Coliform Bacteria in Drinking Water

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, although 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. http://www.health.state.mn.us/divs/eh/water/ncom/tcconsumer.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 Posting Notice**


Information for food, beverage, and lodging establishments that have tested positive for *E.coli*

http://www.health.state.mn.us/divs/eh/food/fs/fecalcol.html

**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/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 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

http://www.health.state.mn.us/divs/eh/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.

April 2016
<table>
<thead>
<tr>
<th>Coliform problems (Causes)</th>
<th>Preventative/ Corrective Action(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of proper maintenance on treatment units such as carbon filters, sediment filters, water softeners, etc. The treatment unit can act as a reservoir for bacteria.</td>
<td>Replace filter cartridges regularly. Sanitize the filter housing with a dilute bleach solution when replacing cartridges. Clean and sanitize brine tanks on a regular basis and maintain salt levels.</td>
</tr>
<tr>
<td>Well or plumbing repairs/additions without system disinfection can introduce bacteria.</td>
<td>Always disinfect water systems after well or plumbing repairs/additions.</td>
</tr>
<tr>
<td>Seasonal systems can have coliform bacteria introduced during draining, startup, or anytime drained water lines are not properly closed or capped in the fall.</td>
<td>Never leave any part of the plumbing system open to the environment. Drained water lines should be disinfected prior to use.</td>
</tr>
<tr>
<td>Dead ends in the plumbing system allow water to become stagnant and sediment to accumulate creating conditions favorable for bacterial growth. Dead ends 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, church baptisteries, and other seasonal or seldom used fixtures.</td>
<td>Remove all unnecessary plumbing dead ends. Routinely run water through seldom-used fixtures. Ensure that feed lines to lawn sprinkler systems and boilers have proper backflow prevention installed and maintained.</td>
</tr>
<tr>
<td>Water systems with very low use allow the water to become stagnant which may promote bacterial growth.</td>
<td>Periodically flush the entire water distribution system. Running an outside hose or lawn sprinkler is also helpful.</td>
</tr>
<tr>
<td>Damaged, loose fitting or missing well caps/sanitary seals and electrical conduits.</td>
<td>Repair or replace well cap/sanitary seal and electrical conduit.</td>
</tr>
<tr>
<td>Wells located in pits/basements are prone to bacterial contamination when the pit/basement floods and water enters the well through the cap or vent.</td>
<td>Hire a licensed well contractor to extend the well casing at least 12 inches above ground level and then fill in the pit or replace the well.</td>
</tr>
<tr>
<td>Well casing that terminates near or at the ground surface allows surface water to enter the top of the well through the well cap or vent.</td>
<td>Hire a licensed well contractor to extend the well casing at least 12 inches above the surrounding ground level which has been graded to prevent water pooling at its base.</td>
</tr>
<tr>
<td>A well casing could be damaged above or below the surface when struck by a motorized vehicle. Coliform bacteria can enter the damaged well through surface water which seeps into cracks in the well casing.</td>
<td>Wells located in areas with motorized vehicles should be protected by surrounding the casing with rigid posts, large rocks, or fencing. Avoid locating new wells in or adjacent to traffic areas.</td>
</tr>
</tbody>
</table>

Drinking Water Protection Section  
Noncommunity Public Water Supply Unit  
Email:  HEALTH.nonCommunityCompliance@state.mn.us