

Water Testing Basics

Test results can be reported out in several ways. Below is a short definition of the most common bacteriological test methods:

MPN – most probable number- an estimation of bacterial population of total coliform. Probably won't find *E. coli* test option.

P/A – presence or absence of total coliform or *E. coli* in the water sample (must specify when scheduling the test). The results may also be reported as detected or not detected, or undetected. No bacterial colony count is given, meaning you don't know the extent of the contamination, just that there is contamination, or is not. It is not as precise a test as the quantified test (describe below).

Quantify or quantitative – an actual number of total or *E. coli* bacteria colonies (must specify when scheduling the test). Helpful for evaluating the extent of the contamination and best treatment protocols and post treatment effectiveness.

Total Coliform vs Fecal Coliform vs *E. coli*

Total coliform are prolific in the soil, but their presence doesn't necessarily imply fecal contamination, and doesn't imply imminent health risk. Total coliform in water samples are the indicator bacteria, especially for a 'closed system' like municipal or piped well water.

A properly constructed and maintained closed water system should not have total coliform present. Their presence would indicate that the system is not so closed, since the presence of bacteria in this group indicates the possibility but not the certainty that disease organisms may be present in the water.

Absence total coliform means there is a low probability of disease organisms. This reliably predicts the bacterial safety of drinking water relative to the hundreds of possible diseases. It is impractical to test for every type of disease causing organism. Immediate public health threat; public notice and boil order to users (within 24 hours) are required to users due to the higher likelihood of disease organisms being present in the water.

Fecal Coliform - A subset of total coliform, fecal coliform generally originate in the intestines of mammals, have relatively short lifespans. With fecal coliform present, there is a higher likelihood of disease organism presence in the water. Immediate public health threat; public notice and boil order to users (within 24 hours) are required to users due to the higher likelihood of disease organisms being present in the water.

E. coli - A specific species within the fecal coliform group. *E. coli* only originate in the intestines of animals and humans, and also have a relatively short lifespan. An *E. coli* presence indicates a strong likelihood that human or animal waste has entered the water source. If *E. coli* is present in the water sample the risk of giardia also being present is much higher. However, a negative *E. coli* test cannot rule out the presence of giardia.

Surface Waters – there will be coliforms in surface waters. The test for E coli is to determine an indicator of fecal contamination.

Giardia and Cryptosporidium.

Exceptions to the total coliform generalization above include protozoa such as Giardia and Cryptosporidium, which can be present in the water even when total coliform test shows the absence of organisms.

Giardia – has a protective outer shell that allows it to survive outside the body for long periods of time. It is tolerant to chlorine disinfection. Drinking water and recreational water is most common method of transmission, but also food or soil are known carriers. Humans, dogs, cats, birds, cattle, beavers, deer and sheep are known hosts.

Cryptosporidium - Very similar to Giardia – can survive for long periods of time outside a host. It is also resistant to many common disinfectants, and highly resistant to chlorine. Similar hosts to Giardia; transmission by food, poor hygiene and water.

Specific tests have to be done for Giardia and Cryptosporidium.

CDPHE and Weld County laboratories do not test for Giardia. A laboratory in Loveland does test for Giardia. It is CH Diagnostic & Consulting Services, (970) 667-9789. This is an expensive test that requires special equipment for sampling that is supplied by the lab. They may be able to direct you in testing for cryptosporidium.