THE GARDEN CLUB OF AMERICA

DRINKING WATER SAFETY

Do you know what is in your drinking water? When we turn on the faucet, we expect clear, cool, life sustaining water to flow. We can go without food for many days; but we cannot live for a week without water. We are supposed to drink eight glasses of water every day. Today run-off and acid rain as well as pollutants from many other sources flow into our streams, lakes, and aquifers.

HISTORY

In 1974, Congress passed the SAFE DRINKING WATER ACT in response to increasing chemical contamination of public water sources. The Act directed the Environmental Protection Agency (EPA) to establish drinking water standards and to protect drinking water sources.

In 1986, the Act was revised to require the EPA to set specific regulations for 84 known contaminants. They are called Maximum Contaminant Levels MCLs, the largest allowable amount of pollutants dissolved in water, measured in mg/L (milligrams per liter), or parts per million, (ppm).

Further amendments to the Safe Drinking Water Act in 1996 require community water systems serving more than 10,000 customers to provide annual water quality reports to their customers, beginning in 1999. The reports will list the contaminants that the EPA now regulates. Smaller water companies are allowed variances and can get assistance from a revolving fund to pay for infrastructure improvements.

THE CONTAMINENTS

The health-threatening water pollutants that are regulated by the EPA are divided into five groups:

- **Microorganisms**, some naturally occurring: bacteria, viruses and parasites.
- **Synthetic Organic Chemicals** (SOCs): fertilizers, pesticides, solvents, leakage from underground storage tanks and many other man-made products.
- **Inorganic Chemicals and Metals**: toxic minerals such as mercury, lead, and arsenic.
- **Radionucleides**: natural and human made radioactive metals and minerals.
- **Additives**: treatments added to water before delivery to consumers.

**Bacteria** in water can cause typhoid, cholera, and other diseases. Fortunately, these can easily be detected and are killed when treated with chlorine. Since the early 1900’s, municipal water systems have treated water with chlorine and have virtually eliminated these diseases. Viruses can be present in untreated water and most of them can be killed with chlorine disinfectant. Protozoan parasites like *Giardia* and *Cryptosporidium* occur as hard-shelled cysts that are resistant to chlorine disinfection. In April 1993, the microorganism *Cryptosporidium* found in Milwaukee’s water supply made 400,000 people sick and killed 100.

There are thousands of **synthetic organic chemicals (SOCs)** used in manufacturing everything from fertilizers to plastic baby bottles. They are often toxic. Pesticides are designed to kill living organisms that feed on valued crops. These compounds tend to persist in nature and have widespread effect on plants and animals. They are picked up in heavy rain and snowmelt run-off from agricultural areas, urban streets, and construction sites. SOCs can also occur in surface water as a result of airborne particles from incinerators and smokestacks.

Of the harmful **minerals** in water, cadmium, lead, and mercury are the most toxic. Water treatment plants do a good job in reducing them to safer levels, meeting the standards of the EPA. **Lead** can leach into our water supply from old pipes and faucets in our houses. The use of fertilizers and the raising of livestock contribute to high levels of **nitrates** and **nitrites**. Sewers, septic tanks, and industrial plants are other sources of these pollutants.

**Radioactive materials** occur naturally. Uranium mining can produce radioactive runoff. Nuclear power
plants and weapons facilities, as well as disposal sites, are man-made sources of radioactive minerals.

**Radon** is a naturally occurring gas that is a by-product of the decay of radioactive minerals. If present, evaporation in an enclosed space can cause this odorless and colorless gas to be inhaled.

**Chlorine** is the best-known additive at public water treatment plants. For over 80 years it has been used in almost every public water system in the United States and has proven to be very effective as a disinfectant. But now there is evidence that when chlorine combines with organic chemicals in water, toxic chemicals are sometimes formed. These toxic chemicals are called disinfection by-products. **Trihalomethanes** have received the most attention. (On your water company’s report they might be listed as primary compounds.)

**Fluoride** is added at some water treatment plants and is thought to harden children’s teeth against decay. Its use implications are still debated.

**Flocculents** are chemicals added to make particles coagulate for more efficient filtering.

Most community water systems produce high quality drinking water within the government standards. Because city water companies have large enough customer bases and can afford more modern water treatment facilities, city tap water is generally higher quality than water from small town or private water systems.

Water from rivers and lakes (surface water) is usually low in minerals but might have pollutants from microorganisms, toxic organic chemicals, and nitrates. Surface water is also affected by illegal dumping and runoff from heavy rain, especially from disturbed land.

Ground water is usually higher in minerals and lower in microorganisms than surface water, but may contain radon, nitrates and other organic chemicals.

**WHAT CAN WE DO TO HELP**

We must conserve water by using less in our homes and gardens. We must not dump or flush any chemical materials into drains, indoors or out. These include cleaners, polishes, paints, motor oils, fertilizers, and pesticides. We should also learn about our watersheds.

**PRIVATE WELLS**

Over 15 million private wells supply drinking water to American families. Well water is ground water and needs to be tested periodically. The EPA does not require testing, but homeowners with wells should test their water for bacteria and nitrates at least once a year and for chemicals every three years. If gastrointestinal illness develops among well water users, the supply should be tested immediately and the local health department consulted. Local extension agencies or health departments have the names of local water testing laboratories. The National Testing Laboratories can be reached at 1-800-458-3330 or on the Internet at [www.watercheck.com](http://www.watercheck.com).

Well owners should be aware of the aquifer that supplies their water. How deep is it? What is the source? Is there new development in the neighborhood that would threaten draw downs? Could there be contamination from agriculture in the area?

**TESTING**

Public water systems are required by the Safe Drinking Water Act to test their water on a regular basis and report the results to the state and the EPA. You can get these results by calling your water company. If you want to have your own tap water tested, use a laboratory certified by the EPA. Your state water agency can give you the name and number of your water company and the name and number of testing laboratories in your area.

**TYPES OF FILTERS**

Carbon filters remove many organic chemicals and chlorine and radon. Carbon filters should be of good quality and maintained properly. Because bacteria can grow on some filters, it is imperative that carbon filters be changed frequently.

Reverse osmosis units remove most toxic minerals and organic chemicals but generally do not remove
radon or chlorine. They should be used with carbon filters. Reverse osmosis units are slow and should only be used for drinking water at a spigot. The purified water becomes aggressive and can corrode the pipes of the delivery system. These pipes and faucets should not be made of lead or lead components.

Distillation removes pollutants by boiling water and cooling the steam so it condenses back into water. Distillation is slow and expensive and distilled water is poorly buffered. Therefore, distilled water can be highly aggressive and should be stored in glass or other inert containers.

Water softeners remove calcium and magnesium from “hard” water and make it clean better. However, calcium and magnesium are considered human nutrients.

The healthiest water is free of pollutants but contains beneficial minerals like calcium and magnesium.

**WHAT ABOUT BOTTLED WATER?**

Bottled water is now a four billion dollar a year industry in this country. Not only are there questions about the origin of the water and what is in it, but the plastic bottle itself can be suspect. Then there is the problem of disposing of all the plastic bottles.

Bottled water includes drinking water, purified water, natural-source water, and specialty waters. The Food and Drug Administration sets standards for bottled water used in interstate commerce.

**Drinking water** has been partially purified but still has its good minerals. It is probably from a municipal water system. Home delivery water and the gallon jugs in the market come under this category. Vending machines generally dispense good quality water at a better price than bottled water; however, there may be a problem with the containers used for water by the consumer. They must be perfectly clean and of good quality plastic or glass.

**Purified water** has had all its minerals removed by distillation, filtration, etc. Because purified water becomes “aggressive” and reacts with the surface of its container, it should always be kept in glass containers, not plastic. Some bottled water has been totally purified and then trace amounts of minerals (potassium, calcium, and magnesium) are added for taste and to minimize the “aggressive” tendencies of purified water.

**Natural-source bottled water** comes from a naturally occurring spring or aquifer that may or may not have been tested and may or may not have contaminants. The companies’ reputations depend on the safety of their bottled water. Labels should give information about the water source and the analysis. Bottled water is regulated by the Food and Drug Administration; more can be learned by calling 1-888-INFO-FDA.

Bottled water suppliers can belong to the **International Bottled Water Association (IBWA)**, that sets quality standards for its members. Some bottlers also obtain certification from the independent non-profit testing group **NSF International** (National Sanitation Foundation). IBWA contracts with NSF International to do unannounced third party independent inspections of all IBWA member-bottling facilities. Check labels to see if the bottler belongs, or call 1-800-WATER-11. NSF International can be reached at 1-800-NSF-MARK, or on the Internet at [www.nsf.org](http://www.nsf.org).

**LEARN ABOUT YOUR WATER**

Call your water company.
Ask where your water comes from, surface or ground water.
Ask how it is treated, how it is disinfected and if there are disinfection by-products.
Ask to receive their annual water quality report.

Call your State Water Agency.
Ask if they publish a newsletter about your drinking water.
Call your regional office of the EPA and/or the EPA Safe Drinking Water Hotline: (1-800-426-4791).

On the Internet you can reach the EPA’s Office of Ground Water and Drinking Water at [http://www.epa.gov/OGWDW](http://www.epa.gov/OGWDW).
Call the US Geological Water Survey Information Clearing House at 1-888-ASK-USGS.

**For more information:**
NSF International, *Consumer Drinking Water Book*