

Bad Bugs, Bad Bugs, What You Gonna Do?

By Jeff Swanson, Circuit Rider

In a past article, I mentioned that all public water systems are required to have a written Coliform Sampling Plan. The plan can help the water system operator decide which corrective actions to take should routine coliform samples test positive. It is important to keep in mind the critical rationale behind that requirement. Routine total coliform samples are taken to help determine if more harmful (pathogenic) microbiological organisms may also be present. The harmful 'bugs' – if present, can cause illness or even death in certain circumstances. The number of total coliform samples to be collected on a monthly basis depends on the size (population) and type (surface water or groundwater) of the water system. The following information should help clarify more specifically the harmful organism addressed in this article – *E. coli* O157:H7.

One of hundreds of strains of the bacterium *Escherichia coli*, *E. coli* O157:H7 is a rising cause of food borne and waterborne illnesses. Although most strains of *E. coli* are harmless and live in the intestines of healthy humans and animals, this strain produces a powerful toxin and can cause severe illness. *E. coli* O157:H7 was first recognized as a cause of illness during an outbreak in 1982 traced to contaminated hamburgers. Since then, most infections are believed to have come from eating undercooked ground beef. However, some have been waterborne. In 1999, people became sick after drinking contaminated water in Washington County, New York and swimming in contaminated water in Clark County, Washington.

E. coli is a type of fecal coliform bacteria commonly found in the intestines of animals and humans. *E. coli* is short for *Escherichia coli*. The presence of *E. coli* in water is a strong indication of recent sewage or animal waste contamination. Sewage may contain many types of disease-causing organisms. Fecal coliforms are bacteria that are associated with human or animal wastes. They usually live in human or animal intestinal tracts, and their presence in drinking water is a strong indication of recent sewage or animal waste contamination.

E. coli comes from human and animal wastes. It can enter water sources during rainfalls and snow melts, then be washed into creeks, rivers, streams, lakes, or groundwater. When these waters are used as sources of drinking water and the water is not treated or inadequately treated, *E. coli* may end up in drinking water. Although most strains of *E. coli* are harmless and live in the intestines of healthy humans and animals, O157:H7 produces a powerful toxin and can cause severe illness. Infection often causes severe bloody diarrhea and abdominal cramps; sometimes the infection causes non-bloody diarrhea. Frequently, no fever is present. It should be noted that these symptoms are common to a variety of diseases, and may be caused by sources other than contaminated drinking water.

“In some people, particularly children under 5 years of age and the elderly, the infection can also cause a complication called hemolytic uremic syndrome, in which the red blood cells are destroyed and the kidneys fail. About 2%-7% of infections lead to this complication. In the United States, hemolytic uremic syndrome is the principal cause of acute kidney failure in children, and most cases of hemolytic uremic syndrome are caused by *E. coli* O157:H7. Hemolytic uremic syndrome is a life-threatening condition usually treated in an intensive care unit. Blood transfusions and kidney dialysis are often required. With intensive care, the death rate for hemolytic uremic syndrome is 3%-5%.” (ref: USEPA)

Symptoms usually appear within 2 to 4 days, but can take up to 8 days. Most people recover without antibiotics or other specific treatment in 5-10 days. There is no evidence that antibiotics improve the course of the illness, and it is thought that treatment with some antibiotics may precipitate kidney complications. Antidiarrheal agents, such as loperamide (Imodium), should also be avoided. To avoid playing the 'guessing game', consult with a physician. Diagnosis is done with stool sampling. Since most laboratories that conduct stool sampling do not test for *E. coli* O157:H7, it is important to request the method that will determine its presence –

especially if blood is associated with diarrhea. Children under the age of five, the elderly, and people whose health and immune system is weakened, are at a greater risk of severe illness.

This kind of ‘bug’ will surely have an unwelcome presence in your water system. Generally speaking, our public water systems are free of *E. coli* O157:H7, yet it can be present and go unnoticed under many different circumstances. Prevention is commonly the most practical approach. However, due to the severity of the potential health effects that can result when its presence is known, immediate actions will have to be implemented. In the Coliform Sampling Plan, make sure that proper protocol has taken place during and after repeat sampling. *E. coli* O157:H7 is considered an acute risk to health and initiates the ‘Tier 1 Public Notification’ process. It would be well advised to have an EPA Public Notification Handbook at your water system. It provides both the necessary notification requirements, as well as useful written notification templates with pertinent health effects language. These are **bad** bugs – don’t give them the chance to ruin an otherwise **good** day – for anyone!