA in stool, intestinal fluid, tissue samples, biopsy specimens, or other biological sample by certain laboratory methods with a high positive predictive value (PPV), e.g.:

- Direct fluorescent antibody (DFA) test,
- Polymerase chain reaction (PCR),
- Enzyme immunoassay (EIA), or
- Light microscopy of stained specimen.

Probable: the detection of *Cryptosporidium* antigen by a screening method, such as immunochromatographic card/rapid card test; or a laboratory test of unknown method.

C. Case classification (2012)

Probable:

- A case with supportive laboratory tests for *Cryptosporidium* spp. infection using a method listed in the Probable laboratory criteria. When the diagnostic test method or a laboratory test result for cryptosporidiosis cannot be determined, the case can only be classified as probable, OR
- A case that meets the clinical criteria and is epidemiologically linked to a confirmed case.

Confirmed: a case that is diagnosed with *Cryptosporidium* spp. infection based on laboratory testing using a method listed in the Confirmed criteria.

4. DIAGNOSIS AND LABORATORY SERVICES

A. Diagnosis

The diagnosis of cryptosporidiosis is usually made by detection of the organism in stool using special stains, or by enzyme immunoassay. Since *Cryptosporidium* may not be detected by routine O&P stool examination, health care providers considering the diagnosis of *Cryptosporidium* infection should request that specific testing be performed.

B. Tests Available at Washington State Public Health Laboratories (PHL)

In outbreak situations PHL ca provide direct fluorescent antibody (DFA) testing on stool. Consult with Office of Communicable Disease Epidemiology prior to submitting specimen, such as in an outbreak settings. For details of specimen submission to PHL see: http://www.doh.wa.gov/Portals/1/Documents/5240/SCSI-Para-Intest-Conf-V1.pdf

Specimens need to be shipped with a completed microbiology form (http://www.doh.wa.gov/Portals/1/Documents/5230/302-013-Micro.pdf). Note that PHL requires all clinical specimens have two patient identifiers, including a name **and** a second identifier (e.g., date of birth) both on the specimen label and on the submission form. Due to laboratory accreditation standards, specimens will be rejected for testing if not properly identified. Also include specimen source and collection date.

C. Specimen Collection

To maximize the likelihood of detecting *Cryptosporidium*, three stool specimens should be collected 48 hours apart or over a 10-day period. Stool should be stored and

transported either in Para Pac ULTRA ECOFIX™ or in one tube with 10% formalin and one tube with PVA. If the ECOFIX™ kit is being used, stool should be added to the collection kit until the fluid level reaches the red line marked on the outside of the tube. The kit should then be mixed and shipped at room temperature.

5. ROUTINE CASE INVESTIGATION

Interview the case and others who may be able to provide pertinent information.

A. Evaluate the Diagnosis

Review the clinical presentation and laboratory results. Reports of asymptomatic persons do not require an investigation.

B. Identify Source of Infection

Ask about possible exposures in the 2 to 12 days before onset, including:

1. Contact with any acquaintances or household member with a similar illness. Anyone meeting the probable case definition should be reported and investigated in the same manner as a confirmed case.
2. Attendance or work at a child care facility by the case or a household member.
3. Source(s) of drinking water, including water at home and work, as well as streams, lakes or other untreated sources.
4. Recreational water exposures: lakes, rivers, swimming pools, water slides, etc. Obtain the date and location of exposure.
5. Travel outside the area. Obtain travel dates and locations visited.
6. Contact with livestock and other animals.
7. Consumption of high-risk foods (e.g., raw milk or raw milk products).

C. Identify Potentially Exposed Persons

Collect the name, age, and phone number of contacts with a similar illness. These people should be investigated as probable cases. A symptomatic contact who meets the probable case definition should be investigated as a case.

D. Infection Control Recommendations/Case Management

1. Hospitalized patients should be cared for using standard precautions. In addition, contact precautions should be used for diapered or incontinent persons for the duration of illness or to control institutional outbreaks.
2. Educate regarding modes of transmission and ways to prevent transmission to others.
    a. Follow good personal hygiene, including effective hand washing, particularly after using the toilet, changing diapers, and before preparing or eating food. The importance of proper hygiene is essential; excretion of organisms may persist for several weeks. Alcohol-based hand sanitizers are not effective against the organism.
    b. Do not enter public recreational water (e.g., pools, fountains, splash parks, lakes) until 2 weeks after resolution of diarrhea.

c. Avoid sexual practices that can cause oral exposure to stool (e.g., oral-anal contact).

d. While symptomatic with diarrhea, avoid close contact with anyone who has a weakened immune system.

3. School Restrictions: Children should not attend school as long as they have diarrhea.
4. Work or Child Care Restrictions: Persons should not work as food handlers, child care or health care workers, or attend child care as long as they have diarrhea.
5. If a suspected source of infection is identified and has the potential for transmitting infection to a defined population (e.g., contaminated well, infected animal), advise those individuals on measures to avoid exposure.

E. Environmental Evaluation

An environmental evaluation is appropriate if an ongoing source of exposure is identified, such as a recreational water venue or drinking water system, or a child care setting. *Cryptosporidium* oocysts are resistant to chlorine thus enhanced disinfection methods are required to control transmission via swimming pools, drinking water, and environmental surfaces.

If an animal venue such as a petting zoo is suspected, consult the Compendium of Measures to Prevent Disease Associated with Animals in Public Settings, available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6004a1.htm?s_cid=rr6004a1_w.

If a swimming pool is suspected, consult the CDC recommendations available at: https://www.cdc.gov/healthywater/swimming/residential/index.html.

6. MANAGING SPECIAL SITUATIONS

A. Case Attends or Works at a Child Care Facility

1. Exclude persons with cryptosporidiosis until the diarrhea has resolved.
2. If the facility cares for diapered children, interview the operator and inspect attendance records to identify suspect cases among other children or staff during the preceding month. Note: WAC 170-295-3030 specifies that the facility operator keep a log of illnesses and that parents be notified if their children have been exposed to infectious diseases or parasites.
3. If an outbreak is suspected:
   - A facility may have requirements for reporting to their licensing agency.
   - Facilitate testing of stool specimens from all symptomatic staff members, attendees, and family members who have a diarrheal illness consistent with cryptosporidiosis.
   - Exclude all symptomatic persons from the child care facility until their diarrhea resolves. Testing and exclusion of asymptomatic carriers, even in the setting of a child care outbreak, is not generally recommended.
   - Instruct the operator and staff about proper food handling, hand washing after diaper changing or bathroom use, and the importance of keeping diaper changing areas away from food preparation areas. Alcohol gels and hand sanitizers do not kill *Cryptosporidium*.

- Instruct the operator regarding environmental sanitation, particularly in diaper changing areas. No disinfectant is guaranteed to be completely effective against *Cryptosporidium*. However, hydrogen peroxide is more effective than standard bleach solutions.
- Instruct the child care operator to call the local health jurisdiction immediately if new cases of diarrhea occur.
- Follow up with the child care center to ensure that surveillance and appropriate prevention measures are in place. Manage newly symptomatic children as outlined above.

For additional information, see:
https://www.cdc.gov/parasites/crypto/childcare/outbreak.html.

B. Contaminated Swimming Pools

Fecal accidents in pools pose a risk to other swimmers. A pool contaminated with *Cryptosporidium* species may need to be closed for days, or in some cases drained and refilled.

For additional information regarding responding to fecal accidents in pools, see:
http://www.cdc.gov/healthywater/swimming/pdf/fecal-incident-response-guidelines.pdf

7. ROUTINE PREVENTION

A. Immunization Recommendations: None

B. Prevention Recommendations (see: http://www.cdc.gov/parasites/crypto/)

1. **Practice good hygiene.**
   a. Wash hands thoroughly with soap and water after using the toilet; before handling or eating food; after changing a diaper or assisting with toileting; after caring for somebody who is sick; after touching something that could be contaminated (such as a trash can, cleaning cloth, drain, or soil); and after handling animals or their toys, leashes, or feces.
   b. Assist or visually supervise young children and other people you are caring for with hand washing as needed.
   c. Wash hands thoroughly after contact with animals, particularly young livestock or animals with diarrhea. Minimize contact with animal feces
   d. Keep *Cryptosporidium* organisms and other germs out of pools, lakes, hot tubs, fountains, water parks, splash parks, lakes, etc., by taking the following steps:
      - Protect others by not swimming if you are experiencing diarrhea and for 2 weeks after your diarrhea stops. This is essential for children in diapers.
      - Shower with soap and water before entering the water, especially the genital and rectal areas.
      - Wash children thoroughly (especially the rectal area) with soap and water after they use the bathroom or after their diapers are changed.
      - Take children on frequent bathroom breaks or check their diapers often.
      - Change diapers in the bathroom or a designated diaper-changing area.

2. **Avoid drinking water that might be contaminated.**
    a. Do not drink untreated water from shallow wells, lakes, rivers, springs, ponds, streams, or the ocean.
    b. Do not drink untreated water or use ice made from untreated water during community-wide outbreaks of disease caused by contaminated drinking water.
    c. Do not swallow recreational water (pools, hot tubs, fountains, lakes, rivers). For more information on recreational water-related illness, visit CDC's Health Swimming website: http://www.cdc.gov/healthywater/swimming/.
    d. Do not drink untreated water or use ice made from untreated drinking water in countries where the water supply might be unsafe. For information on traveler's health and cryptosporidiosis, visit CDC's Yellow Book: https://wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/cryptosporidiosis.
    e. Obtain recommendations on safe drinking water sources if severe flooding occurs. Shallow private well in flooded areas may need to be checked before use.
3. **If you are unable to avoid using or drinking water that might be contaminated, then you can make the water safer to drink by doing one of the following:**
    a. Heat the water to a rolling boil for at least 1 minute (at altitudes greater than 6,562 feet [>2,000 meters], boil water for 3 minutes).
    b. Use a filter that has an absolute pore size of 1 micron or smaller, or one that has been NSF rated for "cyst removal". For information on choosing a water filter, see CDC's A Guide to Water Filters fact sheet, available at: https://www.cdc.gov/parasites/crypto/gen_info/filters.html
    c. Chemical treatments (e.g., chlorine, iodine) are often not effective for preventing cryptosporidiosis and are not recommended.
4. **Avoid food that might be contaminated.**
    a. Use safe, uncontaminated water to wash all food that is to be eaten raw.
    b. Wash and/or peel all raw vegetables and fruits before eating.
    c. After washing vegetables and fruit in safe, uncontaminated water, peel them if you plan to eat them raw.
    d. Avoid eating uncooked foods when traveling in countries with minimal water treatment and sanitation systems.
5. **Avoid fecal exposure during sexual activity. This is especially important while experiencing diarrhea caused by cryptosporidiosis.**
    a. Use a barrier during oral-anal sex.
    b. Wash hands immediately after handling a condom used during anal sex or after touching the anus or rectal area.

ACKNOWLEDGEMENTS

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UPDATES

January 2011:
The Legal Reporting Requirements section has been revised to reflect the 2011 Notifiable Conditions Rule revision. Case classifications and laboratory criteria revised in accordance with 2011 CSTE case definitions.

January 2012: Changes in Case Classification Criteria
Section 3a. Changes to laboratory criteria for case classification: Enzyme immunoassay detection is included in confirmed criteria (formerly probable), while detection by rapid card test or unknown testing method is classed as probable.
Section 3b: Probable case definition using clinical and epidemiologic criteria require link to a confirmed case as defined by laboratory criteria.

April 2014: Combined Section 5 Routine case investigation and Section 6 Controlling further spread. Specimen collection information updated.

December 2016: Front page added, minor revisions in Section 7 Routine Prevention.