

What is cryptosporidiosis?

Cryptosporidiosis is a diarrheal disease caused by *Cryptosporidium* species, a single-celled parasite that can live in the intestine of humans and animals and is passed in the stool of an infected person or animal. Both the disease and the parasite are commonly known as "Crypto." Crypto produces oocysts which are shed in feces of infected persons or animals. The oocysts are the infectious form of the parasite. The oocyst is protected by an outer shell that allows it to survive outside the body for long periods of time and makes it resistant to chlorine-based disinfectants. During the past 2 decades, Crypto has become recognized as one of the most common causes of waterborne disease (recreational water and drinking water) in humans in the United States. The parasite is found in every region of the United States and throughout the world.

Who gets cryptosporidiosis?

Anyone can get cryptosporidiosis. People who are most likely to become infected with *Cryptosporidium* include:

- Children who attend day care centers, including diaper-aged children.
- Child care workers.
- Parents of infected children.
- People who take care of other people with cryptosporidiosis.
- People exposed to human feces through sexual contact.
- People who handle infected cattle.
- International travelers.
- People exposed to contaminated water.
 - Backpackers, hikers, and campers who drink unfiltered, untreated water.
 - People who drink from untreated shallow, unprotected wells.
 - People, including swimmers, who swallow water from contaminated sources.
- Contaminated water may include water that has not been boiled or filtered, as well as contaminated recreational water sources (e.g., swimming pools, lakes, rivers, ponds, and streams). Several community-wide outbreaks of cryptosporidiosis have been linked to drinking municipal water or recreational water contaminated with *Cryptosporidium*.

Who is most at risk for developing serious disease?

Although Crypto can infect all people, some groups are likely to develop more serious illness. Young children and pregnant women may be more susceptible to the dehydration resulting from diarrhea and should drink plenty of fluids while ill. If you have a severely weakened immune system, you are at risk for more serious disease. Your symptoms may be more severe and could lead to serious or life-threatening illness. Examples of persons with weakened immune systems include those with AIDS, cancer and transplant patients who are taking certain immunosuppressive drugs, and those with inherited diseases that affect the immune system.

How is this parasite spread?

Cryptosporidiosis is contracted by swallowing oocysts of this parasite in contaminated food or water. Oocysts resist chlorination and are difficult to filter. Person-to-person transmission may occur as a result of inadequate handwashing (fecal-oral transmission) or sexual activities. Direct contact with infected animals, such as cattle and sheep, can also lead to infection.

What are the symptoms of cryptosporidiosis?

The most common symptom is diarrhea, which is usually watery and profuse. The diarrhea is often accompanied by abdominal cramping. Nausea, vomiting, low-grade fever, headache, and loss of appetite may also occur. In an otherwise healthy person, symptoms usually continue for one to two weeks. A person whose immune system is weakened by HIV infection, cancer chemotherapy, steroid therapy, or who is otherwise immunocompromised may experience persistent, even life-threatening, illness.

How soon after exposure do symptoms appear?

Symptoms usually appear one week after exposure.

For how long can an infected person carry this parasite?

A person with a healthy immune system usually clears this parasite within two to three weeks. Three to four weeks after becoming well symptoms sometimes return for about one week, then disappear entirely. Immunocompromised individuals whose disease is persistent continue to shed oocysts for the duration of their infection.

How is cryptosporidiosis diagnosed?

Diagnosis is based on microscopic identification of the oocysts in the stool of a symptomatic or asymptomatic (clinically well but infected) person.

What is the treatment for cryptosporidiosis?

Treatment is primarily supportive and directed toward preventing dehydration. Most people with healthy immune systems will recover with fluid rehydration alone.

A new antiprotozoal medication, nitazoxanide (Alinia®) has been approved for treatment of diarrhea caused by *Cryptosporidium* in people with healthy immune systems.

People with weakened immune systems are at higher risk of more severe and prolonged illness. The effectiveness of nitazoxanide in immunocompromised individuals is unclear. For persons with AIDS, anti-retroviral therapy that improves immune status will also decrease or eliminate symptoms of cryptosporidiosis. However, even if symptoms disappear, cryptosporidiosis is usually not curable in immunosuppressed individuals and symptoms may return if immune status worsens.

How is cryptosporidiosis prevented?

The most effective means of preventing *Cryptosporidium* transmission is washing hands with soap and water, particularly after using the bathroom, changing diapers, and before handling food. Wash and/or cook food. Cooking kills *Cryptosporidium*. Do not eat or drink the following items unless they are pasteurized: milk, dairy products, juice, and cider. Wash hands thoroughly after working in soil and after handling household pets, farm animals (especially those less than 6 months old), or stray animals. Do not drink or swallow water directly from rivers, lakes, streams, springs, or pools.

Notes on bottled water, filters, boiling and chlorination.

Bottled water from a wide range of sources is marketed. Read the labels carefully. **Only bottled water that has been distilled or treated by reverse osmosis can be considered free of oocysts.** Point-of-use filters must also be examined carefully. To remove oocysts of *Cryptosporidium*, filters must have an absolute filtration range of 1 µm or less. Bringing water to a rolling boil for one minute destroys oocysts. Ground water (well water) from an approved well is ordinarily safe. Chlorination alone will not destroy oocysts in surface water or in well water that is contaminated by surface water.

What should I do if I think I may have cryptosporidiosis?

If you suspect that you have cryptosporidiosis, see your healthcare provider.

For more information, please visit these websites:

- CDC Cryptosporidiosis: www.cdc.gov/parasites/crypto/

Intensified Cryptosporidiosis (Crypto) Control Measures for the Child Care Setting

Cryptosporidium is resistant to chlorine disinfection so it is tougher to kill than most disease-causing germs. The usual disinfectants, including most commonly used bleach solutions, have little effect on the parasite. An application of hydrogen peroxide seems to work best.

When an outbreak of crypto occurs in the child care setting:

1. Educate staff and parents
 - Inform all staff about the ongoing outbreak, the symptoms of crypto, how infection is spread, and control measures to be followed.
 - Inform parents about the ongoing outbreak, the symptoms of crypto, how infection is spread, outbreak control policies, and needed changes in hygiene and cleanliness.
 - Notify parents of children who have been in direct contact with a child or an adult caregiver with diarrhea. Parents should contact the child's healthcare provider if their child develops diarrhea.
 - Inform staff and parents of children about crypto's potential to be a severe disease in people with weakened immune systems. Immunocompromised persons should consult their healthcare provider for further guidance.
 - Exclude child care attendees and workers as required by Ohio Administrative Code.
2. Terminate all water play or swimming activities — this includes any play or activities involving water tables, temporary inflatable or rigid fill-and-drain swimming pools and slides, or public pool visits. The water can become contaminated and facilitate the spread of germs.
 - Exclude children diagnosed with crypto from water-play and swimming activities for an additional 2 weeks after their diarrhea has resolved.
3. Practice good hygiene.

Note: The handwashing and diapering measures outlined should be routine but are especially important during outbreaks.

 - Reinforce frequent handwashing and good handwashing technique for all children and adults.
 - Good handwashing means:
 1. Wet your hands with clean running water and apply soap. Use warm water if it is available.
 2. Rub hands together to make a lather and scrub all surfaces, including under the fingernails.
 3. Continue rubbing hands for 20 seconds. Need a timer? Imagine singing "Happy Birthday" twice through to a friend!
 4. Rinse hands well under running water.
 5. Dry your hands using a disposable paper towel or a hand dryer.
 6. Use your disposable paper towel, if possible, to turn off the faucet.
 - For children:
 - Observe handwashing or assist when needed.
 - Wash children's hands when they first arrive at the child care setting, after they use the toilet, after having their diapers changed, and before eating snacks or meals.

- For adults:
 - Wash hands after using the toilet, after helping a child use the toilet, after diapering a child, and before handling or eating food. Note: Where staffing permits, people who change diapers should not prepare or serve food.
- Reinforce good diapering practices.
 - Separate diaper-changing areas from children's play and food preparation areas.
 - Use disposable gloves and change them after each diaper change.
 - Use disposable paper over diaper changing surfaces and change it after each diaper change.
 - Ensure children wear clothing over their diapers to reduce the opportunity for leakage.
 - Wash hands: both yours and the child's after each diaper change.

Note: *Cryptosporidium* is not killed by alcohol gels and hand sanitizers so these materials are of little use in controlling an outbreak.

4. Disinfect surfaces and objects.

Note: The health department may instruct you to soak contaminated surfaces for 20 minutes with a 3% hydrogen peroxide (99% kill rate) and then rinse them thoroughly. No disinfectant is guaranteed to be completely effective against *Cryptosporidium*. However, hydrogen peroxide is more effective than standard bleach solutions.

Note: Do not mix hydrogen peroxide and bleach solutions. The two chemicals may react violently. In certain situations (for example, if an outbreak is caused by two or more types of germs), the health department may instruct you or a child care facility to disinfect surfaces and objects with both hydrogen peroxide and a bleach solution. If so, disinfect with the bleach solution first and thoroughly rinse with water. Then soak with hydrogen peroxide for 20 minutes and thoroughly rinse with water. Note: Hydrogen peroxide breaks down when exposed to sunlight. Store hydrogen peroxide in dedicated opaque containers — never reuse containers for a different chemical.

- Disinfect
 - Bathrooms, diaper-changing areas, and food preparation surfaces daily.
 - Toys, tabletops, and high chairs more frequently than usual (at least twice daily).
 - Dishwasher-safe toys in a commercial dishwasher that has a dry cycle or a final rinse that exceeds 113°F for 20 minutes or 122°F for 5 minutes or 162°F for 1 minute.
 - Cloth toys may be washed and heat-dried on the highest clothes dryer heat setting for 30 minutes.
5. Notify the local health department about an excessive level of diarrhea or any crypto cases in a day care. Cryptosporidiosis is a reportable disease in Ohio.

***Cryptosporidium* ("Crypto") Prevention for Immunocompromised People**

1. Wash your hands.

Washing your hands often with soap and water is probably the single most important step you can take to prevent an infection with *Cryptosporidium* and other illnesses. Always wash your hands before eating and preparing food. Wash your hands well after touching children in diapers; after touching clothing, bedding, toilets, or bed pans soiled by someone who has diarrhea; after gardening; any time you touch pets or other animals; and after touching anything that might have had contact with even the smallest amounts of human or animal stool, including dirt in your garden and other places. Even if you wear gloves when you do these activities, you should still wash well when you finish. Children should be supervised by adults to make sure they wash their hands well.

2. Practice safer sex.

Infected people may have Crypto on their skin in the anal and genital areas, including the thighs and buttocks. However, since you cannot tell if someone has Crypto, you may want to take these precautions with any sex partner. Avoid sexual practices that might result in oral exposure to stool (e.g., oral-anal contact). To reduce the risk for exposure to stool, consider using dental dams or similar barrier methods for oral-anal and oral-genital contact, wearing latex gloves during digital-anal contact, and changing condoms after anal intercourse. Frequent washing of hands and genitals with warm soapy water during and after activities that might bring these body parts in contact with stool might further reduce the risk for infection with Crypto. This advice is good not only for preventing infection with Crypto but also preventing infection with other gastrointestinal germs, such as *Giardia*, hepatitis A, *Salmonella*, *Shigella*, and amoebas.

3. Avoid touching farm animals.

If you touch a farm animal, particularly a calf, lamb, or other young animal, or visit a farm where animals are raised, wash your hands well with soap and water before preparing food or putting anything in your mouth. Do not touch the stool of any animal. After you visit a farm or other area with animals, have someone who is not immunocompromised clean your shoes, or wear disposable gloves if you clean them yourself. Wash your hands well with soap and water after taking off the gloves.

4. Avoid touching the stool of pets.

Most pets are safe to own. However, someone who is not immunocompromised should clean their litter boxes or cages and dispose of the stool. If you must clean up after a pet, use disposable gloves. Wash your hands well with soap and water afterwards. The risk of getting Crypto is greatest from pets that are less than 6 months old, animals that have diarrhea, and stray animals. Older animals can also have Crypto, but they are less likely to have it than younger animals. If you get a puppy or kitten that is less than 6 months old, have the animal tested for Crypto before bringing it home. If any pet gets diarrhea, have it tested for Crypto.

5. Avoid swallowing water when swimming in the ocean, lakes, rivers, or pools, and when using hot tubs.

When swimming in lakes, rivers, or pools and when using hot tubs, avoid swallowing water. Several outbreaks of Crypto have been traced to swallowing contaminated water while swimming. Crypto can live in chlorinated swimming pools and water parks for days. Crypto also can remain alive in salt water for several days, so swimming in polluted ocean water may also be unsafe. For more information, visit [What are recreational water illnesses \(RWIs\)?](#)

6. Wash and/or cook your food.

Fresh vegetables and fruits may be contaminated with Crypto. Therefore, wash well all vegetables or fruit you will eat uncooked. If you take extra steps to make your water safe (see below for ways to do so), use this safe water to wash your fruits and vegetables. When you can, peel fruit that you will eat raw after washing it. Do not eat or drink unpasteurized milk or dairy products. Cooking kills Crypto. Therefore, cooked food and heat-processed foods are probably safe if, after cooking or processing, they are not handled by someone infected with Crypto or exposed to possibly contaminated water.

7. Drink safe water.

Do not drink water directly from shallow wells, lakes, rivers, springs, ponds, and streams. Because you cannot be sure if your tap water contains Crypto, you may wish to avoid drinking tap water, including water and ice from a refrigerator and drinks made at a fountain, which are usually made with tap water. Because public water quality and treatment vary throughout the United States, always check with the local health department and water utility to see if they have issued any special notices about the use of tap water by immunocompromised persons. You may also wish to take some additional measures: boiling your water, filtering your water with certain home filters, or drinking certain types of commercially-bottled water. Processed carbonated (bubbly) drinks in cans or bottles are probably safe, but drinks made at a fountain might not be because they are made with tap water. If you choose to take these extra measures, use them all the time, not just at home. If the public health department advises boiling the water, do not drink tap water unless you boil it. You could also use one of the commercially-bottled waters described below.

- A. **Safe, commercially-bottled water:** See [A Guide to Commercially-Bottled Water and Other Beverages](#) for more information.
- B. **Boiling water:** Boiling is the best extra measure to ensure that your water is free of Crypto and other germs. Heating water at a rolling boil for 1 minute kills Crypto. After the boiled water cools, put it in a clean bottle or pitcher with a lid and store it in the refrigerator. Use the water for drinking, cooking, or making ice. Water bottles and ice trays should be cleaned with soap and water before use. Do not touch the inside of them after cleaning. If you can, clean water bottles and ice trays yourself.
- C. **Filtering tap water:** Many but not all available home water filters remove Crypto. Filters that have the words "reverse osmosis" on the label protect against Crypto. Some other types of filters that function by micro-straining also work, but not all filters that are supposed to remove objects 1 micron or larger from water are the same. Look for the words "absolute 1 micron." Some "1 micron" and most "nominal 1 micron" filters will not work against Crypto. Also look for the words like "Standard 53" or "Standard 58" and the words "cyst reduction" or "cyst removal" for a tested filter that works against Crypto. The wording should indicate that the filter is listed and labeled to NSF/ANSI standard 53 or 58 by an ANSI accredited certification organization. Because filter testing is expensive, some filters that may work against Crypto may not have been tested. Reverse-osmosis filters work against Crypto whether they have been tested or not. Other filters that may not have been tested also may work if they have an absolute pore size of 1 micron or smaller.

See [A Guide to Water Filters](#) for guidance on labels for filters that are designed to remove Crypto, and label wording that may not be appropriate for removal of Crypto.

Filters collect germs from your water, so someone who is not immunocompromised should change the filter cartridges for you; if you do it yourself, wear gloves and wash your hands well with soap and water afterwards. Filters may not remove Crypto as well as boiling does because even good brands of filters may sometimes have manufacturing flaws that allow small numbers of Crypto parasites to get past the filter. Also, poor filter maintenance or failure to replace filter cartridges as recommended by the manufacturer can cause your filter to fail.

- D. **Home distillers:** You can remove Crypto and other germs from your water with a home distiller. If you use one, you need to carefully store your water. After purification, put the water in a clean bottle or pitcher with a lid and store it in the refrigerator. Water bottles and ice trays should be cleaned with soap and water before use. Do not touch the inside of them after cleaning.

8. Take extra care when traveling.

If you travel, particularly to developing nations, you may be at a greater risk for Crypto because of poorer water treatment and food sanitation. Warnings about food, drinks, and swimming are especially important in such settings. Foods and beverages, in particular raw fruits and vegetables, tap water, ice made from tap water, unpasteurized milk or dairy products, and items purchased from street vendors might be contaminated. Steaming-hot foods, fruits you peel yourself, bottled and canned processed drinks, and hot coffee or hot tea are probably safe. Talk with your healthcare provider about other guidelines for travel abroad.

For more information on Crypto in immunocompromised people, call CDC-INFO at (800) 232-4636 or e-mail cdcinfo@cdc.gov.

This information was prepared by the inter-agency Working Group on Waterborne Cryptosporidiosis, which includes representatives from the Centers for Disease Control and Prevention, Environmental Protection Agency, Food and Drug Administration, U.S. Department of Agriculture, National Association of People With AIDS, AIDS Coalition to Unleash Power, and representatives of state and local health departments and water utilities.