

Pharmaceuticals and Personal Care Products (PPCPs)

An Emerging Issue

Overview

Most of us take some kind of medication, whether it's a prescription drug or an over-the-counter product. Most of us probably have an out of date bottle of something in our medicine cabinets and wondered what to do with it. *Before you flush that medication or pour it down the drain*, learn more about an emerging issue of concern - pharmaceuticals and personal care products (PPCPs) in water supplies. PPCPs are a diverse group of chemicals that include:

- Human and veterinary drugs.
- Dietary supplements.
- Other consumer products, like fragrances, cosmetics and sunscreens, laundry and cleaning products.
- All the inert, or inactive, ingredients that are part of these products, which can often be just as or more harmful than a product's active ingredients.

The U.S. Geological Survey conducted a breakthrough study in 1999 of surface and groundwater samples from around the U.S. to check for the presence of materials such as pharmaceuticals, antibiotics, sterols, hormones, and other compounds. At least one chemical was detected at low levels in 80% of streams and 93% of groundwater sampled. Low levels of steroids, nonprescription drugs, and insect repellents were the chemical groups most frequently detected. Seven streams in Nebraska and aquifers in eastern Nebraska were included in the 1999 study.

Did You Know - How PPCPs Enter the Environment

PPCPs enter the environment and become contaminants in several ways:

- *Excretion by humans and domestic animals* - All the components of each pharmaceutical and over-the-counter medication aren't fully metabolized by humans and animals, and the unmetabolized portions of these compounds are excreted from the body as waste.
- *Disposal of unneeded or expired PPCPs by flushing them down a toilet or drain* - Some experts recommend flushing as a safe method of PPCP disposal. Flushing does prevent accidental ingestion, but can cause eventual pollution of ground and surface water.
- *Bathing and swimming* - Compounds from products such as cosmetics, lotions and sunscreen enter surface water bodies through direct contact.
- *Discharge from municipal sewage systems or private septic systems.* Municipal wastewater treatment plants generally don't treat for the compounds found in PPCPs, so they are present in treated wastewater and discharged into surface water bodies. Septic system owners need to be especially careful about not flushing PPCPs down the toilet or drain - some PPCPs can disrupt the processes in a septic system, posing a risk of groundwater contamination from PPCP compounds and fecal matter.

PPCPs also enter the environment through leaching from landfills; runoff from confined animal feeding operations; discharge of raw sewage from

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For more information contact your local health department or The Groundwater Foundation.



The Groundwater Foundation
P.O. Box 22558
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www.groundwater.org

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storm overflow events, cruise ships, and some rural homes directly into surface water; and discharge to groundwater recharge areas.

Did You Know?

- No drinking water standard for PPCP compounds currently exists and most drinking water treatment plants can't and don't treat for these compounds.
- The technology and funding needed to remove PPCPs from water and wastewater are lagging behind science's ability to detect the chemicals. Current methods can detect these compounds at the part-per-trillion level.
- Scientists have found fewer male fish than anticipated in streams in recent years, and male fish with female reproductive characteristics. Many scientists attribute these findings to endocrine disrupting chemicals such as detergent metabolites (broken down components of the original compound) found in treated wastewater, which is discharged to surface water bodies.
- There are no Nebraska or federal laws regarding flushing or throwing away unneeded or expired pharmaceuticals by consumers. Federal law does prohibit anyone except a law enforcement officer from accepting controlled substances from an end user.

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Recommended disposal methods and options, and state and federal legislation for these materials continue to evolve. The research into PPCPs in water supplies is in its early stages. Research is ongoing in Nebraska and the U.S. on human and animal products to address questions related to the health impacts of these chemicals in drinking water, such as:

- What is the impact of exposure to low levels of PPCPs over time?
- What is the impact of exposure to mixtures of chemicals?
- Are the impacts acute (short-term) or chronic (long-term)?
- Are certain populations, such as the elderly, very young, or immuno-compromised, more vulnerable to the impacts of these compounds?

What You Can Do – Pharmaceuticals

- NEVER flush unneeded or expired medications down a toilet or drain, especially if you use a septic system.
- Find out if any pharmacies in your community will take back unneeded or expired medications, or if a take-back program exists in your community.
- If no other disposal options exist, alter the medications in some way and place them in the trash. Opinions on altering medications vary – some believe the medications should be simply made unpalatable or undesirable to prevent accidental ingestion, while others believe they should be made totally unusable.
- If the medications will be landfilled, they should be left in their original containers to reduce seepage, making sure all identifying information has been removed. Add something to the medication to make it unusable (kitty litter to liquid medications, glue to pills, or a small amount of disinfectant to any medication) or unpalatable (a small amount of water to pills or salt, flour or a powdered spice like mustard or turmeric to liquid medications). Package in an obscure container such as an empty margarine tub or non-transparent bag and place it in the trash.

What You Can Do – Personal Care Products

- Use products sparingly, completely, and according to label recommendations.
- Unneeded products are best disposed of by landfilling. Leave products in their original containers.
- When purchasing new products, avoid unnecessary ingredients, such as scents or those labeled antimicrobial.
- Consider using products with ingredients that are more likely to biodegrade harmlessly in the environment, such as those with ingredients like vinegar, lemon juice, or baking soda.

For More Information

- USGS's *Pharmaceuticals, Hormones and Other Organic Wastewater Contaminants in Ground Water Resources*: toxics.usgs.gov/pubs/contaminant_studies_article.pdf
- USGS's *Pharmaceuticals, Hormones, and Other Organic Wastewater Contaminants in U.S. Streams*: toxics.usgs.gov/pubs/FS-027-02/index.html
- USGS's *Is Septic Waste Affecting Drinking Water from Shallow Domestic Wells Along the Platte River in Eastern Nebraska?*: <http://pubs.usgs.gov/fs/fs07203>
- US Environmental Protection Agency: www.epa.gov/nerlesd1/chemistry/pharma/index.htm
- Nebraska Health and Human Services System: www.hhs.state.ne.us/cancerdrugs