

	Division of Community and Public Health	
	<b>Section: 4.0 Diseases and Conditions</b>	Revised 8/11
	Subsection: Cryptosporidiosis	Page 1 of 7

## Cryptosporidiosis

### Table of Contents

[Cryptosporidiosis](#)

[Fact Sheet](#)

Disease Case Report (CD-1)      [PDF format](#)      [Word format](#)

[Record of Investigation of Cryptosporidiosis Infection](#) (CD-18)

[Record of Investigation of Enteric Infection](#) (CD-2C)

[Missouri Outbreak Surveillance Report](#) (CD-51)

[Reporting Waterborne Disease and Outbreaks](#) (CDC 52.12)

Sample Letters Regarding Exposure to Cryptosporidiosis

[To parents at beginning of outbreak](#)

[To parents when pool is identified](#)

[To Child Care Center parents](#)

[To Child Care Center](#)

[To pool operators](#)

	Division of Community and Public Health	
	<b>Section: 4.0 Diseases and Conditions</b>	Revised 8/11
	Subsection: Cryptosporidiosis	Page 2 of 7

## Cryptosporidiosis

### Overview<sup>1,2,3</sup>

Cryptosporidiosis or “Crypto” is a diarrheal disease caused by microscopic parasites of the genus *Cryptosporidium*. *Cryptosporidium* is found in soil, food, water, or surfaces that have been contaminated with infected human or animal feces. If a person swallows the parasite they can become infected. Transmission does not occur through contact with blood. The most common symptoms of Crypto are profuse, watery diarrhea and abdominal cramps, sometimes severe. Weight loss, nausea, vomiting, and fever occur less frequently. Some people with cryptosporidiosis may have no symptoms at all. The disease is often self-limiting, but it can be a life threatening illness in immunocompromised individuals, especially HIV-infected persons.

Symptoms of Crypto generally begin 2 to 14 days (average 7 days) after becoming infected with the parasite.<sup>2</sup> In persons with healthy immune systems, symptoms often wax and wane, usually lasting about 1 to 2 weeks. Shedding of the organism in stools may continue for several weeks after symptoms resolve, and the hardy, infectious fecal oocysts may survive in the environment for several months and are resistant to many chemicals used to disinfect water.

*Cryptosporidia* may be found in every region of the United States and throughout the world. Subgroups at increased risk for contracting cryptosporidiosis include: animal handlers, travelers, men who have sex with men, children under the age of two, and close contacts of infected persons. During the past two decades, cryptosporidiosis has become recognized as one of the most common causes of waterborne disease within humans in the United States. The number of reported cryptosporidiosis outbreaks associated with treated recreational water sources increased more than three-fold between 1997-98 and 2005-2006.

For a complete description of cryptosporidiosis, please refer to the following texts:

- ◆ *Control of Communicable Diseases Manual*. (CCDM), American Public Health Association. 19<sup>th</sup> ed. 2008.
- ◆ American Academy of Pediatrics. *Red Book: 2009 Report of the Committee on Infectious Diseases*. 28<sup>th</sup> ed. 2009.
- ◆ *Mandell, Douglas, and Bennett’s Principles and Practice of Infectious Diseases*. 7<sup>th</sup> ed. 2010.

	Division of Community and Public Health	
	<b>Section: 4.0 Diseases and Conditions</b>	Revised 8/11
	Subsection: Cryptosporidiosis	Page 3 of 7

## **Case Definition** <sup>(4)</sup>

### ***Clinical description:***

A gastrointestinal illness characterized by diarrhea, abdominal cramping, fever, nausea, vomiting and/or anorexia.

### ***Laboratory criteria for diagnosis:***

*Confirmed:* The detection of *Cryptosporidium* organisms, or DNA, in stool, intestinal fluid, tissue samples, biopsy specimens, or other biological samples.\*

*Probable:* The detection of *Cryptosporidium* antigen by immunodiagnostic methods.\*\*

\* The confirmed laboratory criteria include detection of *Cryptosporidium* by established laboratory methods (e.g., direct fluorescent antibody [DFA] test or polymerase chain reaction [PCR]).

\*\*Test results known to be obtained with commercially-available immunochromatographic card tests are limited to meeting "probable" case criteria due to a recent report of unacceptably high rates of false-positive results (Clin Infect Dis. 2010 Apr 15;50(8):e53-55).

### ***Case classification:***

*Confirmed:* A case that meets the clinical description and the respective criteria for laboratory-confirmation as described above.

*Probable:* A case that meets the clinical description and has probable criteria for laboratory diagnosis or that is epidemiologically linked to a confirmed case.

## **Information Needed for Investigation**

**Verify the diagnosis.** What laboratory tests were conducted and what were the results? Was cryptosporidiosis confirmed?

**Establish the extent of illness.** Determine if household or other close contacts are, or have been ill, by contacting the health care provider, patient or family member.

**Determine the source of infection to prevent other cases.**

- Does the case or a member of the case's household attend a childcare center or nursery school?
- What is the case's primary source of drinking water?
- Has the case ingested untreated water from a lake or stream?
- Had the case participated in recreational water activities in a pool, water park, lake or stream?
- Has the case traveled recently?
- Does the case handle animals or otherwise have contact with feces from wild or domestic animals especially a calf with diarrhea?
- Have there been other cases linked by time, place or person (persons who drink from the same water supply, consumed fresh fruit or vegetables)?
- Does the case engage in sexual practices that might place them or others at increased risk?

	Division of Community and Public Health	
	<b>Section: 4.0 Diseases and Conditions</b>	Revised 8/11
	Subsection: Cryptosporidiosis	Page 4 of 7

## **Notification**

- Contact the [District Communicable Disease Coordinator](#), or the [Senior Epidemiology Specialist](#), or the Department of Health and Senior Services' Situation Room (DSR) at 800-392-0272 (24/7) immediately if an outbreak\* of cryptosporidiosis is suspected.
- Contact the Bureau of Environmental Health Services at (573) 751-6095 and the Section for Child Care Regulation at (573) 751-2450, if the case is associated with a child care center.
- Contact the Section for Long Term Care Regulation at (573) 526-8524, if cases are associated with a long term-care facility.
- Contact the Bureau of Health Services Regulation at (573) 751--6303, if cases are associated with a hospital, hospital-based long-term care facility, or ambulatory surgical center.

\*Outbreak is defined as the occurrence in a community or region, illness(es) similar in nature, clearly in excess of normal expectancy and derived from a common or a propagated source.

## **Control Measures**

### **General**

- It should be the general practice of all food establishments, childcare centers, and health care facilities to exclude persons with poor hygiene from working in these facilities.
- Identify symptomatic individuals and obtain stool specimens.
- Individuals found positive should be interviewed and referred for medical assessment.
- If cases are associated with a public water supply, notify the [District Communicable Disease Coordinator](#) or [Senior Epidemiology Specialist](#), who will notify the Department of Natural Resources (DNR). DNR should be contacted before the collection of any public water samples.
- If coliform bacteria are detected in a private water supply (e.g. cistern, well), advise the family to boil their water (bring water to a full rolling boil for one minute) used for drinking, food preparation, dishwashing, and tooth brushing until the problem with the water supply can be corrected.
- All individuals with diarrhea should not use public recreational water (e.g., swimming pools, water parks, lakes, ponds) and individuals with a diagnosis of cryptosporidiosis should *not use recreational waters for 2 weeks after symptoms resolve.*<sup>2</sup>
- If fresh fruits or vegetables are suspected as the vehicle in an outbreak, trace back of the product may prevent additional cases.
- Epidemiological investigation of a cluster of cases or an outbreak, try to determine the source of the infection and mode of transmission. Search for a common vehicle, such as recreational water, drinking water, raw milk or other potentially contaminated food or drink. Control person-to-person or animal-to-person transmission, institute applicable prevention or control measures.<sup>1</sup> Recommendations related to prevention or control measures may need to be modified or changed as needed.

	Division of Community and Public Health	
	<b>Section: 4.0 Diseases and Conditions</b>	Revised 8/11
	Subsection: Cryptosporidiosis	Page 5 of 7

### **Foodhandlers and Health Care Workers**

- Exclude symptomatic individuals from food handling and direct care of hospitalized and institutionalized patients until *asymptomatic*. **Stress proper handwashing.**<sup>1</sup>
- For individuals with questionable hygiene, they may return to work when symptoms resolve, but should be reassigned to other duties (non-food handling or direct patient care) until they can be trained, and are likely to follow good hygienic measures.<sup>9</sup>
- If a food service employee no longer has diarrhea, but is being treated, they should not work handling foods that will not be subsequently cooked or heated (salad bar duties, preparing sandwiches, etc.) until therapy has been completed.<sup>9</sup>

### **Child Care & School**

- Exclude symptomatic children and teachers from childcare facilities and school until *diarrhea* stops. **Stress proper handwashing.**<sup>1</sup>
- Upon identification of an acute case in childcare, the facility should be provided with the “*Sample Letter to Parents of Children in Childcare Center Exposed to Cryptosporidiosis*” for parent notification and the “*Sample Letter to Childcare Center: Crypto Notification*”. The fact sheet and sample letter can be reproduced for use in the facility.
- All rules and guidelines regarding handwashing, toileting, diapering, and food handling, referenced in “*Licensing Rules for Group Child Care Homes and Child Care Centers*”<sup>7</sup> should be followed rigorously.
- Contact the Section for Child Care Regulations for the Environmental Public Health Specialist to perform an assessment of the childcare facility.
- In the laboratory, *Cryptosporidium* is relatively resistant to commonly used disinfectants. However, it is extremely sensitive to drying. Therefore, the practical approach to environmental disinfection of surfaces potentially contaminated with *Cryptosporidium* involves physical cleaning with a good detergent to remove the soiling, followed by thorough drying of the surfaces.<sup>9</sup>

### **CDC Healthy Swimming and Recreational Water Recommendations (*Cryptosporidium*)**<sup>10</sup>

- Those who swim when ill with diarrhea place other swimmers at a significant risk for getting sick. Diarrheal accidents are much more likely than formed stool to contain germs. Cryptosporidiosis is extremely resistant to chlorine, therefore, it is important that all pool managers stress to patrons that swimming when ill with diarrhea is an unhealthy pool behavior.

## **Laboratory Procedures**

### **Specimens:**

#### **Microscopic examination for Ova and Parasites:**

1. Use an ova and parasite (O&P) kit, which contains two different preservatives, polyvinyl alcohol (PVA) and formalin to collect specimens. Specimens must be placed in both preservatives. Specimens may be shipped at room temperature. The Missouri State Public Health Laboratory (SPHL) performs this test. Specifically request testing for

	Division of Community and Public Health	
	<b>Section: 4.0 Diseases and Conditions</b>	Revised 8/11
	Subsection: Cryptosporidiosis	Page 6 of 7

*Cryptosporidium* on the specimen submission form. Initial specimens should also be screened for *Giardia lamblia*. The same specimen can be used for both tests. Additional information on specimen collection and submission is available at:  
<http://health.mo.gov/lab/microbiology/parasitology.php>

- If a large number of samples will be submitted (+15), or if sampling will continue over a long period, contact the Regional Communicable Disease Coordinator so arrangements may be made with the laboratory.

#### **Enzyme immunosorbent assay (EIA) antigen testing:**

The SPHL does not routinely perform EIA testing of stool specimens for *Cryptosporidium*. However, many commercial laboratories do. Generally, the specimens can be fresh unpreserved stool, rectal swabs in culturettes or stool collected in formalin. Consult with the testing laboratory before specimen collection.

#### **Enteric cultures:**

When investigating diarrheal illness of unknown etiology specimens should be initially screened for *Salmonella*, *Shigella*, *Campylobacter* and *E. coli O157:H7*. Collect specimens in Cary-Blair media using the enteric specimen collection kit supplied by the SPHL. Specimens should be shipped refrigerated.

#### **Environmental samples:**

Water supplies will **not** be tested for *Cryptosporidium* without substantial and convincing epidemiological evidence. If the water supply is suspected as the source of infection, it can be screened for coliform bacteria, which is a general indicator of the safety of the water.

### **Reporting Requirements**

Cryptosporidiosis is a Category 3 disease and shall be reported to the local health authority or to the Missouri Department of Health and Senior Services within three (3) calendar days of first knowledge or suspicion:

- For confirmed and probable cases, complete a “[Disease Case Report](#)” (CD-1) and a “[Record of Investigation of Cryptosporidiosis Infection](#)” (CD-18).
- If food is suspected to be the source of the illness, complete the “[Record of Investigation of Enteric Infection](#)” (CD-2C) and collect the case’s food history for the seven days prior to onset of the illness
- Entry of the completed CD-1 into the WebSurv database negates the need for the paper CD-1 to be forwarded to the District Health Office.
- Send the completed secondary investigation form(s) to the District Health Office.
- All outbreaks or "suspected" outbreaks must be reported as soon as possible (by phone, fax or e-mail) to the District Communicable Disease Coordinator. This can be accomplished by completing the [Missouri Outbreak Surveillance Report](#) (CD-51).

	Division of Community and Public Health	
	<b>Section: 4.0 Diseases and Conditions</b>	Revised 8/11
	Subsection: Cryptosporidiosis	Page 7 of 7

6. If an outbreak is associated with the consumption or use of water for drinking, or with ingestion, contact, or inhalation of recreational water, a [CDC 52.12 form](#) (Reporting Waterborne Disease and Outbreaks) is to be completed and submitted to the Bureau of Communicable Disease Control and Prevention.
7. Within 90 days from the conclusion of an outbreak, submit the final outbreak report to the [District Communicable Disease Coordinator](#).

## **References**

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3. American Academy of Pediatrics. Cryptosporidiosis. In: Pickering LK, ed. *Red Book: 2009 Report of the Committee on Infectious Diseases*. 28th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2009: 272-273.
4. Centers for Disease Control and Prevention. Division of Notifiable Diseases and Healthcare Information, *Nationally Notifiable Infectious Conditions*: [http://www.cdc.gov/osels/ph\\_surveillance/nndss/casedef/cryptosporidiosis\\_current.htm](http://www.cdc.gov/osels/ph_surveillance/nndss/casedef/cryptosporidiosis_current.htm) (8/11)
5. Whitley, RJ. Cryptosporidiosis. In: Mandell GL, Bennett JE, Dolin R, eds. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases*. 7<sup>th</sup> ed. Philadelphia, Pa.: Elsevier Churchill Livingstone; 2010: vol.2: 3547-3560.
6. J Clin Microbiol. “Evaluation of nine immunoassay kits (enzyme immunoassay and direct fluorescence) for detection of *Giardia lamblia* and *Cryptosporidium parvum* in human fecal specimens.” Garcia LS; Shimizu RY: 1997 Jun;35(6):1526-9.
7. NCCLS Document M28-P, 1993: Procedures for the recovery and identification of parasites from the intestinal tract; proposed guidelines. National Committee for Clinical Lab. Standards, Villanova, PA.
8. Missouri Department of Health and Senior Services. 19 CSR 30-62-Health. Chapter 62-Licensing Rules for Group Day Care Homes and Child Day Care Centers.
9. Missouri Department of Health and Senior Services. Section for Community Protection. 2005.
10. Centers for Disease Control and Prevention, Healthy Swimming/Recreational Water, <http://www.cdc.gov/healthyswimming/> (8/11)

## **Other Sources of Information**

1. Infection Control in the Child Care Center and Preschool, 4<sup>th</sup> Edition, Donowitz, 1999: 117-119.
2. Medscape Reference, Cryptosporidiosis: <http://emedicine.medscape.com/article/215490-overview>