

How can you contract the disease?

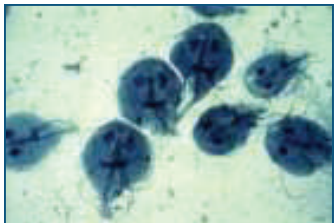
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Follow-up on many cases in Southcentral Alaska revealed that the victims had consumed untreated surface water, usually on camping or fishing trips.

The parasite is carried by most mammals, including humans and wild or domestic animals. Beavers and muskrats seem particularly susceptible to *Giardia* infections and carry large numbers of cysts in their intestines. The feces of carrier animals contain cysts which live outside the host. The cysts reach water drainage systems either by direct deposits into water, as in the case with beavers and muskrats, or indirectly by rain and runoff.

Giardiasis is usually passed between humans as a result of poor sanitary practices. Young children who become infected may reinfect themselves or others. Typically a child may neglect to wash their hands after bowel movements. Later, their hands reach their mouths while eating or playing, reintroducing the cysts to their intestines.

Those who handle babies and change diapers, such as day care workers, must also be cautious about washing their hands to avoid passing cysts to others.



Giardia lamblia
cysts

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Giardia lamblia

It's called 'backpacker's disease', 'beaver fever', or 'giardiasis', and each year an increasing number of wilderness travelers suffer from its unpleasant symptoms. Before you quench your thirst from a clear Alaska stream, consider the following information about the *Giardia lamblia* parasite-and how to avoid it.

What is giardiasis?

Giardia lamblia is found worldwide and is the most commonly reported human intestinal parasite in the United States. The cyst can be transmitted on food and from person to person by physical contact. Frequently, transmission is through surface water that is either untreated or inadequately treated. In treated water, either inadequate chlorination or defective filters or both have been responsible for large outbreaks of the disease nationwide.

What are the symptoms?

Abdominal bloating, cramps, excessive gas, diarrhea and a vague feeling of physical discomfort are typical. The incubation period after ingesting the cysts is one to four weeks with an average duration of symptoms from 10 to 14 days.

If you have any combination of the above symptoms, especially if they continue longer than seven days, you should consult your physician and mention the possibility of giardiasis so that appropriate tests can be done. Diagnosis is confirmed by stool examination.



Treatment

Treatment for humans involves use of properly prescribed drugs for seven to ten days. The drugs may produce side effects, and care must be observed in their use by pregnant women and elderly. Treatment should be prescribed by a doctor.

There is a catch to the treatment of this unpleasant disease. From 85% to 90% of patients are cured with one course of medication. The 10% to 15% who are not, must take a second course of treatment.

Whenever possible, people in the outdoors should carry drinking water of known purity with them. When this is not practical, and water from streams, lakes, ponds and other outdoor sources must be used, time should be taken to boil or disinfect the water before drinking.

Boiling

Except for municipal water treatment methods that include adequate filtration, boiling is the only technique that can be recommended with complete confidence for eliminating Giardia in water. Boiling for one minute is adequate to kill Giardia. If other upstream contamination is suspected (from places of human habitation, sewage outfalls, ect.) the water should be boiled for 3 minutes.

Water Filters

Portable water filtration devices which are effective against Giardia are those with pore sizes less than one micrometer (one micrometer is one millionth of a meter). Water pressure will be required to use filters with pore openings of this size. Water filters containing resins or activated carbon granules without microfilters with pore size less than one micrometer probably will not filter out Giardia cysts.



Chlorine or Iodine Disinfection

Although boiling is the most reliable method of disinfection, it is recognized that boiling drinking water is not practical under many circumstances. Therefore, when it is not possible to boil water, chemical disinfectants such as iodine or chlorine should be used. This will provide a large degree of protection against Giardia and will destroy most bacteria and viruses that cause illnesses.

The effectiveness of chlorine and iodine against Giardia has been studied by researchers. They have shown that chlorine and iodine can be effective against Giardia cysts under certain circumstances. The effectiveness decreases as water gets colder. Cloudy or turbid water also decreases the effectiveness of chlorine or iodine treatment. To counteract these effects, the contact time (holding time) after the disinfectant is added should be extended.

Chlorine

Household liquid chlorine bleach (Chlorox, Purex, ect.) usually has about 5.25% available chlorine. Read the label to find the percentage of chlorine in the solution. Chlorine tablets (Halazone) are also available at many drug stores and camping stores.

Mix the chlorine and water thoroughly by stirring or shaking it in the container and let stand for 1 hour. For chlorine tablets, contact time begins after tablets have dissolved. (Be sure to disinfect the screw-cap threads of your water bottle for the appropriate contact time as well.) The water should have a slight chlorine odor after standing. If not, repeat the dosage and let stand for an additional 45 to 60 minutes before using.

Chlorine	Amount per quart (1 drop = 0.05 ml)	Contact
Household Bleach	2 Drops	60 minutes
Halazone	5 Tablets	60 minutes

Note: Very cold (less than 41degrees Fahrenheit or 5 degrees Celsius) or turbid water will require prolonged contact time. Let water stand several hours or overnight.

Iodine

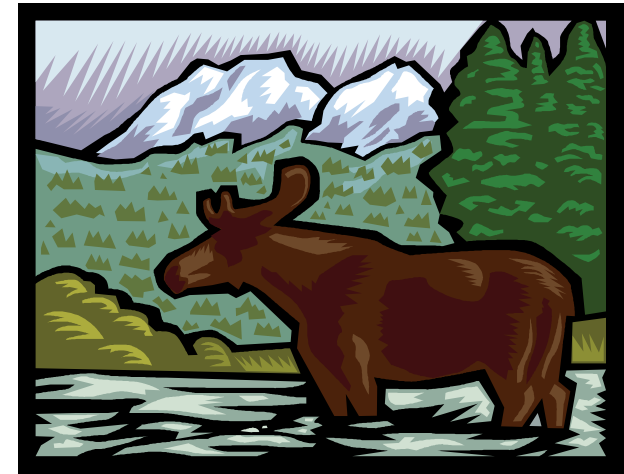
Iodine from the medicine chest or first aid kit (tincture of iodine), iodine disinfection tablets (Globaline, Potable Aqua, Couchlans, ect.), or a saturated solution made from iodine crystals may all be used to disinfect drinking water. Iodine crystals or tablets are available at many drug and camping stores.

Mix the iodine and water thoroughly by stirring or shaking it in the container and let stand for 60 minutes. For iodine tablets, contact time begins after tablets have dissolved (be sure to disinfect screw cap threads of your water bottle for the appropriate contact time as well.) The water should have a slight iodine odor after standing. If not, repeat the dosage and let stand for an additional 45 to 60 minutes before using.

Iodine	Amount per quart (1 drop = 0.05 ml)	Contact time
Tincture (2%)	12 Drops	60 minutes
Tablets	2 tablets	60 minutes
Iodine Crystal Solution Temperature:		
32-41F (0-5C)	2 oz. (60 ml)	60 minutes
41-68F (5-20C)	1.5 oz (45 ml)	60 minutes
68-100F (20-38C)	1 oz (30 ml)	60 minutes

Note: Very cold (less than 41 degrees Fahrenheit or 5 degrees Celsius) or turbid water will require prolonged contact time. Let water stand several hours or overnight.

If iodine crystals are used, commercially available kits are handy since USP grade sublimed iodine crystals are not readily available at drug stores. It is recommended that the dosages and contact time listed previously be followed if directions with iodine kits call for smaller dosages. The temperature of the saturated iodine solution is very important since the amount of iodine in solution can double within the normal temperature range experienced during a day hike.



Practical Points About Iodine and Chlorine:

- These are potentially dangerous chemicals. Keep iodine crystals, saturated solution or tincture, or chlorine bleach away from skin and eyes
- None of these chemicals should be consumed directly.
- If you are sensitive to iodine, develop allergic symptoms, or have a history of thyroid disease, consult your doctor before usage.
- Iodine crystals keep indefinitely; as long as there are crystals visible, the solution will be saturated.
- Remember, boiling is the preferred method of treatment. Chlorine and iodine disinfection depend on water temperature, pH, turbidity, amount of disinfection added, disinfectant demand of the water, and contact time.

“Before you fill up a bottle of ‘fresh’ mountain water, consider the source and the potential contaminants.”

