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# ENVIRONMENTAL Fact Sheet

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WD-DWGB-4-4

2008

## Giardiasis in Drinking Water

*Giardia lamblia* is an intestinal parasite which can cause a diarrheal illness in humans and animals called giardiasis. It is commonly found in many areas of the world, including New Hampshire. The parasite occurs naturally in warm blooded animals such as beaver, muskrat, and other wildlife. The organism is hearty and can survive in cold waters for weeks. Consequently, *Giardia* can be expected to be naturally present in any surface water supply. *Giardia* also occurs in humans, therefore, proper wastewater disposal is critical to minimize *Giardia* transmission. This parasite is too small to be seen with the naked eye.

Typical symptoms of giardiasis are diarrhea, abdominal cramps, and fatigue. Symptoms usually begin approximately two weeks after exposure, however, many infected persons never develop symptoms. The illness caused by *Giardia* may resemble many other illnesses. The appropriate method to confirm a *Giardia* infection is by laboratory analysis of stool samples. Giardiasis is usually not life threatening to an otherwise healthy person. Medication can normally cure giardiasis in approximately 10 days. Giardiasis commonly affects many members of the same family. Hand-to-mouth reinfection is often a problem among young children due to poor hygiene.

Giardiasis can be contracted by the consumption of unfiltered surface water, groundwater that allows the direct entry of surface runoff, or through other types of pollution. Giardiasis can also be acquired by ingestion of poorly washed food and by direct contact with the feces of animals or humans infected with the parasite.

### WATER QUALITY TESTING

The DES laboratory does not analyze water samples for *Giardia*. A partial list of laboratories performing this test is given below. Laboratory testing of water samples for *Giardia* is very expensive and time consuming. The collection procedure consists of filtering approximately 500 gallons of water through a cartridge type particle filter, a process which takes approximately six hours. When collection is completed, the cartridge sample must be refrigerated and delivered to the laboratory within 24 hours. Commercial laboratory testing costs hundreds of dollars per sample.

**Well Construction.** Rather than conduct costly water testing for *Giardia*, DES recommends the following alternative procedures.

1. Carefully inspect the cover and exposed sides of the well for a broken casing or a cover that allows entry of contaminants. Look for any construction weaknesses where animal waste, insects, or unfiltered surface water could enter the well. Repair as necessary. For further information concerning good well construction, consult the DES fact sheets concerning well design on the fact sheets webpage at [www.des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm](http://www.des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm) (WD-DWGB-1-2 through WD-WSEB-1-6).
2. Once the well's defects have been repaired, and the well has been disinfected, take samples for coliform bacteria. These samples should be taken after a period of heavy rain and spaced out over time. DES suggests taking three or more bacteria samples and evaluating all results.

**If Bacteria Are Absent.** There is no direct relationship between coliform bacteria and *Giardia*, however, if your well is properly constructed and the aquifer provides adequate filtration of water percolating into the soil, then *Giardia* should not be present in groundwater. *Giardia* organisms are approximately 5-7 microns in size while coliform bacteria are 1-2 microns in size. Where no coliform bacteria are detected after multiple samples, one can reasonably conclude that if the well's construction and the aquifer's filtration are adequate to exclude the smaller coliform bacteria, then these conditions should also be able to prevent the entry of the larger *Giardia lamblia* organisms.

**If Bacteria Are Present.** Where coliform bacteria are detected, the well must be judged at risk to *Giardia* and other potentially harmful organisms. In such cases the well's construction or aquifer's filtration must be examined and deficiencies corrected.

Where the well's construction is judged to be sufficient, but bacteria still continue to be present, other actions should be taken. Options include drilling another well or installing a continuous disinfection system. *Giardia* are resistant to disinfection. The conceptual weakness of a disinfection system is that on occasions the concentration of bacteria, from the still unknown source, may exceed the capability of the disinfection system, thus leaving the user unprotected.

**Laboratories Performing Giardia Analysis:\***

**Environmental Associates**

24 Oak Brook Drive  
Ithaca, NY 14850  
(607) 272-8902

**Morrell Associates**

PO Box 268  
Marshfield, MA 02050  
(781) 837-1395

**CH Diagnostic and Consulting Service**

214 SE 19<sup>th</sup> Street  
Loveland, CO 80537  
(970) 667-9789

**Analytical Services**

PO Box 515, 130 Allen Brook Lane  
Williston, VT 05495  
(802) 878-5138

\*This is only a partial listing. No DES endorsement is implied.

**FOR MORE INFORMATION**

Please contact the Drinking Water and Groundwater Bureau and the New Hampshire Water Well Board at (603) 271-2513 or [dwgbinfo@des.nh.gov](mailto:dwgbinfo@des.nh.gov) or visit our website at [www.des.nh.gov/organization/divisions/water/-dwgb/index.htm](http://www.des.nh.gov/organization/divisions/water/-dwgb/index.htm). All of the bureau's fact sheets are on-line at [www.des.nh.gov/organization/commissioner/pip/-factsheets/dwgb/index.htm](http://www.des.nh.gov/organization/commissioner/pip/-factsheets/dwgb/index.htm).

Note: This fact sheet is accurate as of August 2008. Statutory or regulatory changes or the availability of additional information after this date may render this information inaccurate or incomplete.