

Our Water

Keeping it Clean

North Dakota Department of Health  Environmental Health Section

Pharmaceuticals and Water Quality: An Emerging Issue

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Pharmaceuticals and water quality, a relatively new topic of discussion. Armed with advanced technology, scientists are conducting studies into the amounts of prescription and nonprescription drugs found in the nation's waters. How the pharmaceuticals get into the water is not a mystery; they enter via human waste and direct disposal.

In 2011, the U.S. Environmental Protection Agency (EPA) conducted the largest study of water coming from wastewater treatment plants.

It looked at samples from 50 large wastewater treatment plants nationwide and tested for 56 drugs including oxycodone, high-blood pressure medications, and over-the-counter drugs like Tylenol and ibuprofen. More than half the samples tested positive for at least 25 of the drugs monitored. High

blood pressure medications appeared in the highest concentrations and most frequently. "We were surprised to find that many drugs occurring across all the wastewater plants," said Mitchell Kostich, the EPA research biologist who led the study. "We were also surprised to see so many drugs of a particular class—the high blood pressure medications—appear at those levels across the board."

Research has shown that small amounts of drugs are excreted in the urine and fecal material of humans. A larger concern is the disposal of unused or unwanted pharmaceuticals into our sewage systems. It is an emerging and complex environmental issue in North Dakota. These products include a wide variety of items such as:

- Over-the-counter and prescription medications
- Controlled substances
- Pet medications (often similar or identical to those prescribed to people)
- Agricultural pharmaceuticals

Waste materials can be in the form of solid pills and capsules, creams, liquids or aerosols. Improper disposal of pharmaceuticals by dumping, pouring or flushing can cause them to enter surface waters where they can trigger adverse environmental impacts, including

endocrine disruption in aquatic life.

Health care facilities are required to manage their pharmaceuticals properly. Many facilities use a reverse distributor to manage their unused and outdated pharmaceuticals. Pharmaceuticals that cannot be managed through a reverse distributor program, must be characterized as either hazardous or non-hazardous waste and properly managed. These include pharmaceuticals that are:

- Outdated (not returnable for credit)
- Used in compounding or IV preparation
- Spilled
- No longer usable for their intended purpose

Any items used in pharmaceutical spill cleanup (vermiculite, paper towels, etc.) would also be considered hazardous or non-hazardous waste.

If not disposed of properly, pharmaceuticals can pose a threat to human health by creating the risk of unintentional overdose or illegal abuse. Aquatic life may also be harmed as U.S. Geological Survey research shows small amounts of pharmaceuticals cause male fish to develop female characteristics, for instance.

If you would like more information, the North Dakota Department of Health - Division of Waste Management has developed guidelines for properly managing and disposing of unused or unwanted pharmaceuticals. Please visit <https://deq.nd.gov/WM/MedicationPharmaceuticalWaste/>.

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