

Alternative Medication Disposal

During pharmacy school training, the proper disposal of medication has rarely been a topic for discussion, nor has this issue been explored in many curricula. Most medication package inserts contain no specific instructions on how to properly dispose of unused or expired medications, and when patients bring such questions to their healthcare providers, the answers that the patients

by Sherry Yang

receive are often vague and non-practical. Concerns about the potential harmful effects on the environment with flushing medicine have made medication disposal a popular issue in recent years. “How to properly dispose of unused or unwanted medicine?” is no longer a question asked only by patients, but a question that many healthcare providers are now trying to figure out, too. Before we start searching for the answer, we must first understand the problems, issues, and challenges at hand.

What is the problem?

In 2002, the US Geological Survey (USGS) published a study investigating the presence of pharmaceuticals, hormones, and other organic contaminants in US streams. The study revealed that chemicals—including hormones, steroids, and other human and veterinary drugs—were found to be present at low concentrations in 80% of the 139 streams sampled.¹ Although chemical contaminants were detected, the impact of trace amounts of these contaminants on aquatic and terrestrial wildlife and humans remain unclear. Since that time, the issue has become a growing concern in the nation.

What is wrong with flushing the medicine?

Flushing was adopted as a conventional method of disposal because it was easy to use. Almost everyone has access to a toilet or a drain, and all that is required is to flush solid medications down the toilet or pour liquid medications into a drain. Once the medication is flushed, it's gone. We do not need to worry that medications might get into the wrong hands or might end up in the mouths of children or family pets.

The problem with flushing or pouring the medicine down the drain is that these pharmaceuticals can then end up in the water system. Our waste water treatment plants are not specifically designed to remove pharmaceutical chemicals; hence, it is impractical to expect that the treatment plants are able to completely remove all chemicals before returning the water back to the water system. These chemical residuals that treatment plants cannot remove ultimately end up in streams and lakes, and some may even get into the drinking water.²

It is important to note that medication flushing is not the only contributor to the presence of pharmaceutical contaminants in the water. Sources such as residues from hospitals and pharmaceutical manufacturing, runoff from agribusiness, veterinary drug use, and human activities have all been identified by the Environmental Protection Agency (EPA) as significant contributors to the pharmaceuticals and personal care products (PPCPs) in the environment.³ (Disposing of unwanted medications to sewers and trash, along with bathing and excretion, are included in the category of

“human activities.”)

One may wonder just how much of the pharmaceutical contaminants in the water results directly from medication flushing. Unfortunately, there is not an answer to the question. There is currently no method that can be used to precisely quantify the amount of pharmaceuticals in water that comes from household medication flushing. Nevertheless, we must still recognize the potential environmental effects that flushing unwanted medications, along with other human activities, can have on the water system. In February 2007, the White House Office of National Drug Control Policy (ONDCP) put forth federal guidelines regarding medication disposal in which the flushing method was no longer considered as the standard disposal method. The guidelines recommended that flushing be used only if the medication label or the accompanying patient information instructs doing so.⁴

Why does medication disposal matter?

Environmental quality is a leading indicator of Healthy People 2010. One of the program's focus areas centers around ensuring water quality.⁵ By discouraging flushing and promoting alternative medication disposal methods, the amount of PPCP-related pollution generated by individuals can be reduced, in turn helping to maintain water quality and overall environmental health.

In 2007, a declaration was made at the 2nd International Conference on the Environment held in Athens, Greece.⁶ The Athens Declaration listed six reasons why medication disposal is an issue that we need to address:

- To curtail childhood overdoses
- To restrict household drug theft
- To limit accumulation of drugs by the elderly
- To protect our physical environment
- To restrain improper international drug donations
- To eliminate waste in the international health care systems of all countries

Besides the environmental reasons, the Athens Declaration pointed out another important aspect of medication disposal: medication safety. According to 2006 data from the Center for Disease Control and Prevention (CDC), an average of 1,900 people are seen in emergency departments every day due to poisoning incidents, with an estimated 95% of poisoning deaths resulting from drug poisoning.⁷ The Athens Declaration suggested that, by encouraging proper medication disposal, there is a high likelihood that we can reduce the number of accidental poisonings and improve overall medication safety.

What can we do?

Stop flushing unused medications! Although flushing is easy to do, the ONDCP, FDA, and EPA all now discourage consumers from using flushing as the universal way of medication disposal.^{3,4,8} Although flushing should be avoided as a disposal option, this does not mean that unused and unwanted medication should accumulate in the house. Alternative methods of medication disposal need to be explored.

What has been done nationally?

Medication take-back programs are one of the alternative disposal methods with which many states are experimenting. The purpose of a take-back program is to get unused medications out of patients' homes, collecting them for a centralized disposal. There are three established take-back models that are being adopted by pilot programs:

Mail-back – A prepaid envelope or label is provided to patients. Following instructions on the envelope, patients use the envelope or label to mail the unused medicine to the collection center.

Collection bin – A medication collection bin is placed in the pharmacy or at a collection site, and patients can come at any time to place their unwanted medications in the bin.

Drop-off – Patients bring their medications to the designated sites for drop-off on a specified collection date.

Most programs contract with waste disposal companies and use incineration as the final means of disposal. Besides solving the problem of improper medication disposal, many pilot take-back programs are collecting data from the program participants and on the medications received. This collected data may be valuable in figuring out why so many medications go unused and answering many public health-related questions. From the patient's perspective, medication take-back programs are immensely convenient, and most take-back programs usually have very successful turn-outs.

Take-back programs do have their challenges, though. The following are common hurdles that many programs have encountered:

Funding – Many large-scale pilot programs are partially supported by grants. There are many costs involved with running a take-back program, and to be able to continue the programs, sustainable funding sources must be found.

Controlled substances – The Drug Enforcement Administration (DEA) has a closed system of distribution for controlled substances. The current regulations indicate that controlled substances can only be transferred between DEA registrants, and because patients are not DEA registrants, pharmacies cannot take controlled substances from patients.^{9,10} This is a major problem for many take-back programs, as most patients do not know what is controlled and what is not. It then becomes the program's responsibility to ensure that DEA regulations are not violated.

Transportation – Transportation can be costly. The collected medications need to be transported in a secure manner, and if the collected medications contain hazardous waste, special consideration needs to be given when planning for the transportation. If the mail-back model is to be used, getting the permission for mailing of controlled substances from the postal service provider is required.

The cost and regulatory issues must be carefully evaluated and considered before starting a take-back program, and this may be the reason why many states and cities are hesitant about establishing their own program.¹¹

What can we do in NC?

Currently, there is neither a statewide medication take-back program or medication disposal program available in North Carolina. Some may have attempted to use the Hazardous Household Waste (HHW) program for medication disposal, but because HHW is not designed to take medication waste, it is not recommended to use HHW as a medication disposal means.

For North Carolina residents seeking alternative methods of medication disposal, SMARxT Disposal™ may be considered. SMARxT Disposal™ is a national campaign created to raise awareness about the potential impact from improperly disposed medications and to provide guidance on the disposal alternative. The SMARxT Disposal™ campaign advocates disposing unwanted medications in the household trash. The medications should be placed in a sealable plastic bag, crushed, and then mixed with coffee grounds, sawdust, or kitty litter to make it less appealing to family pets and children. The mix is then sealed in the bag, and the bag can be disposed of in the trash.¹² Federal guidelines recommend a very similar approach, but without the step of crushing, and the final mix can be placed in any sealable container.^{4,8}

This disposal method can be used for most medications, but due to the high potential for misuse and abuse, the FDA recommends the following medications be flushed for disposal instead of thrown in the trash:⁴

- Actiq lozenges (fentanyl citrate)
- Daytrana patches (methylphenidate)
- Duragesic patches (fentanyl)
- OxyContin tablets (oxycodone)
- Avinza capsules (morphine sulfate)
- Baraclude tablets (entecavir)
- Reyataz capsules (atazanavir sulfate)
- Tequin tablets (gatifloxacin)
- Zerit oral solution (stavudine)
- Meperidine HCl tablets
- Percocet tablets (oxycodone and acetaminophen)
- Xyrem oral solution (sodium oxybate)
- Fentora buccal tablets (fentanyl)

As for plastic prescription vials and bottles, some may wish to recycle these containers. Most recycling services in North Carolina only recycle plastic bottles whose "neck" is smaller than its base. It is best to call the local recycling service to see if prescription bottles or vials are accepted. A listing of local waste management service can found at the following website: <http://www.p2pays.org/localgov/PAYT/ncwaste.asp>.

To protect personal information, it is important to educate patients about removing and shredding the prescription label before recycling or throwing away prescription bottles.

Conclusion

Flushing is no longer recognized as the standard method of medication disposal. Although PPCPs have been detected in the water, they are present at very low concentrations. While the effects of long-term low exposure of pharmaceutical contaminants in the water on wildlife and humans are being evaluated, there is a national effort to promote alternative disposal methods that are safe and at the same time more environment-friendly. There are debates about whether disposing of medications in the trash is a wise choice, and also questions on the practicality of the crushing-and-mixing method. Alternative ways of medication disposal are still being studied, but currently there is not a single best solution for medication disposal. Federal guidelines encourage the public to utilize community medication take-back programs if they are available. For areas without a take-back program, an approach similar to the one presented in the SMARxT Disposal™ campaign is recommended. Due to the lack of choices in North Carolina,

author feels that it is reasonable to present an alternative method like SMARxT Disposal™ to patients as an option for medication disposal. ❖

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How to dispose of your old prescription medicine?



You were taking one medicine, but then your doctor switched you to another med. Now what to do with the leftover old medicine? Currently, North Carolina does not have a state-wide medication disposal program, but that does not mean those old meds should pile up in the house. It's time to clean out those old bottles in the cabinet! Here are some tips for a child-safe and environment-friendly way to dispose of old prescription medicine:

Check

FLUSH



CHECK before FLUSH Flushing your old medicine down the toilet or sink may seem easy and safe, but the meds can actually go to the streams and lakes through the water system. So to help the water stay clean, the flushing method should **only** be used when instructed to do so. Please check with your pharmacist to see if your leftover

medicine can be flushed. If not, please take the following steps to dispose of the leftover medication.

CRUSH and DISSOLVE To make sure that the medicine doesn't get into the hands of children or the mouth of family pets, crush the unused solid medicine (tablets, capsules) and dilute the liquid medicine (syrup, oral solution) with some water.

MIX, BAG, and SEAL Mix the crushed or watered down medicine with coffee grounds, cat litter, sawdust or other solid waste, then bag the mix in a plastic bag and seal the bag.

Now you can throw that sealed bag into the trashcan without worrying that children or animals might get to it.



Old medicine

Crush

Mix, Bag, and Seal

Safe Disposal

Handout made by Sherry Yang, 12/18/08

Handout information is based on the **SMAR_xT DISPOSALTM** campaign