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Giardia And Cryptosporidium In Drinking Water

What are Giardia and Cryptosporidium?

Giardia and *Cryptosporidium* are microscopic parasites that can be found in water. *Giardia* causes an intestinal illness called giardiasis or "beaver fever." *Cryptosporidium* is responsible for a similar illness called cryptosporidiosis.

How do these parasites cause illness?

Both parasites produce cysts that are very resistant to harsh environmental conditions. When ingested, they germinate, reproduce, and cause illness. After feeding, the parasites form new cysts, which are then passed in the faeces. Studies with human volunteers have shown that ingestion of only a few cysts will cause illness.

What are the symptoms?

Diarrhoea, abdominal cramps, gas, malaise, and weight loss are the most common symptoms caused by *Giardia*. Vomiting, chills, headache, and fever may also occur. These symptoms usually surface six to 16 days after the initial contact and can continue as long as one month.

The symptoms of cryptosporidiosis are similar; the most common include watery diarrhoea, abdominal cramps, nausea, and headaches. These symptoms occur within two to 25 days of infection and usually last one or two weeks; in some cases they stick around for up to a month.

How are infections treated?

Giardia is usually cleared from healthy people without treatment within a month. Anti-parasitic drugs are available and are particularly helpful for immunocompromised people in whom the illness could otherwise develop into a persistent state.

Cryptosporidium will also usually disappear from healthy people within a month without treatment. Anti-diarrhoeal drugs and rehydration therapy may be used if diarrhoea becomes severe. No drugs to fight the illness have been approved, though many are now being tested.

What extra precautions can immunocompromised people take?

Both parasites, but particularly *Cryptosporidium*, can pose a more serious threat to immunocompromised people, such as those living with AIDS or cancer, or transplant patients receiving immunosuppressive drugs. For these people, the symptoms are more severe and can be life threatening.

It is presently unknown whether immunocompromised individuals are at greater risk of contracting giardiasis or cryptosporidiosis than the general public.

Nevertheless, immunocompromised individuals should discuss these risks with their physicians. People who wish to take extra precautions can boil their water for one minute to kill any parasites that may be present. This practice will also destroy any other microorganisms that might be of concern to these individuals. As bottled water is not routinely monitored for *Giardia* and *Cryptosporidium*, its suitability as an alternative to boiled tap water is unknown.

What should you tell your physician?

If you are suffering from diarrhoea and suspect that your symptoms may be due to *Giardia* or *Cryptosporidium*, visit your physician and mention any exposure you may have had to water, food, or faeces that may have been contaminated by the parasites.

How can drinking water become contaminated with these parasites?

Giardia are often found in human, beaver, muskrat, and dog faeces. Cattle faeces appear to be the primary source of *Cryptosporidium*, although these parasites have also been found in humans and other animals. Drinking water sources become contaminated when faeces containing the parasites are deposited or flushed into water. If treatment is inadequate, drinking water may contain sufficient numbers of parasites to cause illness. Other sources include direct exposure to the faeces of infected humans and animals, eating contaminated food, and accidental ingestion of contaminated recreational water. The comparative importance of these various routes of exposure is unknown.

Have these parasites been found in Canadian drinking water supplies?

Low levels of both parasites, especially *Giardia*, were detected in a national survey of drinking water conducted by Health Canada. Only a small fraction of the parasites appeared to be viable and their ability to infect humans was not determined. Nevertheless, outbreaks of illness linked to these parasites in drinking water have been reported in several provinces. Their spread in swimming pools has also been reported.

How can these waterborne illnesses be prevented?

Municipal drinking water treatment providing filtration and disinfection with chlorine can reduce the risk of contracting giardiasis and cryptosporidiosis. Chlorine by itself is not effective against *Cryptosporidium* but can inactivate *Giardia*. Recent research indicates that ultraviolet light will inactivate both organisms. Protection of the raw water supply is also beneficial.

If *Giardia* or *Cryptosporidium* in municipal drinking water is suspected or known to be the cause of an outbreak, public health authorities will issue a boil water advisory to help control the spread of illness.

In the outdoors, water should be boiled for at least one minute before it is used for drinking, food preparation or dental hygiene. This treatment will destroy not only *Giardia* and *Cryptosporidium*, but also any other disease-causing microorganisms that might be present. Certain types of filters can remove the parasites.

Travellers to countries where the safety of drinking water is suspect should boil or disinfect and filter water that is to be used for drinking, food preparation, or dental hygiene.

Are water supplies tested for Giardia and Cryptosporidium?

Unfortunately, no reliable methods are currently available to detect these

parasites on a routine basis. This is largely because the methods underestimate the number of organisms present and do not provide any information on their capacity to cause illness in humans. The tests that do exist take a few days to come up with results which means they aren't very good for day-to-day monitoring. Research is underway in Canada and internationally to develop appropriate detection methods and treatment technology to safeguard drinking water against these parasites.

Is there a Canadian drinking water guideline for these parasites?

Yes and no. A guideline has been established for *Giardia* and *Cryptosporidium*, but because the current detection methods are not very reliable the guideline does not give a maximum acceptable concentration (MAC) value for these parasites in drinking water. The guideline does, however, encourage water treatment authorities to implement measures aimed at reducing the risk of illness as much as possible. The guideline states: "If the presence of viable, human-infectious cysts or oocysts is known or suspected in source waters, or if *Giardia* or *Cryptosporidium* has been responsible for past waterborne outbreaks in a community, a treatment and distribution regime and a watershed or wellhead protection plan (where feasible) or other measures known to reduce the risk of illness should be implemented."

What is Health Canada doing to ensure the safety of our drinking water?

Health Canada works with the provinces and territories to ensure they have access to the most current scientific information available about issues related to drinking water. A consistent approach to improving drinking water quality is provided by Health Canada's *Guidelines for Canadian Drinking Water Quality* which are designed to ensure that Canadians have access to wholesome and safe drinking water.

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