

wellcare® information for health care providers:

PPCPs and Drinking Water

(Pharmaceuticals and Personal Care Products)

Basic Information You Should Know

New water testing methods now give scientists the ability to detect the smallest amounts of chemicals in our water supplies. As a result, new studies are revealing the presence of drugs, personal care products, and other substances we use every day at home, work, and on farms. These substances are commonly referred to as “emerging pathogens” or “emerging contaminants.”

According to the U.S. Geological Survey’s (USGS) Toxic Substances Hydrology Program, a study of 139 streams throughout the country detected 82 chemicals in 80% of the waterways tested between 1999-2000. The most common chemicals were steroids (anti-inflammatory drugs), antibiotics, nonprescription drugs, caffeine, and insect repellent.

Active ingredients and preservatives of cosmetics, toiletries, and fragrances have been found in water. Nitro musk compounds that are used as fragrances in personal care products may have adverse environmental effects. These potential water quality contaminants are termed, PPCPs (Pharmaceuticals and Personal Care Products). According to the Environmental Protection Agency (EPA), PPCPs are referred as “any products used by individuals for personal health or cosmetic reasons or used by agribusiness to enhance growth or health of livestock”.

Potential water quality contaminants are flushed into ground water from a variety of sources. The most common are wastewater from sewage treatment plants, run-off from agricultural land uses, particularly from industrial scale livestock facilities, and discharge from individual septic systems. Conventional sewage treatment varies greatly in its ability to eliminate drug or personal care product residues.

PPCPs include:

- Human and veterinary drugs
- Dietary supplements
- Consumer products (fragrances, perfumes, sunscreens, cleaning products, etc)

People unknowingly release PPCPs into water by:

- Excreting unmetabolized medication into wastewater collection systems
- Flushing unused/expired pharmaceuticals down toilets and sinks
- Washing cosmetics, perfumes, and sunscreens into water when bathing

Other ways PPCPs enter water sources:

- Excretion of veterinary drugs (hormones and antibiotics) by farm animals into fields that run off into surface water
- Discharge from manufacturing processes
- Improper commercial disposal methods

Pharmaceuticals are usually found at lower concentrations in the water, leading some researchers to believe there is no major threat to humans. Other researchers are concerned that pharmaceuticals and certain chemicals can act as endocrine disrupters, interfering with hormone production. The release of antibiotics into water systems may lead to the development of drug-resistant diseases because disease-causing bacteria can become immune to treatment.

Aquatic life is at greatest risk from PPCPs in water. Studies indicate that anti-depressants altered sperm levels and spawning patterns in aquatic animals. Other studies have suggested that fish exposed to estrogen had deformed reproductive systems. Male trout were found to have the female egg protein vitellogenin.

Overall concerns about PPCPs:

- Humans and domestic animals dispense large quantities of PPCPs into the environment
- Sewage treatment plants do not have PPCP removal equipment
- Health risks are not well-known so many researches advise caution
- The number of PPCPs are increasing (as of 2007, over 100 individual PPCPs have been found in samples of drinking water)

PPCPs in drinking water are being recognized as an emerging issue. Ongoing research is being done to study the impact of exposure to low levels of PPCPs over time and the impact of exposure to mixtures of chemicals. Researchers question whether impacts are acute or chronic and whether certain populations like the elderly or children are more sensitive to the chemicals. Meanwhile, there are recommendations regarding the disposal of pharmaceuticals and personal care products.

The Resource Conservation and Recovery Act (RCRA) controls the management and disposal of solid and hazardous wastes produced by industries and other sources. However, RCRA does not regulate the disposal of household waste, including pharmaceutical waste.

Proper Disposal of Pharmaceuticals

- DO **NOT** flush medications down a toilet or drain (especially if a septic system is used)
- Do **NOT** burn PPCPs in a burn barrel. This can cause uncontrolled burning, which releases dioxins and other air pollutants.
- Inquire about drug take-back programs in your community. If there are none, contact state and local waste management authorities.
- When there are no other disposal options, alter the medications to make them undesirable or unusable.
- Medications that are going to be landfilled should be made unusable and placed in their original container, and then ultimately placed in some obscure container (margarine tub, non-transparent bag, etc). After placing it in a trash bag, the EPA suggests taking the trash bag out as close to garbage pick-up time as possible. Be sure to remove all identifying information from the original container. You can make the medication unusable by:
 - o Adding kitty litter to liquid medications
 - o Adding coffee grounds
 - o Adding glue (such as ordinary household glue) to pills
 - o Adding a small amount of disinfectant to any medication

To make the medications unpalatable, you can add water to pills or add spices like mustard or turmeric to liquid medications. Pharmaceuticals for pets should be handled the same as for humans.

Reducing the Risk of Personal Care Products in Water

- Products should be used sparingly, but completely
- Label recommendations should be followed
- Use products that contain biodegradable ingredients like vinegar, lemon juice, or baking soda.

Although EPA has set standards for contaminants in municipal water, they have not established standards for PPCPs. Scientists are currently researching PPCPs and their possible health effects. In order to stay protected, educate yourself and become aware of personal behaviors and consumer choices that affect you and your environment.

Private well owners are encouraged to test annually for drinking water contaminants. If PPCPs are detected, activated carbon filters can be used to reduce, but not completely eliminate them. Advanced treatments like reverse osmosis, nano filtration, biologically active filters, and ozone with advanced oxidation may also reduce the presence of PPCPs in drinking water.

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wellcare® is a program of the **Water Systems Council (WSC)**. WSC is the only national organization solely focused on protecting the health and water supply of the 43 million people nationwide who depend on wells for their water supply.



This publication is one in a series of wellcare® information sheets that can be downloaded for FREE from the WSC website at www.watersystemscouncil.org. Healthcare providers, well owners and others with questions about wells or ground water can contact the wellcare® hotline at 1-888-395-1033 or visit www.wellcarehotline.org. You may also want to join the wellcare® Well Owners Network. To join call 1-888-395-1033 or visit www.watersystemscouncil.org. MEMBERSHIP IS FREE!

Association of Clinicians for the Underserved

The Association of Clinicians for the Underserved (ACU) participated in the writing and research for this information sheet. The ACU is a nonprofit, transdisciplinary organization of clinicians, advocates and health care organizations united in a common mission to improve the health of America's underserved populations and to enhance the development and support of the health care clinicians serving these populations. Please visit the ACU at www.clinicians.org.



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