

Coliform Bacteria in Drinking Water

NONCOMMUNITY PUBLIC WATER SUPPLY PROGRAM

Contamination of Drinking Water by Microorganisms

Pathogenic (causing or capable of causing disease) microorganisms are among the oldest threats to drinking water quality, and are responsible for most of the waterborne diseases that occur worldwide. Although it is not a common occurrence in the United States, pathogenic microorganisms such as bacteria, viruses, and protozoa can sometimes find their way into drinking water supplies and cause human illness.

Role of Coliform Bacteria in Detecting Contamination

Not all disease-producing microorganisms present in water are known or easily identifiable. The best approach for identifying microbiological contamination is the use of an easily measured “indicator organism” to signal that pathogenic microorganisms may be present. The coliform group of bacteria is the indicator used for this purpose in testing drinking water. They are found in water, soil and on vegetation, and are present in large numbers in the feces of warm blooded animals. They quickly and inexpensively give an indication that other pathogenic microorganisms may be present. For example, some strains of *Escherichia coli* (*E. coli*) can cause serious illness, and are members of the coliform group.

Coliform Bacteria Sampling

Minnesota Department of Health (or your local health department) typically samples for coliform bacteria on an annual basis at

noncommunity public water systems, however, more frequent testing is sometimes required. Water samples that indicate the presence of coliforms triggers the collection of additional samples to confirm the contamination. More sampling is required to ensure the contamination has been eliminated.

What Does It Mean When Coliform Bacteria Are Found In My Water

Coliform bacteria are not considered a normal inhabitant of groundwater or disinfected surface water. Their presence suggests that there has been a breach, failure, or other change in the integrity of the water system. Disease-causing microorganisms may also have gained entry into the water system. While coliform bacteria themselves pose little health risk, their presence indicates that other health-threatening microorganisms may also be present. The presence of *E. coli* is a strong indicator of fecal (sewage) contamination. This type of contamination greatly increases the likelihood that other pathogenic microorganisms are present.

Safety of the Water Supply and Possible Health Effects

Total coliform bacteria (without the presence of *E. coli*) are generally not considered harmful, but their presence indicates a potential pathway for contamination to enter the drinking water. If you have specific health concerns, you may want to consider seeking an alternate source of water.

The presence of *E. coli* indicates pathogenic microorganisms may be present in your drinking water and increases your risk of contracting a waterborne illness. **Therefore, a noncommunity public water supply, where the presence of *E. coli* bacteria has been confirmed, is not considered safe for drinking water use.**

Symptoms of waterborne illness may include gastrointestinal cramps, diarrhea, nausea, headaches, or other symptoms. It is important to note that these symptoms may be caused by other conditions. Some groups of people, such as infants, young children, and those with compromised immune systems may be more susceptible to waterborne illness.

Public Notification Requirements

If total coliform bacteria is confirmed at a noncommunity public water system, the water may be consumed. A consumer notice is required to be posted. [Total Coliform Bacteria Consumer Notice \(https://www.health.state.mn.us/communities/environment/water/docs/ncom/tconsumer.pdf\)](https://www.health.state.mn.us/communities/environment/water/docs/ncom/tconsumer.pdf). If *E. coli* is present in the drinking water, it must not be used for drinking, food preparation, making ice, brushing teeth, or manual dishwashing. Purchased bottled water must be provided to all users of the water supply for these purposes. In addition, precautions should be taken when washing hands, bathing, and showering. Public notifications are required to be posted. [E. coli Public Notification \(https://www.health.state.mn.us/communities/environment/water/docs/ncom/ecolipn.pdf\)](https://www.health.state.mn.us/communities/environment/water/docs/ncom/ecolipn.pdf)

[Food, Beverage and Lodging Establishments \(https://www.health.state.mn.us/communities/environment/food/docs/fs/fecalcol.pdf\)](https://www.health.state.mn.us/communities/environment/food/docs/fs/fecalcol.pdf)

Common Causes of Coliform Bacteria Problems

There are many reasons why coliform bacteria may be found in a water supply. Some common causes include defects in the water distribution system, problems with the well, cross connections with nonpotable water, poorly maintained treatment equipment, or failure to disinfect following repairs or seasonal opening. In general, the presence of coliform bacteria most often indicates a problem with some part of the well or distribution system.

Resolving the Problem

Coliform bacteria can be eliminated through a well and/or distribution system disinfection. The cause of the coliform presence is often unknown, but if one is determined, it must be corrected prior to a final disinfection. In addition, a public water system should always disinfect following repairs, additions to the water system, or seasonal opening. Disinfection instructions are available at [Well Disinfection \(https://www.health.state.mn.us/communities/environment/water/docs/wells/waterquality/disinfection.pdf\)](https://www.health.state.mn.us/communities/environment/water/docs/wells/waterquality/disinfection.pdf)

After the disinfection has been completed, the water system must be re-sampled to ensure the coliform bacteria have been eliminated.

Causes and Actions

| Causes of Coliform Problems | Preventative/Corrective Actions |
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| Lack of proper maintenance on treatment units such as carbon filters, sediment filters, water softeners, etc. | Follow best practices and the manufacturer’s requirements pertaining to operation, maintenance, cleaning/sanitizing, and repair. |
| Plumbing repairs or additions without system disinfection. | Always disinfect water systems after plumbing repairs or additions. |
| Seasonal systems can have coliform introduced during draining, startup, or anytime drained water lines are not properly closed or capped in the fall. | Never leave any part of the plumbing system open to the environment. Always thoroughly flush the system when opening. Disinfect the well and plumbing prior to opening and during shutdown. |
| Dead ends in the plumbing system allow water to become stagnant and sediment to accumulate creating conditions favorable for bacterial growth. They are created when plumbing fixtures are removed or taken out of service and the associated water lines are left in place. Dead ends can also exist on water feed lines to fire and lawn sprinkler systems, boilers, heat exchangers, pools/spas, church baptisteries, and seasonal or seldom used fixtures. | Remove all unnecessary plumbing dead ends. Routinely run water through seldom-used fixtures. Ensure that feed lines to fire, boiler, lawn sprinkler systems, pools/spas, etc. have proper backflow prevention installed and maintained. |
| Water systems with very low water use are in effect dead ends and may promote bacterial growth. | Periodically flush the entire water system by lawn sprinkling, outside hose, or other means. |
| Damaged, loose fitting, or missing well caps/seals and electrical conduits. | Repair or replace with a well code compliant cap/seal and electrical conduit. |
| During pump replacement coliform may be introduced from the new pump or the drop pipe/wiring if set on the ground. | Prevent drop pipes and wiring from becoming soiled during pump replacement. Disinfect the well and plumbing thoroughly after pump replacement. |
| Wells located in pits/basements are prone to contamination when the pit/basement floods and water enters the well via the cap or vent. | Hire a licensed well contractor to extend the well casing at least 12 inches above ground level and fill in the pit or replace the well. |
| Well casing that terminates near or at the ground surface allows surface water to enter the well through the well cap or vent. | Hire a licensed well contractor to extend the well casing at least 12 inches above the surrounding ground level which has been graded to divert water away from the casing |
| Well casing could be damaged above and below the ground surface when struck by a motorized vehicle allowing contaminated water through the damaged casing. | Wells located in areas where motorized traffic occurs should be protected by surrounding the casing with rigid posts, large rocks, or fencing. Avoid locating new wells near traffic areas. |

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