

FACTS



Microorganisms in Drinking Water

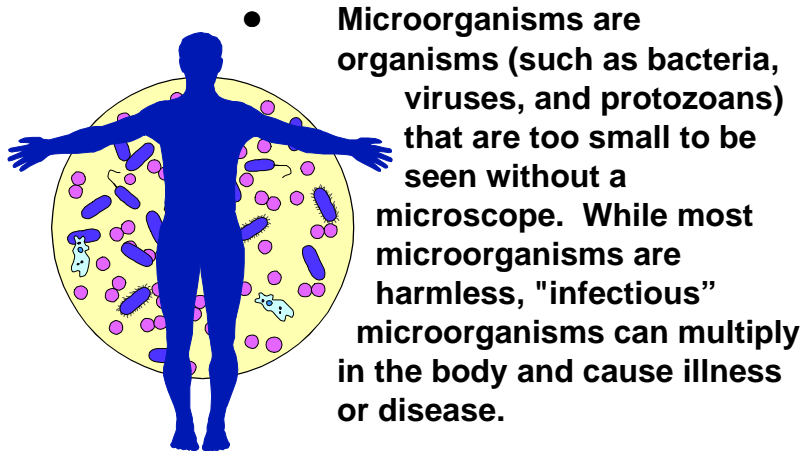


Division of Environmental and Occupational Health Services
Consumer and Environmental Health Services

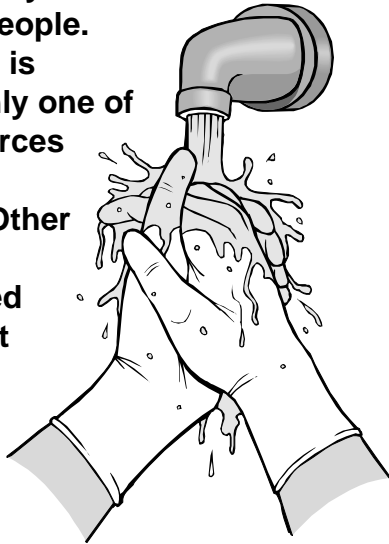
FACTS Microorganisms In Drinking Water

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INTRODUCTION



- **Microorganisms are organisms (such as bacteria, viruses, and protozoans) that are too small to be seen without a microscope. While most microorganisms are harmless, "infectious" microorganisms can multiply in the body and cause illness or disease.**
- **Low levels of infectious microorganisms are present throughout our environment and only occasionally cause illness in healthy people. Drinking water that is contaminated is only one of many possible sources of infectious microorganisms. Other sources include eating contaminated food, direct contact with the excretions of infected people or animals, and breathing contaminated air.**



- **Since the chemical disinfection (for example, chlorination) of drinking water began in the United States in the early 1900's, outbreaks of disease from contaminated drinking water in this country are uncommon. Private wells are usually safe, but can be affected by nearby septic systems, farm animal wastes, or other sources of contamination. Shallow private wells, or those with cracked casings or linings, are most vulnerable to contamination.**



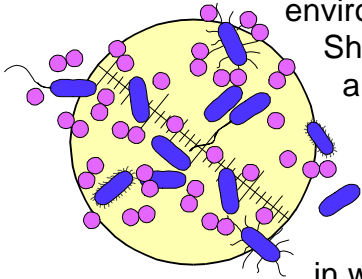
- **Untreated water from rivers, lakes, ponds, springs, or streams is likely to contain unsafe levels of infectious microorganisms, and drinking it may cause illness.**



If the presence of infectious microorganisms is suspected or known, boil the water for one minute to kill microorganisms that may have gotten into the water.

WHAT TYPES OF MICROORGANISMS IN DRINKING WATER CAN CAUSE ILLNESS?

Of the many infectious microorganisms found in the environment, bacteria (such as Shigella, Escherichia coli, Vibrio, and Salmonella), viruses (such as Norwalk virus and rotaviruses), and protozoans (such as Entamoeba, Giardia, and Cryptosporidium) may be found in water.

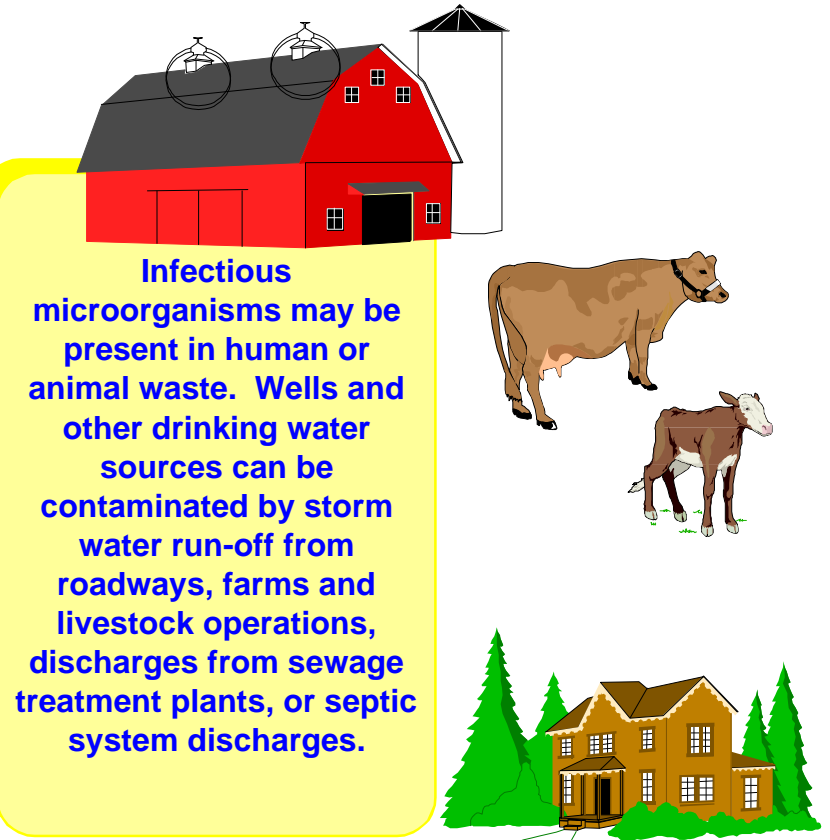


These microorganisms can cause symptoms such as nausea, vomiting, diarrhea, and stomach cramps. In healthy adults, these illnesses are usually mild and do not last long. In infants, children, the elderly, and persons with weakened immune systems, these illnesses can be more severe.

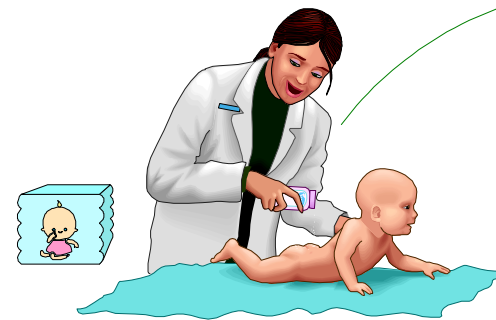


Because of their resistance to disinfection, Giardia and Cryptosporidium are now the most commonly identified causes of waterborne illness in the United States. Additional information about Giardia and Cryptosporidium can be obtained by contacting the agencies in the resource list at the back of this booklet.

HOW DO INFECTIOUS MICROORGANISMS CONTAMINATE DRINKING WATER?



Infectious microorganisms may be present in human or animal waste. Wells and other drinking water sources can be contaminated by storm water run-off from roadways, farms and livestock operations, discharges from sewage treatment plants, or septic system discharges.



HOW IS THE MICROBIOLOGICAL SAFETY OF PUBLIC WATER SUPPLIES ENSURED?

Public water systems use many water treatment methods to provide safe drinking water. The most commonly used treatment method is disinfection with chlorine chemicals. For drinking water obtained from surface supplies (lakes, rivers or reservoirs), filtration is also usually required.

A variety of federal and state regulations ensure the microbial safety of public drinking water.

Public water suppliers are required by law to routinely test drinking water for contaminants, including total coliform bacteria. Although most types of coliform bacteria are not infectious, many are

present in fecal matter (which is the source of most waterborne infectious microorganisms). If coliform bacteria are found, further testing is required to determine if the coliform bacteria are of fecal origin (fecal coliform). If these tests determine that the water contains these microorganisms, the public water supplier is required to notify the public (TV, radio, newspapers, mailings) and take immediate corrective action. In some situations, a “boil water” notice may be given to the public with specific instructions.

WHAT CAN YOU DO TO MAKE SURE YOUR PRIVATE WELL WATER IS SAFE TO DRINK?

According to New Jersey regulations, private wells must be located at least 100 feet from any possible source of contamination, such as a septic system. Private well construction codes require that all newly constructed private wells be tested for and

be proven free of coliform bacteria. Local health departments have the responsibility of enforcing these codes.

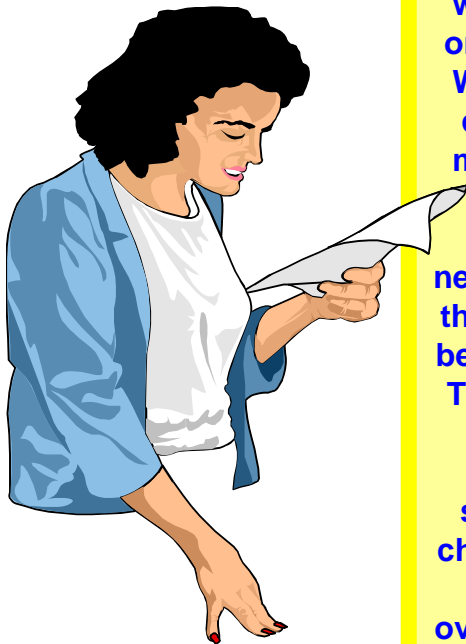
After these initial tests, there are no state requirements for additional testing of private wells for microorganisms.

It is recommended that private wells be tested at least annually, and more frequently if flooding (which can cause contamination) occurs.



Contact your local health department to find out if there are any additional testing requirements in your community.

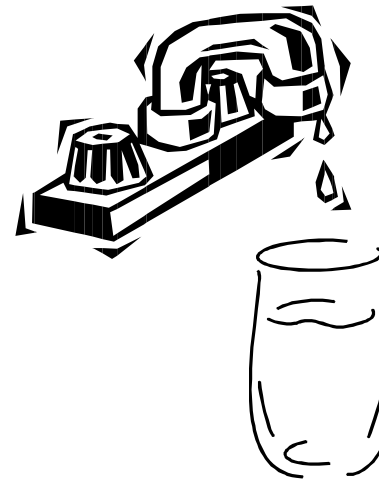
Your local health department or the New Jersey Department of Environmental Protection, Office of Quality Assurance



(609-292-3950) can provide you with a list of commercial laboratories that are certified to test for coliform bacteria.

Private wells, which are generally found in rural areas and service about 10% of New Jersey's population, are usually associated with a private home or a small business. When a well is new, contaminated with microorganisms, or taken apart and repaired, it is necessary to disinfect the well with chlorine before using it again. The volume of water in the well is determined and a specific amount of chlorine is added and allowed to remain overnight. The well is then turned on and the water is allowed to run through all plumbing fixtures until no chlorine is detectable at any tap.

WHAT IF COLIFORM BACTERIA ARE FOUND IN YOUR PRIVATE WELL WATER?



If total coliform (TC) bacteria are found in your private well water, you should make sure that:

(1) the TC water sample is then tested for the presence of fecal coliform or *E. coli* bacteria; and

(2) an additional well water sample is taken to repeat the total coliform test. (The confirmed presence of fecal coliform or *E. coli* bacteria indicates that infectious microorganisms may be in the water.)

If fecal coliform or *E. coli* bacteria are present, or if repeat testing reveals total coliform bacteria, discontinue using your well for drinking purposes or boil the water for at least one minute before drinking. Bottled water may be used instead of boiling water.

If no fecal coliform or *E. coli* bacteria are found, and if the repeat testing for total coliform bacteria is negative, no immediate action is recommended, except to consider more frequent testing of your well.



Corrective actions include one or more of the following:

- **identification and removal (if possible) of the source of fecal contamination;**
- **chemical disinfection of the contaminated well;**
- **repair of the existing well;**
- **installation of a home water treatment system; and**

- **installation of a new and deeper well.** A deeper well would draw water from a deeper water source that is less likely to be impacted by surface contaminants. Wells must be disinfected following installation and after any repairs.

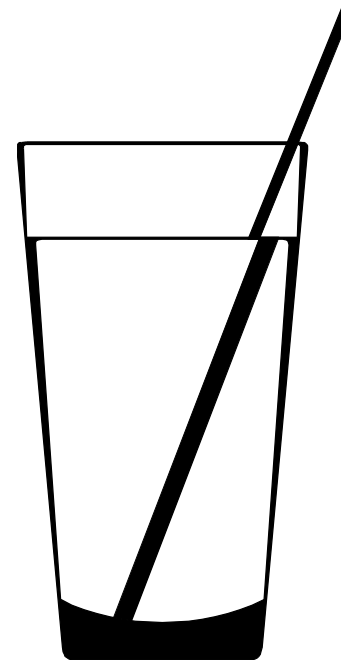
Contact your local health department for additional help in evaluating test results, for advice on further testing, and for corrective action recommendations.

IS BOTTLED WATER FREE OF INFECTIOUS MICROORGANISMS?

Bottled water is considered a food product and is regulated by both the United States Food and Drug Administration and the New Jersey Department of Health and Senior Services.

Bottled water is required to be tested on a weekly basis, and the microbiologic standards are the same as for public water supplies.

However, just as with tap water, bottled waters may not be entirely free of all infectious microorganisms. The presence of microorganisms in bottled water depends on the source of the water and how the water is treated. If used by the water bottling company, distillation and reverse osmosis are effective in removing infectious microorganisms. Other filtration processes can greatly reduce the number of microorganisms.



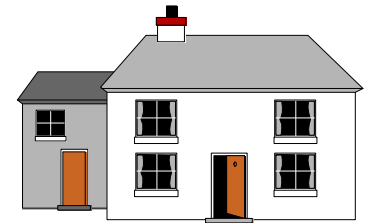
Individuals can contact bottled water companies to learn where their brand of water is obtained and how it is treated. You can also obtain information on bottled water from the International Bottled Water Association (1-800-928-4711) or through the NSF International Bottled Water Program (1-800-673-6275.) These organizations can provide information on most of the water bottlers in the United States and many foreign countries.



CAN A HOME WATER TREATMENT DEVICE REMOVE INFECTIOUS MICROORGANISMS?

Home water treatment devices are devices installed in the home to treat water either where it enters into the home (point-of-entry treatment devices) or where the water comes out of the tap (point-of-use treatment devices).

Some types of water filtration units available for the home reduce, but do not eliminate, microorganisms that might be present in the water (see next page). For more information on home water treatment devices, you can contact NSF International at (313) 769-8010.



Only boiling (1 minute or more), distillation, or reverse osmosis filtration units can be used to kill or remove all infectious microorganisms from your drinking water.

HOME WATER TREATMENT DEVICES

◆ Distillation

Water is heated to steam, which is then cooled and collected as liquid, leaving behind microorganisms and many other contaminants.

◆ Membrane Filtration

Water is passed through a porous membrane to reduce water contaminants. To reduce bacterial and protozoan levels, the pores in the membrane need to be at least as small as 0.45 microns. (Viruses are not removed by this method.)

◆ UV Treatment

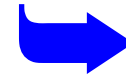
Water is exposed to ultraviolet (UV) light. UV light destroys many, but not all, harmful microorganisms in the water, including those most often found in groundwater (e.g., some viruses and bacteria).

◆ Reverse Osmosis

Water is passed through a membrane filter with very small pores under high pressure to remove minerals and contaminants, including all microorganisms.

WHAT ROLE DOES THE GOVERNMENT PLAY IN PROTECTING YOUR DRINKING WATER?

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New Jersey Department of Health and Senior Services (NJDHSS) is responsible for addressing issues concerning disease control and the health impacts from contaminated drinking water. NJDHSS is also responsible for the enforcement of bottled water regulations.

New Jersey Department of Environmental Protection (NJDEP) is responsible for enforcing federal and state drinking water regulations. NJDEP regulates public drinking water supplies and provides information on water safety and adequacy of water supplies. Other functions include monitoring drinking water quality and approving the construction of water treatment facilities.

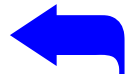
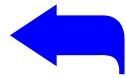
LOCAL



County and municipal health departments certify that private wells and certain small public water system wells have been constructed in accordance with New Jersey standard construction regulations. They also may perform some monitoring of these wells.

United States Environmental Protection Agency is responsible for enforcing the Federal Safe Drinking Water Act, which sets standards for public water supplies.

United States Food and Drug Administration is responsible for the regulation and safety of bottled water and sets safe levels for contaminants in bottled water.



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FOR MORE INFORMATION...



◆ **Local Health Department**

Local telephone directory
Local water issues, private well testing guidance, health effects of microorganisms in drinking water

◆ **New Jersey Department of Health and Senior Services Consumer and Environmental Health Services**

PO Box 369
Trenton, NJ 08625-0369

(609) 588-7500

Health effects of microorganisms in drinking water

(609) 588-3123

Bottled water regulations

(609) 588-3120

Health effects of chemically contaminated drinking water

◆ **New Jersey Department of Environmental Protection Bureau of Safe Drinking Water**

(609) 292-5550

Federal and State drinking water regulations and public water supply monitoring results

Office of Quality Assurance

(609) 292-3950

NJ certified laboratories for microorganisms in drinking water

◆ **United States Environmental Protection Agency Safe Drinking Water Hotline**

(800) 426-4791

Federal drinking water regulations, health effects of microorganisms in drinking water, and other water safety issues

◆ **NSF International**

(313) 769-8010

(800) NSF-6275

Home water treatment device and bottled water information

OTHER AVAILABLE MATERIALS...



- FACTS: Lead in Drinking Water*
- FACTS: Mercury in Drinking Water*
- FACTS: Nitrate and Nitrite in Drinking Water*
- FACTS: Pesticides in Drinking Water*
- FACTS: Volatile Organic Compounds in Drinking Water*
- Parasites and New Jersey Drinking Water: Information on Giardia and Cryptosporidium*
- Contacts and Information: Drinking Water Issues*
- Don't Drink Lead (11" x 17" poster)*
- Don't Drink Lead (8½" x 11" flyer)*
- Keep Your Baby Safe From Lead (11" x 17" poster)*
- Keep Your Baby Safe From Lead (8½" x 11" flyer)*

Name _____

Address _____

Town _____ State _____ Zip _____

Please send this order form to:

New Jersey Department of Health and Senior Services
Consumer and Environmental Health Services
PO Box 369
Trenton, NJ 08625-0369



Division of Environmental and Occupational Health Services
Consumer and Environmental Health Services
PO Box 369
Trenton, NJ 08625-0369