Drugs in Water: What You Need to Know

Article by the National Ground Water Association
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News reports about the presence of drugs in America’s water supply may come as a surprise to some. However, it has been known for decades that water throughout the United States and the world contains trace amounts of both pharmaceutical compounds and endocrine disrupting chemicals (EDCs), which mimic or interfere with hormones in the body.

What is not fully understood is the degree to which people should be concerned about the human and environmental effects of these substances, usually found at the parts-per-billion or even parts-per-trillion level. This is an emerging area of research, so many questions remain to be answered. Following is some of what is known:

Where can these substances be found and how are they getting into the water?

Pharmaceutical compounds and EDCs can be found in waterways and sediments throughout the United States—both in populated areas and relatively unpopulated areas.

Portions of it passes through the body after ingestion. Contained in human and animal waste, often many of these substances are not completely removed during the sewage or waste treatment process because sewage treatment plants are not designed for their removal. They then may enter the environment in sewage effluent after treatment. Some of these compounds enter the environment through the disposal of unused medications. Still other drugs and EDCs enter the environment through the wastes of farm animals or farm field applications of waste water treatment sludge and pesticides/biocides, some of which act similarly to estrogen.

Are these substances in both surface water and groundwater?

Groundwater is generally a more protected resource than surface water. Still, traces of some very persistent substances can be present in groundwater from sources such as septic tank effluent, leaking landfills, and leaking sewer lines. Once in the groundwater, they can be more difficult to clean up.

The ground can reduce or remove many pharmaceutical compounds and EDCs through processes including microbiological activity and adsorption to name a few. Further evidence of the ground’s effectiveness in removing these substances from water is river bank filtration used to manage risk by some municipal water utilities, where wells draw groundwater that has filtered through river banks. River bank filtration has been shown to remove up to 90 percent of some pharmaceutical compounds and EDCs from water.

What are the health effects of having these substances in water?

The research on ecological and human health risks due to trace amounts of pharmaceutical compounds and EDCs in water is not conclusive. Some believe that low concentrations of these substances make a human health threat unlikely at this time. Others believe that adverse health effects on aquatic species, the existence of antibiotic-resistant bacteria in rivers, and mixtures of pharmaceutical compounds and EDCs suggest a threat to humans, including sensitive populations such as unborn fetuses.
Can I test my well water for these drugs?
At this time, most water testing laboratories are not equipped to test for these pharmaceutical compounds and EDCs because no federal drinking water standards exist for them. Check with your local water testing laboratory about the availability of specific tests.

What is being done about this issue to protect public health?
While there currently are no federal U.S. drinking water standards pertaining to pharmaceutical compounds and EDCs in water, the issue is being researched. Federal U.S. drinking water standards for public water systems are established only after peer-reviewed science and data support an intensive technological evaluation. That evaluation focuses on occurrence of the substances in the environment; human exposure and risks of adverse health effects in the general population and sensitive subpopulations; analytical methods of detection; technical feasibility; and impacts of regulation on water systems, the economy and public health.

Even where public drinking water standards exist, they do not apply to privately owned household wells, so it is the responsibility of these private well owners to make sure their water is safe to drink.

As a private well owner, what can I do if I want to protect myself from these substances in the water?
The first step to minimizing the potential for contamination of your well water is proper location, construction and maintenance of the well.

Second, if you have a septic system, make sure that it is properly maintained. Proper maintenance includes having your septic system checked every one to two years and pumped every three to five years by a professional contractor.

Third, the Office of National Drug Policy recommends that many drugs not be poured down the drain or flushed down the toilet. (http://www.whitehousedrugpolicy.gov/drugfact/factsht/proper_disposal.html)

More specifically:
- Take unused, unneeded, or expired prescription drugs out of their original containers and throw them in the trash.
- Mixing prescription drugs with an undesirable substance, such as used coffee grounds or kitty litter, and putting them in impermeable, non-descript containers, such as empty cans or sealable bags, will further help reduce the risk that drugs are diverted.
- Flush prescription drugs down the toilet only if the label or accompanying patient information specifically instructs doing so.
- Take advantage of community pharmaceutical take-back programs that allow the public to bring unused drugs to a central location for proper disposal. Some communities have pharmaceutical take-back programs or community solid-waste programs that allow the public to bring unused drugs to a central location for proper disposal. Where these exist, they are a good way to dispose of unused pharmaceuticals.

The U.S. Environmental Protection Agency also has information on the subject at http://www.epa.gov/ppcp/.

Fourth, water treatment experts find that existing technologies show promise in removing many of these substances from water. Such technologies include activated carbon, reverse osmosis, nanofiltration and ozonation.