

## My Water Tested Positive For Coliform Bacteria. Should I Be Concerned?

When a water supply tests positive for coliform bacteria, there is at least one of the 26 bacteria species present:

<i>Escherichia coli</i>	<i>Citrobacter freundii</i>	<i>Klebsiella pneumoniae</i>	<i>Enterobacter aerogenes</i>
<i>Escherichia blattae</i>	<i>Citrobacter koseri (diversus)</i>	<i>Klebsiella ozaenae</i>	<i>Enterobacter cloacae</i>
<i>Escherichia vulneris</i>	<i>Citrobacter amalonaticus</i>	<i>Klebsiella oxytoca</i>	<i>Enterobacter agglomerans</i>
<i>Escherichia fergusonii</i>		<i>Klebsiella rhinoscleromatis</i>	<i>Enterobacter amnigenus</i>
<i>Escherichia hermannii</i>		<i>Klebsiella planticola</i>	<i>Enterobacter sakazakii</i>
		<i>Klebsiella terrigena</i>	<i>Enterobacter gergoviae</i>
		<i>Klebsiella ornithinolytica</i>	<i>Enterobacter dissolvens</i>
			<i>Enterobacter nimipressuralis</i>
			<i>Enterobacter asburiae</i>
			<i>Enterobacter cancerogenus</i> ( <i>taylorae</i> )
			<i>Enterobacter hormaechei</i>

Of any particular species listed above, there are subspecies. For example, within the *Escherichia coli* species, there are well over 150 subspecies.

The above-named species account for less than 0.5% of all the bacteria found in the large intestines of humans, meat-eating animals and combination-meat-and-plant-eating animals. Water is not a natural medium for coliform bacteria. They do not live in water for the same length of time. *Klebsiella*, *Citrobacter* and *Enterobacter* are more likely than *Escherichia coli* to grow and persist in organic-rich waters and form a chlorine-resistant biofilm within a water distribution system. *E. coli* is most sensitive to environmental stresses and least likely to grow in water and soil. Coliform bacteria are either oxygen-loving or sometimes non-oxygen-loving under some circumstances. All coliform bacteria may produce serious outside-the-intestine infections such as:

<u>Bacteria</u>	<u>Symptoms</u>
<i>Escherichia coli</i>	sinusitis, meningitis, endocarditis, multiple types of diarrhea, multiple types of urinary tract infections, pneumonia, appendicitis, bacteriuria, septicemia, neonatal sepsis, etc.
<i>Citrobacter</i>	wound and urinary tract infections.
<i>Klebsiella oxytoca</i>	lesions in almost every part of the body, pneumonia, upper respiratory (UR) tract infections, sinusitis, peritonitis, uterine and vaginal infections, meningitis, septicemia.
<i>K. ozaenae</i>	UR tract infections, urinary tract, middle ear and blood infections.
<i>K. pneumoniae</i>	lesions in almost every part of the body, pneumonia, upper respiratory (UR) tract infections, sinusitis, peritonitis, uterine and vaginal infections, meningitis, septicemia.
<i>K. rhinoscleromatis</i>	produces chronic destructive masses or nodules of inflamed tissue in the nasopharynx.

### **There is a small chance that other disease-causing bacteria could be present if your water tests negative for coliform**

When a water system tests “negative” for coliform bacteria, there is a small chance that the following disease-causing bacteria may be present, but at this time, testing for these is not required by law, nor are these tests inexpensive:

*Yersinia*  
*Campylobacter jejuni*  
*Pseudomonas aeruginosa*  
*Acinetobacter*  
*Flavobacterium*

For new private water systems or private water systems that require alteration it is required by law that a

sanitarian from the Ashland County-City Health Department (ACCHD) inspect the water system and obtain water sample(s). For real-estate transactions, it is recommended that you use the services of the ACCHD for the following reasons:

- 1) Sanitarians are registered/licensed by the State of Ohio. They have at least a bachelors degree with at least a year of study in the sciences, they undergo a 1-2 year internship, and have passed a rigorous national environmental health examination. They are required to earn at least 18 hours of continuing education each year.
- 2) Quality control. Meetings are held to keep inspectors consistent in the latest evaluation and inspection techniques. For legal reasons, it is necessary that an unbroken “chain-of-custody” be maintained for any water sample. It is also necessary that a water sample remain continuously refrigerated and is not exposed to lengthy periods of light from the time that the sample is obtained to the time that the laboratory begins the test.
- 3) Samples that are obtained are handled and processed consistent with Standard Methods for the Examination of Water and Wastewater 21<sup>st</sup> edition.
- 4) The Ashland County-City Health Department sanitarians have knowledge of the voluminous current and former designs, policies, codes, and legal doctrines affecting these systems.

### **Certified water laboratories that health departments use**

The Ashland County-City Health Department uses an Ohio Environmental Protection Agency (OEPA) certified water laboratory that uses the Colilert™ presence/absence test method because it is generally quicker and the results are presented in a straightforward manner. In brief, this method combines two separate checks. First, the 100-115 milliliter (mL) water sample is combined with growth medium, and subsequently incubated for 24 hours at 35<sup>o</sup> C. During this period, usually only coliform bacteria will use the growth medium for food, resulting in a color change in the water. If the color change occurs, a second check is performed to determine if the water contains one particular species, that is *Escherichia coli*. Thus, the test is completed approximately 26 hours after it has begun.

Some health departments and public water distribution systems in Ohio use an OEPA certified water laboratory that uses a “membrane filter” test. This test involves the laboratory filtering the water over a special membrane/paper and then placing the paper on a petri dish for 48 hours at 35°C ± 0.5°. When the 48-hour incubation period is over, the petri dish is taken out, and the sample is viewed with a combination light and magnifying glass used especially for coliform viewing. Any fecal coliform colonies will appear blue in color, while non-fecal coliform colonies will appear gray or cream colored. When the colonies are counted, the entire surface of the filter is scanned using a 10-15x binocular, wide-field dissecting microscope. In this test, filters which show a growth over the entire surface of the filter with no individually identifiable coliform colonies are recorded as "confluent growth" or "CG". Filters which show a very high number of colonies (greater than 200) are recorded as “too numerous to count”.

### **Shock disinfecting your private water well**

When you need to shock-disinfect your private water well, you need to account for the volume of water in the well; debris at the bottom of the well; the acidity or alkalinity of the water; and the age of the bottle(s) of liquid bleach that you plan to use. White vinegar is a weak form of acetic acid, and can successfully lower the pH of your well water. White vinegar is readily available at most grocery stores, is safe to use, and inexpensive. When using white vinegar, a general rule is to add almost 1 gallon of vinegar to each 100 gallons of water to lower the pH to a desired starting point of between 4.5 - 7 (remember to always check using suitable pH test strips for that range).

Before you buy any bottle of liquid bleach, you need to check the date it was manufactured and how long the bottle has been on the store shelf. Remember that bleach consists of chlorine gas captured in liquid. As weeks and months go by, more chlorine evolves from the bleach and the liquid becomes less and less effective.

For specific procedures on water well disinfection you may want to check the article on this website, “**Floodwaters Entered My Private Water System, What Can I Do To Be As Safe As Possible?**” or visit the following webpage for more information:

<http://www.deq.state.mi.us/documents/deq-wd-gws-wcu-disinfectmanual.pdf>

For a list of Ashland County’s water contractors who are registered by the Ohio Department of Health, please scroll down to “Ashland County” after you click on the following webpage:

[http://www.odh.ohio.gov/ASSETS/7955A4EE9C154307A3360635A8581CF5/oh\\_wcontract.pdf](http://www.odh.ohio.gov/ASSETS/7955A4EE9C154307A3360635A8581CF5/oh_wcontract.pdf)

### **Facts You Need To Know About Public Water Systems In the United States:**

- 1) Even well-run public water distribution systems experience 25-30 breaks per 100 miles of piping per year.
- 2) For the years 1981 to 1998, the Centers for Disease Control reported 57 disease outbreaks related to cross-connections, resulting in over 9,700 illnesses.
- 3) Of the 459 backflow incidences from 1970-2001 reported by the USEPA, over 12,000 cases of illness resulted.
- 4) Of the 12 largest public water disease outbreaks between 1971 and 1998, 1,400 cases of gastroenteritis were associated with contamination of water mains during storage and 1272 cases of *Giardia* were associated with contamination of a broken main.
- 5) Some public water systems that have 70 year old lines could last another 70 years, but some systems that have lines that are less than 50 years old that might need replacement now. Many factors are involved in determining the life of public water lines.
- 6) *Enterobacter*, *Citrobacter*, *Klebsiella*, *Aeromonas*, *Pseudomonas*, *Flavobacterium*, *Acinetobacter*, and some species of *Mycobacterium* have been known to survive in public water distribution systems under continuous disinfection. They may enter a system when there are water main breaks, water main repairs, water tower maintenance/repair problems and/or backflow/back-siphonage events.

**The Ashland County-City Health Department urges you to please check the following places in your home to ensure proper protection against backflow:**

#### 1) **Toilet**

When your water system discharges water into any toilet tank in your dwelling, the water must be prevented from being drawn back into the water supply. The water in the toilet tanks of many homes is often treated with cleansing chemicals that are not safe to drink. It is therefore recommended that an ASSE (American Society of Sanitary Engineering) #1002 anti-siphon ballcock assembly be installed in the toilet tanks throughout your dwelling. This will protect against back-siphonage. The ball cock can also serve as a thermal expansion relief device for the hot water tank, if equipped with an auxiliary relief valve. The relief valve should govern the preset pressure to 80psi or less. Many persons are under the impression that a store would not sell something that is unsafe, however, you must look for the appropriate ASSE label and number on the package that you buy.

#### 2) **Laundry Sink**

To help make your laundry sink safe, an ASSE #1011 hose bibb vacuum breaker is needed. This is a small, inexpensive device that simply attaches to the threaded end of the faucet as with the outside water faucets, also known as sill cocks. The device prevents contaminated water in the laundry sink from being siphoned back into the water supply when a hose is connected to the threads of the tap. This vacuum breaker contains a screw that once tightened, the top can be broken-off to ensure that the vacuum breaker remains in place at all times.

### 3) **Outdoor Faucet/Sill Cock**

The ordinary garden hose is the most common way to contaminate a water supply. This can happen when one end of the hose is attached to an outdoor faucet (sill cock), and the other end is connected to an aspirator type bottle. Insecticides or other chemicals in the aspirator bottle can be siphoned back into the drinking water supply, and there are documented reports of this happening across the United States.

You can easily prevent the possibility that this type of contamination will occur by installing an ASSE #1011 hose bibb vacuum breaker. Again, this is a small, inexpensive device that simply attaches to a sill cock/threaded water faucet.

### 4) **Lawn Irrigation System**

Lawn irrigation systems need an appropriate vacuum breaker or backflow preventer to protect against lawn and pesticide chemicals being drawn in from the lawn and back into the drinking water supply. Every public water system has different requirements concerning backflow prevention from lawn irrigation systems, so it is recommended that you check with your public water purveyor for their specific ASSE vacuum breaker/backflow preventer recommendation.

### 5) **Heating/Cooling Systems**

A hot water system separate from your hot water tank may be used to heat your home. You can ensure the protection of the your water system by making sure an ASSE #1012 dual check valve with atmospheric vent is installed. This will protect against stagnant or chemically treated water from recirculating back into the water supply.

If you are connected to a public water system and own an older dwelling, you will help improve public health and safety of the citizens living around you by having an appropriate backflow preventer installed immediately prior to the water meter. Please check with your water purveyor for their recommendations.

Helping Ashlanders stay healthy is a major goal for the Ashland County-City Health Department. Vital water system backflow and backsiphonage information is found at the following URL:

[http://www.wattscanada.com/pro/divisions/backflowprevention/learnabout/learnabout\\_usc.asp](http://www.wattscanada.com/pro/divisions/backflowprevention/learnabout/learnabout_usc.asp)