



# Drug Disposal Options for Rural Communities

## EXTENSION

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## Introduction

The utilization of both prescription and over-the-counter medication is continually increasing in the U.S., raising concerns about the fate and effects of these medications on the environment. Medicines prescribed by doctors are not always completely taken by patients as intended. Patients may stop taking medication sooner than expected because of:

1. side effects from taking medication,
2. changes in therapy or results,
3. drug intended to only be taken “as needed” and
4. medication expiring before the apportioned quantity is taken.

Research suggests more than 50% of Americans do not take medication as prescribed by doctors and about one-third do not complete the course of therapy or skip doses (Shealy et al., 2014). Further, a patient's death can result in additional unused prescription medications. If not properly handled and disposed of, expired or unused drugs may have a serious impact on human health and safety as well as on the environment. This recognition has boosted the need for the implementation of safe medication take-back programs throughout the U.S. Additionally, it has triggered a new market sector of products for the safe disposal of medication at home. Despite the fact that these products are not approved by any Federal agencies, they are still made available to hospitals, pharmacies, physician's offices, law enforcement and other facilities to ensure proper disposal of expired or unused medication at those locations. They also are available to home users via Amazon, manufacturers websites and other online shopping outlets. According to online product reviews and some research articles, these products seem to be effective at ensuring the proper disposal of unused or expired medications. Regardless of whether you live in a rural or urban area, this fact sheet will provide information to help keep you, your loved ones and the environment safe. Additionally, it recommends disposal methods approved by Federal agencies.

## Public Health Concerns Associated with Unused Prescription Drugs

- Medication ending up in the wrong hands.
- Accidental ingestion by both pets and humans. Children under the age of five are most vulnerable to ingesting unattended medication.
- Some medicines have the tendency to degrade into toxic form if left standing for too long.

## Do's and Don'ts of Medication Handling

### Do's

- Keep medicines safe and away from abuse by locking them up in a cabinet, drawer or medicine safe. Ask your health care provider if any of the medications prescribed may have the potential for abuse.
- Store medicine in its original container. Leave the label on the container because it has vital information about the medication.
- Keep medicine in a cool, dry location out of the reach of children and pets.
- Talk to your doctor or community pharmacist about proper disposal options for unused or expired medications in your location.
- Return unused or expired medications to drug take-back or mail-back programs and events. This fact sheet includes information on these programs and events. For areas with no take-back program in close proximity, suggestions are included to assist with the safe disposal of expired or unused medication in your household trash at home.

### Don'ts

- Don't leave medication in areas that are easily accessible to children or pets.
- Don't share your prescription medication with friends or family, even if symptoms are the same. Doctors or health care professionals prescribe certain types of drugs for individuals based on their personal health profile and other factors. Therefore, medication that works for one person might not work for another. Sharing prescribed medication with family or friends might cause harm to your loved ones and, in some cases, death.
- Don't take expired medication.
- Don't flush expired or unused medication down the toilet or drains. The waste water treatment plant is not designed to remove chemicals found in medication. As a result, traces of medications might find their way to local creeks and lakes.

## Environmental Concerns

**Water Pollution** – In many rural communities where there is no prescription medication disposal option, people generally believe it is often easier to flush medication down the toilets, sinks or septic tanks. This is wrong. Many believe that wastewater treatment plants have all the technologies in place to clean water and send it back to the environment in a safer form to use.

While some new technologies in wastewater plants can detect low concentrations of chemical wastes, not all pharmaceuticals and byproducts are detected and removed. *Medications flushed down the toilet, sink or thrown directly into household trash end up in waterways including creeks, lakes and groundwater simply because the waste water treatment plant is not designed to remove chemicals found in medication.* In areas or homes where a septic tank is utilized, medication flushed down the toilet can leach into the ground, thus finding its way into groundwater. Most rural communities rely on groundwater for drinking purposes. Groundwater provides approximately 40% of the nation's public water supply and more than 40 million people rely on groundwater for drinking purposes via domestic wells. Fish and other aquatic organisms rely on surface water for survival (Barnes et al., 2008). Therefore, it is very important to ensure the safe disposal of leftover or expired medication so they don't end up affecting water resources.

**Air Pollution** – In some rural communities with little or no option for safe medication disposal, people sometimes turn to burning unused medicine (along with other trash) as a way to easily dispose of it. Do not do this. Burning trash or waste of any kind in Oklahoma is illegal. Additionally, open burning is not a good practice for the environment. Below are some of the impacts of burning trash:

- Burning waste can lead to the emission of toxic substances like dioxins, lead, mercury, carbon monoxide and other volatile compounds into the atmosphere. Dioxins have the capability to settle on crops and in waterways, where they eventually end up in food and affect human health.
- Ash from burning trash affects our water resources and poses a threat to human health. If rain falls after trash has been burned, the ash will be washed as runoff into surface water and some will seep into the soil to contaminate the groundwater system.
- Open burning of waste – including medication – causes more pollution than burning the same quantity of waste in an industrial incinerator (Harris, 2011). According to research, open burning is far more harmful to human health than previously thought. It can increase the risk of many illnesses including headaches, respiratory problems and heart disease (Harris, 2011).
- Often, people burning medications don't bother to remove them from their packaging – and instead will burn the plastic packaging alongside the pills. This emits toxic chemicals, like dioxins, into the atmosphere.

## Medication Disposal Options

Instead of burning, unsafely throwing medication in the household trash or flushing or pouring them down the toilet or drain, there are several options to ensure the safe disposal of expired or unused medications. Below are some of the available options and instructions to consider.

### Prescription Drug Take-back Programs

This is the safest, most preferred and environmentally friendly way to dispose of unused or expired medication. A drug take-back program provides the opportunity for residents to legally and safely dispose of all unused and expired medication at a particular location with an authorized collector. Medicines collected at take-back locations are later disposed of in an environmentally-friendly manner by a waste company. The Oklahoma Bureau of Narcotics has developed a partnership with Covanta Energy to safely destroy drugs collected from take-back programs. Medications taken to the Covanta Energy facility are combusted in a safe environment at temperatures high enough to ensure complete destruction. Local law enforcement officials coordinate drug take-back programs in most states across the U.S.

Many states and local governments have developed medication take-back programs, with the aim of reducing the amount of unused or unwanted medication entering into the environment as well as preventing them from getting into the wrong hands. The Oklahoma Bureau of Narcotics and Dangerous Drug Control coordinates a program called “safe trips for scripts” where drug take-back boxes are provided to law enforcement agencies across the state. Additionally, some local pharmacies, hospitals, clinics and other health centers are registered and authorized by the U.S Drug Enforcement Administration (DEA) to collect unused or expired medication. These authorized collectors have take-back boxes designed to safely and securely gather unused or expired medications for proper disposal. For more information about drug take-back programs, please contact any of the following:

- Local law enforcement agency/office
- Local pharmacies, city and county government household trash and recycling service
- Oklahoma Bureau of Narcotics and Dangerous Drug Control – They have made it easier for every Oklahoman to find a take-back location near them via the take-back location finder. Simply go to their website at [enet.obn.ok.gov/TakeBack/default.aspx](http://enet.obn.ok.gov/TakeBack/default.aspx) to find a take-back location near you. Enter your zip code as well as the distance you expect to travel to drop off medication, then click search.
- Oklahoma State Department of Health
- Product Stewardship Institute (Drug take back Oklahoma): <http://www.productstewardship.us/page/1073>
- Product Stewardship Institute (safe disposal of pharmaceuticals and medical sharps in Oklahoma) [productstewardship.us/page/safe-disposal-pharms-medical-sharps-oklahoma](http://productstewardship.us/page/safe-disposal-pharms-medical-sharps-oklahoma). A map with medication drop-off locations in Oklahoma is provided at [deq.maps.arcgis.com/apps/webappviewer/index.html?id=14c3f70ed8214ab9ac86633b009ea9ab](http://deq.maps.arcgis.com/apps/webappviewer/index.html?id=14c3f70ed8214ab9ac86633b009ea9ab)
- The National Drug Enforcement Administration (DEA) – They provide a nationwide drug take-back location finder. Simply go to [apps2.deadiversion.usdoj.gov/pubdispsearch/spring/main?execution=e1s1](http://apps2.deadiversion.usdoj.gov/pubdispsearch/spring/main?execution=e1s1) to find nearby locations collecting controlled substances including retail pharmacies, hospitals and clinics with on-site pharmacies etc. Bear in mind that the DEA location search tool does not include (1) police departments and other law enforcement locations or (2) pharmacies and other locations only collecting non-controlled substances.

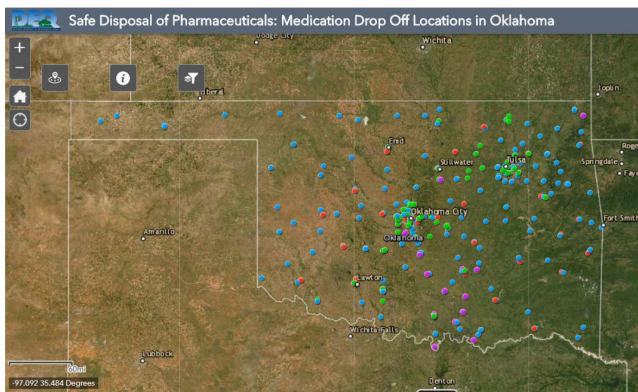
### Types of medicine allowed at take-back locations

- Prescription Medications
- Over-the-counter drugs
- Pet medicines
- Dietary supplements

### Drug Take-back Event

Every year, the U.S. Drug Enforcement Administration (DEA) organizes two nationwide prescription drug take-back days/events with temporary medication drop-off sites operating throughout the day. The dates of these events changes each year. The goal is to help combat accidental exposure and development of addiction. National prescription drug take-back day is a time when a lot of community awareness is created about drug abuse/misuse and safe disposal of expired or unused medication. Additionally, there are communities that organize drug take-back events on a regular basis as well as the national event. Also, some cities or counties regularly organize household or hazardous waste collection events where prescription and over-the-counter drugs are accepted from residents at a central location for safe disposal. Check with your city office to learn about upcoming events.





(Map Source: Product Stewardship Institute/Oklahoma Department of Environmental Quality)

### Medicine Mail-Back Option/Program

Many rural communities do not have take-back options in close proximity and many lack access to healthcare resources including hospitals and pharmacies, which are key facilitators of drug disposal programs. Medication mail-back programs allow consumers to safely dispose of unused or expired medication by mailing them to a disposal program. Some authorized collectors including local pharmacies, clinics and other organizations may require a small fee for postage paid envelopes that consumers can use to mail medication back for safe disposal. For example, some pharmacies sell postage-paid envelopes to assist consumers in mailing any expired or unused prescription drugs, including opioids and over-the-counter medications to a disposal facility. Medication mail-back systems accept both controlled and non-controlled substances. Check with your city, local pharmacy, clinics or health centers for availability.



### Disposal at Home

Disposing unused or expired medication into household trash should only be used as a last resort. The scientific literature shows that pharmaceutical ingredients have been observed in landfill leachate (Masoner, 2020). Similar to opioids flushed down toilets or poured down the drain, medications in landfill leachates tend to end up in local streams and other water sources. When disposing of medications in household trash, take the series of steps listed below to ensure other people or pets do not have access to the expired or unused medication.

- **Using Coffee Grounds, Dirt or Cat Litter** – This is one of the easiest and cheapest ways to safely disposed of leftover, expired and unused medication at home via household trash. Here are some simple steps to follow:
  - a. Remove expired/unused/leftover drugs from their original containers.
  - b. Mix medicine with undesirable substance such as cat litter, coffee grounds or dirt. Substance should be enough to cover medication.
  - c. Put the mixture in a sealable plastic bag such or place it in a container with lid, such as empty yogurt cup or margarine tub.
  - d. Seal the container or plastic bag containing the drug mixture tightly and safely dispose of it in your household trash.
  - e. Remove all personal information, including name, address, Rx number etc. from the empty medicine container.

- f. Check the recycling code/number underneath the empty medicine container. If it matches with what your city accepts in its recycling program, then simply place the empty container in your recycling bin.

Plastics have numbers ranging from 1 to 7. Check which numbers your city is accepting – you can call the local city government to be sure. Because some medication plastics have unusual shape, color and chemical composition, some recycling programs do not accept them.

### Medicine Disposal Products

This is another easy method of altering pharmaceuticals to ensure they can be safely deposited into the household trash. It is more expensive compared to other disposal methods listed above. However, this method of disposal has not been approved by any federal agency. As such, this fact sheet only suggests using these products as the very last resort – the options listed under Prescription Drug Take-Back Programs, Drug Take-Back Events and Medicine Mail-Back are strongly preferred. Examples of medicine disposal products follow. The medical disposal products sold to consumers are placed in a bottle or pouch, then typically placed with other household trash. The products listed do not represent endorsement by OSU Extension.

#### Deterra Drug Deactivation System

This option permanently destroys prescription and over-the-counter drugs, patches, liquids, creams and films. It is available at Deterra Company's website, medical supply retailers and on major online retailers. At the time of printing, prices range from \$18.75 to \$36.35. For more information about the product, visit the Deterra Drug Deactivation website at [deterasystem.com](http://deterasystem.com).

#### DisposeRx

Home users can utilize this to safely dispose of pills, tablets, capsules, liquids and powders into their household trash. This product is available at the DisposeRx website and major online retailers. At the time of printing, the price for 30 drug disposal packets is \$37.24. For more information about the product, visit the DisposeRx website at [disposerx.com](http://disposerx.com).

#### Drug Buster

This system is for disposing tablets, capsules, liquids, suppositories, creams, lozenges and narcotics. The Drug Buster system does not accept drugs like potassium supplements, antacids, gassing agents and hazardous medication. At the time of printing, the price ranges from \$9.95 to \$38.00. It is available at the company website, major online retailers and medical supply retailers. For more information, visit the Drug Buster website at [medline.com](http://medline.com).

#### Element MDS

Home users are instructed to simply tear off the tamper-evident strip to open the pouch, remove medicine from its original container and place them into the Element MDS packet, add water to the pouch, seal and shake pouch vigorously. Finally, place the sealed pouch into your household trash. At the time of printing, the price ranges from \$8.99 to \$279.99. For more information, visit the Element MDS website at [elementmds.com](http://elementmds.com)

#### PillCatcher

Home users are instructed to open the container, add drugs, add water, close the container and shake for 40 seconds. This system disposes all types of drugs and pharmaceuticals in various forms: pill, capsule, tablet, patches, liquid, etc. At the time of printing, the price ranges from \$4.95 to \$22.60. PillCatcher is

available on the company's website and major online retailers. For more information, visit the PillCatcher website at [mcssl.com/store/9950592](http://mcssl.com/store/9950592).

## Pill Terminator

Once activated with warm water, the Pill Terminator solution will turn into a gel like substance with an unpleasant taste and odor. Close the child-resistant cap, shake for five seconds and throw the container into the trash. It destroys pills, capsules, liquids and powders. The product is available on the company's website or major online retailers. For more information, visit the PillTerminator website at [pillterminator.com](http://pillterminator.com).

## RX Destroyer

Home users are instructed to simply add medicine to container and discard into trash when full, according to local, tribal, city, state or federal guidelines. Rx Destroyers dissolves non-hazardous medications including pills, capsules, tablets and liquids, and destroys all non-hazardous medications in the form of liquid and injectable syringes. At the time of printing, the price ranges from \$4.16 to \$195.00. The product is available on the company's website or major online retailers. For more information, visit the RX Destroyer website at [rxdestroyer.com](http://rxdestroyer.com).

## Summary

There are several options available to households for properly disposing of expired or unused prescription or over the counter medication including: (1) prescription drug take-back programs that provide opportunity for citizens to drop off medication at local sheriff's offices, pharmacies and health care centers; (2) drug-take back events, especially the DEA take-back day event that creates awareness on drug overdose, misuse and proper disposal, as well as providing opportunity for citizens to safely dispose of their unused and expired medication; and (3) mail-back programs. If none of these disposal options are in close proximity to where you live, there are other at home options to try; however you should be aware that such options have not been approved by any federal agency. These alternatives include: (1) Mixing with undesirable items like coffee grounds, cat litter, dirt, etc.; and (2) medicine disposal products such as Deterra, Disposal Rx, Drug Buster, Element MDS, Pill Catcher, Pill Terminator and Rx Destroyer. If you need more information on proper medication disposal, please visit the following:

- U.S. Food and Drug Administration (FDA) – their website provides information on safe disposal options for unused or expired medication. Visit their [website](#) to learn more.
- Dispose My Med – this is an online resource operated by the National Community Pharmacists Association Foundation and the National Community Association to help patients find disposal programs at an independent pharmacy in their neighborhood. Simply go to the medication disposal locator on their website at <http://disposemy meds.org/medicine-disposal-locator/>, type in your zip code and click search to participating pharmacies in your area, then click on a marker to see the name and address of the pharmacy. The Dispose My Med website also provides information on the following topics: drug treatment and prevention, environmental impact, and drug treatment/prevention. Click [here](#) to learn more about these opportunities.

## References

- Barnes, K. K., Kolpin, D. W., Furlong, E. T., Zaugg, S. D., Meyer, M. T., & Barber, L. B. (2008). A national reconnaissance of pharmaceuticals and other organic wastewater contaminants in the United States—I) Groundwater. *Science of the total environment*, 402(2-3), 192-200.
- Cactus Smart Sink® Controlled Substance Waste Management System <https://www.stryker.com/content/dam/stryker/surgical/products/cactus/resources/Cactus%20SmartSink%20FAQ.pdf>
- Community Environmental Health Strategies LLC (2019) Medication disposal products- an overview of products & performance questions (a report for San Francisco Department of the Environment)
- Deterra <https://deterrasystem.com/the-science/>
- DisposeRx <https://disposerx.com/page/5/product-and-program>
- Element MDS <https://elementm ds.com/>
- Environmental Protection Agency (EPA). (2011). How to dispose of medicines properly.
- Etter, E. (2019). Safe Medication Disposal in Underserved Communities. *Purdue Journal of Service-Learning and International Engagement*, 6(1), 8.
- GAO Report to congressional Committee. (2019). Prescription Opioids: Patient options for safe and effective Disposal of Unused opioids. Report GAO-19-650. <https://www.gao.gov/assets/710/701126.pdf>
- Glassmeyer, S. T., Hinchey, E. K., Boehme, S. E., Daughton, C. G., Ruhoy, I. S., Conerly, O., ... & Sykes, K. (2009). Disposal practices for unwanted residential medications in the United States. *Environment international*, 35(3), 566-572.
- Harris, M., and Daniels, M. (2011). Safe medicine disposal in Arkansas. University of Arkansas Extension Fact Sheet. <https://www.uaex.edu/publications/pdf/FSFCS21.pdf>
- Khan, U., Bloom, R. A., Nicell, J. A., & Laurenson, J. P. (2017). Risks associated with the environmental release of pharmaceuticals on the US Food and Drug Administration "flush list": Science of the total environment, 609, 1023-1040.
- Masoner, J. R., et al. (2020) Landfill leachate contributes per-/poly-fluoroalkyl substances (PFAS) and pharmaceuticals to municipal wastewater. *Environmental Science: Water Research & Technology*, 6, 1300-1311. <https://pubs.rsc.org/en/content/articlelanding/2020/ew/d0ew00045k#divAbstract>
- Medline <https://www.medline.com/jump/product/x/Z05-PF19622>
- Miller, J. (2019). Safe ways to get rid of expired, unused medicine. *The Oklahoman*. <https://oklahoman.com/article/5629249/safe-ways-to-get-rid-of-expired-unused-medicine>
- Oklahoma Department of Environmental Quality (ODEQ). (2020). Open burning and you factsheet [https://www.deq.ok.gov/wp-content/uploads/deqmainresources/OpenBurning\\_04-2020.pdf](https://www.deq.ok.gov/wp-content/uploads/deqmainresources/OpenBurning_04-2020.pdf)
- Oklahoma State Department of Health [https://www.ok.gov/health/Prevention\\_and\\_Preparedness/Injury\\_Prevention\\_Service/Drug\\_Overdose/Safe\\_Use\\_Storage\\_and\\_Disposal/index.html#:~:text=Medication%20Drop%20Box%20\(Take%20Back,enforcement%20agencies%20across%20the%20state](https://www.ok.gov/health/Prevention_and_Preparedness/Injury_Prevention_Service/Drug_Overdose/Safe_Use_Storage_and_Disposal/index.html#:~:text=Medication%20Drop%20Box%20(Take%20Back,enforcement%20agencies%20across%20the%20state)
- Pill Catcher <http://www.mcssl.com/store/9950592>
- Pill Terminator <https://www.pillterminator.com/>
- Product Stewardship Institute <https://www.productstewardship.us/page/1073>
- Rx Destroyer <https://www.rxdestroyer.com/>
- Shealy, K. M., O'Day, P., & Eagerton, D. H. (2014). The needs and opportunities for medication disposal programs. *Journal of Pharmacy Technology*, 30(5), 147-150.
- Song, Y., Manian, M., Fowler, W., Korey, A., & Kumar Banga, A. (2016). Activated carbon-based system for the disposal of psychoactive medications. *Pharmaceutics*, 8(4), 31.
- Seehusen, D. A., & Edwards, J. (2006). Patient practices and beliefs concerning disposal of medications. *The Journal of the American Board of Family Medicine*, 19(6), 542-547.

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