



Environmental Bulletin

National Aeronautics and Space Administration



June 2019

Pharmaceuticals in Our Waterways

Taking medication is a necessary part of life for a large portion of Americans. According to a survey conducted by the Centers for Disease Control and Prevention (CDC), 45.8% of Americans used at least one prescription medication within 30 days of the survey. Furthermore, approximately \$338 is spent on over the counter medications alone per US household each year. The widespread use of pharmaceuticals has increased concerns regarding concentrations of these substances throughout the water cycle from wastewater to surface and ground waters to drinking water.

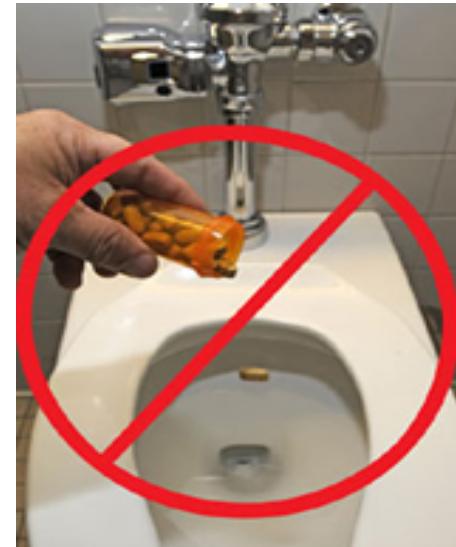
In a multi-stage study conducted by the Environmental Protection Agency (EPA) from 2005-2008, 33 different pharmaceutical and personal care products were identified in at least one effluent sample and 16 were detected in 25% of the effluent samples analyzed. These trace amounts of pharmaceuticals have the potential to negatively affect our local waterways, and the aquatic life that inhabit them.

How Do Pharmaceuticals End up in our Waterways?

Many pharmaceuticals enter these waters via our wastewater system. Traditional sewage treatment plants focus on killing bacteria, extracting solid matter and reducing nutrients; however, antibiotics and other pharmaceuticals found in patients' urine and those improperly disposed of into the sanitary sewer (i.e., via the toilet and sink) have largely been ignored with regards to water treatment.

Most medications are not completely absorbed by the human body and are excreted in human waste. As aforementioned, improper disposal of pharmaceuticals (i.e., flushing, pouring down the drain or by discarding in household trash) contributes to the issue; when wastewater treatment plants fail to remove these pharmaceuticals (as many are not equipped to do so) trace amounts of the substances flow to our waterways and potentially add to the phenomena of antimicrobial resistance (AMR). AMR is the development of disease-causing microbes with the ability to survive exposure to an antimicrobial agent (drug) that was previously an effective means of treatment. The aquatic environment in particular plays several roles in the emergence and spread of AMR:

- Acts as a collecting vessel of resistant bacteria from animals and humans treated with antibiotics
- Offers direct and indirect exposure routes to humans and animals





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- Facilitates the spread of antimicrobial resistant bacteria to other places (through surface and groundwater)

What Can You Do To Help?

- NEVER flush unwanted or expired medications or pour them down the drain.
- Dispose of any unwanted medications properly; at designated locations such as pharmacies or during the Drug Enforcement Administration's National Drug Take Back Days.
- Check the following websites for drop-off locations:
 - DEA Diversion Control Division: <https://apps2.deadiversion.usdoj.gov/pubdispsearch/spring/main?execution=e2s1>
 - Dispose my Meds: <http://disposemy meds.org/>
- If you are unable to find a drop-off location, dispose of medication in the trash by transferring to a disposable container with a lid. In order to discourage others from using the medication, mix it with an undesirable substance like coffee grounds or kitty litter.

Keep yourself, your family, our waterways, and the environment safe by limiting your use of pharmaceuticals where possible and by properly disposing of your expired and/or unneeded medications.

Visit the websites below for more information on 'Pharmaceuticals in Our Waterways'.

MIX
Mix medicines (do not crush tablets or capsules) with an unpalatable substance such as dirt, kitty litter, or used coffee grounds;

PLACE
Place the mixture in a container such as a sealed plastic bag;

THROW
Throw the container in your household trash;

SCRATCH OUT
Scratch out all personal information on the prescription label of your empty pill bottle or empty medicine packaging to make it unreadable, then dispose of the container.

<https://www.nrdc.org/sites/default/files/dosed4pgr.pdf>

https://library.ul.com/wp-content/uploads/sites/40/2015/02/UL_WP_Final_Pharmaceuticals-and-Personal-Care-Products-in-Drinking-Water_v2_HR1.pdf

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