

OVERVIEW OF PHARMACEUTICAL DISPOSAL METHODS



SPOTlight: Proper pharmaceutical disposal can increase medication availability and decrease potential risk posed by the presence of pharmaceutical compounds in water bodies.

What are the preferred methods for pharmaceutical disposal?

- The preferred method of disposal for most medicines is to use a drug takeback option, such as dropping off or mailing in the medication to a designated location, or to follow the disposal instructions provided. If a drop off is not possible, then the medicine can either be 1) flushed if it is on the FDA flush list or 2) mixed with dirt and disposed of in a sealed container in your household trash [1].
- Medications collected through takeback are ultimately incinerated either onsite or by qualified vendors [2].

Why follow disposal guidelines?

- Proper disposal prevents unintentional poisoning, intentional misuse, health problems from expired products and infiltration into water bodies [3].
- The FDA flush list contains medication that could be harmful if even one dose is taken in a different method as prescribed or by someone other than the prescribed user such as children or pets, so flushing is recommended to reduce the risk of overdose or unintentional use [4].

Health and environmental impacts of improper disposal

- Pharmaceuticals are considered contaminants of emerging concerns (CECs) by the EPA because of their increasing low level detection in surface water, although the health risks of consuming small levels of pharmaceuticals over many years are currently unclear [5, 6]. They can enter water bodies either by excretion after ingestion or flushing.
- Health and environmental concerns from flushing medications on the FDA flush list have not been found to be significant compared to the abuse risk they pose [7].
- A study conducted using data from 2000 – 2009 found a significant association between increased adult drug prescriptions and risk of pediatric exposure, especially among children under six [8].
- In 2004 – 2005, unsupervised ingestion of medication leading to overdoses by children younger than 19 accounted for over 80% of medication emergency room visits for medication overdoses [9].
- A study in five Kentucky counties found controlled medications take back events did not have a great impact on reducing controlled medication availability with only around 0.3% of the estimated dispensed medications collected [10].

What are some examples of the impact of pharmaceutical disposal programs?

- The DEA hosts a biannual National Take Back Day, which has collected over 6,000 tons since 2010 [11].
- 38 states have enacted laws for donation and reuse of medication, but many do not have operational programs due to lack of awareness or central responsible party. Illinois does not have an enacted law [12].
- Tulsa County, Oklahoma filled 883 prescriptions in January 2020 with an average wholesale price of \$126,000 through the nursing home take back program [13].
- SafeNetRx provides donated medication to Iowans who are uninsured, underinsured or below 200% of the federal poverty level. The program served over 70,000 people between 2007 and 2016 [14].
- Walgreen operates over 1,500 disposal kiosks across the United States, which has collected over 885 tons of medication since February 2016 [15].

References and additional resources

- [1] Food and Drug Administration. (2019). Disposal of Unused Medicines: What You Should Know. <https://www.fda.gov/drugs/safe-disposal-medicines/disposal-unused-medicines-what-you-should-know>
- [2] Rudzinski, Suzanne. "Recommendation on the Disposal of Household Pharmaceuticals Collected by Take-Back Events, Mail-Back, and Other Collection Programs." RCRA Division Directors EPA Regions I-X, 26 Sept 2012. <https://rcrapublic.epa.gov/files/14833.pdf>
- [3] Environmental Protection Agency. (2011). How to Dispose of Medicines Properly. <https://www.epa.gov/sites/production/files/2015-06/documents/how-to-dispose-medicines.pdf>
- [4] Food and Drug Administration. (2018). Drug Disposal: Flush Potentially Dangerous Medicine. <https://www.fda.gov/drugs/disposal-unused-medicines-what-you-should-know/drug-disposal-flush-potentially-dangerous-medicine>
- [5] Environmental Protection Agency. Contaminants of Emerging Concern including Pharmaceuticals and Personal Care Products. <https://www.epa.gov/wqc/contaminants-emerging-concern-including-pharmaceuticals-and-personal-care-products>
- [6] Boerner, L. (2014, May 14). The Complicated Question of Drugs in the Water. <https://www.pbs.org/wgbh/nova/article/pharmaceuticals-in-the-water/>
- [7] Khan, U., Bloom, R. A., Nicell, J. A., Laurenson, J. P. (2017). Risks associated with the environmental release of pharmaceuticals on the U.S. Food and Drug Administration “flush list”, *Science of The Total Environment*, 609, 1023-1040. <https://doi.org/10.1016/j.scitotenv.2017.05.269>
- [8] Burghardt, L. C., Ayers, J. W., Brownstein, J. S., Bronstein, A. C., Ewald, M. B., & Bourgeois, F. T. (2013). Adult prescription drug use and pediatric medication exposures and poisonings. *Pediatrics*, 132(1), 18–27. <https://doi.org/10.1542/peds.2012-2978>
- [9] Schillie, S. F., Shehab, N., Thomas, K. E., Budnitz, D. S. (2009). Medication Overdoses Leading to Emergency Department Visits Among Children, *American Journal of Preventive Medicine*, 37(3) 181-187. <https://doi.org/10.1016/j.amepre.2009.05.018>
- [10] Egan, K. L., Gregory, E., Sparks M., Wolfson, M. (2017). From dispensed to disposed: evaluating the effectiveness of disposal programs through a comparison with prescription drug monitoring program data, *The American Journal of Drug and Alcohol Abuse*, 43(1), 69-77, DOI: 10.1080/00952990.2016.1240801
- [11] Drug Enforcement Agency. Take Back Day. <https://takebackday.dea.gov/>
- [12] Cauchi, R., & Berg, K. (2018, October 1). State Prescription Drug Return, Reuse and Recycling Laws. <https://www.ncsl.org/research/health/state-prescription-drug-return-reuse-and-recycling.aspx>
- [13] Tulsa County Medical Society. Drug Recycling – Utilization of Unused Prescription Drugs Act. <http://tcmsok.org/drug-recycling/>
- [14] SafeNetRX . Iowa Drug Donation Repository: 2016 Performance Update. <http://safenetrx.org/wp-content/uploads/2017/04/2016-Performance-Update-Drug-Donation-Repository-brochure.pdf>
- [15] Walgreens. Safe medication disposal. <https://www.walgreens.com/topic/pharmacy/safe-medication-disposal.jsp>

The Science Policy Outreach Task Force (SPOT) compiled this document. SPOT is a nonpartisan organization of Northwestern University researchers focused on advocating for science, evidence-based reasoning, and scientifically-sound policy to the voting-aged public and policymakers. This document does not represent an official statement by Northwestern University. It does not contain an exhaustive summary of all scientific issues, but rather is intended to provide background information relevant to the topic.

March 2020.