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COLIFORM BACTERIA

What are coliform and E. coli bacteria and why do we test for them?

Coliform bacteria are found in plants, soil, and surface water. Researchers estimate that 40% of private water supplies and 70% of spring-fed supplies contain coliform bacteria. Most coliform bacteria do not cause disease. However, if coliform bacteria are found in drinking water, disease-causing organisms (pathogens) may also be present. Fecal coliforms are found in human and animal feces, and *E. coli* bacteria are the most common fecal coliforms. Some strains of *E. coli* may be disease causing (pathogenic) and some strains are lethal. Therefore, the presence of *E. coli* in a drinking water sample represents a serious potential health risk.

Since it is not practical to test drinking water for every pathogen, water is tested for the coliform group of indicator bacteria. The Total Coliform Test has been used for over 100 years to indicate contamination of drinking water and the possible presence of intestinal parasites and pathogens such as salmonella, dysentery, and hepatitis. It is generally much quicker, safer, and simpler to identify coliform bacteria in drinking water than individual pathogens. Coliform bacteria are also good indicators because they are killed by disinfection the same way that most pathogenic organisms are killed.

What is the safe amount of coliform or E. coli bacteria in a water supply?

Water containing any coliform bacteria per 100 milliliters of water, TNTC (too numerous to count), or CG (confluent growth), should not be used for drinking or cooking unless boiled for 5 minutes or disinfected by other means. "Confluent Growth" means that there is bacterial growth (with or without coliform bacteria) that covers the entire filtration area. "Too Numerous To Count" means that the total number of bacterial colonies on the filter area are too numerous to count and/or not sufficiently distinct to obtain an accurate count. (This is usually greater than 200 total bacterial colonies per 100 mL of water). The results are marked either "CG" or "TNTC" and is considered unsatisfactory because the presence of coliform bacteria, or large amounts of other bacteria suggests poor water quality. A health risk may or may not be present.

How do coliform bacteria enter a water supply?

- 1. The Sample Point** → The source of the coliform bacteria may not be the water supply. The faucet where the sample was collected may be contaminated. It is very important to remove aerators or strainers prior to collecting a sample. Also, the person collecting the sample must take care not to touch the inside rim or cap of the sample container. Some treatment devices on the plumbing system that aren't replaced regularly, such as particle filters and carbon units, may also harbor bacteria.
- 2. Surface Water** → Coliform bacteria are often found in shallow dug or drilled wells and springs because the surface water may not have been naturally filtered by soil before entering the well or spring. Such wells are "under the influence" of surface water. If a well top is buried, in a pit, or submerged (or if you can't find it at all), chances are that it leaks and introduces surface water. Coliform bacteria may also enter a water supply through faulty plumbing, including line breaks or leaks. Surface water, as well as rain, dust, bird droppings, or small animals and insects, can enter water supplies through poor filtering or damaged caps and covers. Degradation of a well casing from rust or well seal (grout) can also allow surface water to enter the water supply. Proper well construction and adequate well casing can prevent the introduction of surface water containing coliform bacteria into a water supply.
- 3. Well Location** → Wells located in areas susceptible to flooding are also susceptible to bacterial contamination. Regulations require new wells to be located at a set distance from septic systems in order to minimize water well contamination. Also, some wells may be located in an area where the soil surrounding the well may not adequately filter surface water.
- 4. Recent Changes or Repairs to the Water Supply** → Any work performed on a well or water system should be followed by disinfection of the system. Workers' hands, tools, and plumbing supplies are not bacteria-free and should be considered potential sources of contamination.

If you have one or more of the problems described above, it should be corrected. If it is not corrected, the problem may reoccur, even after repeated disinfection. Early testing for coliform bacteria is recommended for private wells.