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## PROPER DISPOSAL OF OLD MEDICATIONS, SHARPS AND MERCURY CONTAINING DEVICES

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### INTRODUCTION

Recently, we at Colorado Recycles have received several inquiries about the proper way to recycle old medications, medical devices and medical paraphernalia such as syringes. Many of the products in these general grouping of materials do not lend themselves to being recycled, but their proper disposal is an issue for safe solid waste management and handling. Recycling, along with landfilling and incineration, are the three major strategies for dealing with solid waste. Composting of organic materials and reuse of materials headed to disposal are additional strategies employed in specific circumstances. Not everything can be recycled, and it is important for communities to have an appropriate balance of strategies to deal with the solid waste that is generated within those communities. This is particularly true as our society begins to learn more about the potential risks of materials and products that find their way into the solid waste stream.

Recent news accounts of detectable levels of pharmaceutical products in municipal wastewater systems and in natural streams has caused members of the public, the media and state and local policymakers to contact municipal water and wastewater providers for information about what might be the local water systems. The members of the Pikes Peak Regional Water Authority have been a few of the many utility operations that have been contacted. The Pikes Peak Regional Water Authority ([www.pprwa.com](http://www.pprwa.com)) and Colorado Recycles ([www.colorado-recycles.org](http://www.colorado-recycles.org)) collaborated to provide the public with this background information about pharmaceuticals in the water system. Since it is often the case that medications and personal care products are disposed of in conjunction with complementary products (e.g., medical devices containing mercury), this background information includes discussion of disposal of such products as well.

As we began our research, we realized that several of the guidelines and recommendations for disposing of unwanted medications that have been relied upon for years are no longer considered the best or proper way of disposing of such products. In addition, we realized that as the American population continues to grow and age, the absolute number of medicines will also grow and it follows logically that we will see an increasing number of medicines being introduced into the wastewater treatment system.

We are concerned about these products finding their way into our municipal sewage systems and then into the environment. Colorado is a semi-arid state and there is

increasing pressure to utilize every drop of water legally available to its maximum beneficial use. Ultimately, that will include the recycling of waste water for human consumption and the use and the presence of pharmaceuticals and personal care products in the water supply means that the treatment of the drinking water will have to address them.

### **WHAT PRODUCTS ARE WE TALKING ABOUT?**

As the inquiries came to us, they were largely about how to safely dispose of prescription medications. A very common theme was that the inquiring person was cleaning out a medicine cabinet and discovered a number of expired or unused medicines that had to be disposed of. In the past, the rule of thumb was to flush them down the toilet or sink or to simply throw them into the trash.

Generally, the term “medication” is used in a generic sense to refer to prescription drugs, over-the-counter medications and veterinary medicines. A broader look at such products also captures personal use products. Many researchers and authorities refer to the combined product list as PPCP’s, an acronym referring to Pharmaceuticals and Personal Care Products. PPCP’s in the broadest sense include thousands of chemical substances from chemotherapy drugs to shampoos, OTC (over-the-counter) cough and cold medicines, cosmetics, colognes and perfumes and so on. However, not all PPCP’s pose the same level of disposal concern. Sadly, as we conducted our research, it also became clear that illicit drugs and controlled substances are beginning to appear in the municipal sewage system and ultimately in the environment.

### **HOW DO PPCP’S GET INTO THE ENVIRONMENT?**

PPCP’s can be introduced into the environment in numerous ways, including:

- \*Flushing down the toilet or the sink;
- \*Rinsing personal care products and household cleaning products down the drain when cleaning up;
- \*Human excrement and urine which contains unabsorbed medications;
- \*From animal excretion that contains veterinary drugs – including hormones and antibiotics – into fields where they get captured in runoff water headed to the streams; and
- \*Land application of organic materials used to condition soils or fertilize crops and vegetation.

### **WHAT IS THE PROBLEM WITH FLUSHING?**

For a very long time, flushing unused or expired medications down the toilet or the sink drain was considered a safe form of disposal. The concern at that time was for medications falling into the hands of children or being ingested by pets. Once down the drain, there was no way for children or pets to gain access to them and ingest them.

We now realize that flushing is often inappropriate and it is discouraged. Municipal wastewater treatment systems and individual septic systems are designed to remove conventional pollutants such as solid matter and biodegradable materials. These systems have not been designed to treat PPCP’s, and as a result the PPCP’s find their way into the environment by simply passing through the treatment system. In one

commonly cited 2002 study by the US Geological Survey, it was reported that 80% of a sample of 139 streams in 30 separate states was found to have low concentrations of chemicals commonly found in prescription medications.

When medications are flushed down the toilet or sink, their chemical components find their way into the streams used by the wastewater treatment facility for its discharge. While the concentration of these chemicals may be quite low, it may be sufficient to begin to affect fish and germs that live in the water. The concentrations may be sufficient to create an antibiotic resistance in germs found in the environment. In nature's way, weak germs may be killed off while stronger and more resistant germs survive and reproduce. Strong antibiotic resistant germs make it more difficult to treat human beings and animals. Perhaps even more importantly, the growing presence of PPCP's in our society means that there is a continuing and constant exposure to these chemicals in the environment.

### **LONG RUN SOLUTIONS ARE YET TO BE DEVELOPED**

We are only beginning to be aware of the presence of PPCP's in our wastewater, and so far it has not been documented that there is a human health risk. However, the evidence is mounting that environmental exposure is having genetic effects on some fish. It is likely that new wastewater treatment technologies will be developed that will remove medications from the water, but that will most likely result in fairly high concentrations of the medications in the sludge that will have to be dealt with. There is increasing interest in developing "take back" programs that would allow consumers to return their unused medications to pharmacies, hospitals or directly to the manufacturer. The collected medications would be disposed of in an appropriate and secure manner.

Colorado has adopted legislation that allows unused medications to be returned to pharmacies for redistribution but that statute is very restrictive. Only licensed health care facilities and health care professionals can be the source of the medications, and there are strict rules for the subsequent redistribution. If you have questions about this option, please contact your local licensed, professional pharmacist or the Colorado Board of Pharmacy.

### **UNTIL THEN, WHAT IS THE BEST OPTION FOR CONSUMERS?**

Until such time as we have a comprehensive set of strategies to deal with the disposal of medicines, the most prudent course is to rely on landfill operations – but with a series of preparation steps to be taken prior to placing the unwanted medications into the trash:

Throwing medications into the trash increases the risk that children, pets or illicit drug users will be able to access them. Before throwing the medications into the trash, check to make sure that they are not a controlled substance that requires special disposal techniques. If the medication is a controlled substance, contact the local authorities for disposal guidance. Some medications, like chemotherapy drugs, may be toxic and require special handling. Consult with your physician or your professional pharmacist for guidance about disposing of such medications. Read the instructions that came with the medication for guidance on safe and proper disposal.

If the medication is one that can be disposed of in the trash, prepare the medication as follows:

1. The medication should be “treated” to make it less palatable or useful should it get intercepted. If possible, use the original container. Most containers are designed with child-proof caps, and many containers will have labels that provide information about first-aid should the product be ingested. However, if the original container is made of glass, it would be wise to transfer the medicine to a plastic container that would be less susceptible to being broken once it is in the trash system where powerful compactors are at work. Adding foreign material such as salt, flour, sawdust, cat litter, dirt, fireplace ashes, barbeque grill ashes, coffee grounds and even liquids such as water can render many medications unpalatable. Crushing tablets and capsules will further mix the medicine with the filler. Liquid medicines can also be mixed with fillers to make them less likely to spill.
2. Remove any individual or personal identification information that may be on the label. In these days of increased concern over identity theft, extra precaution to protect private information is warranted.
3. Contain the container. First, seal the container as completely as possible. Use a really durable tape to securely fasten the lid to the container – the ubiquitous duct tape is always a good choice. When tightly sealed, place that container into a sealable plastic bag and seal it. The plastic bag will help contain any leakage if the package is damaged while in the trash. Place the sealed plastic bag with the sealed container into a nondescript but sturdy and durable container – such as cardboard box, a plastic margarine tub, or other durable container.
4. Before placing the secured container into the trash, check to see if there is a household hazardous waste collection program available which will accept prescription medications. If so, take advantage of it. If not, place the secured container in the trash as close to the scheduled pick up date and time as possible in order to reduce the opportunity that the package will find its way into the wrong hands.

### **MANAGING MEDICAL SHARPS**

Medical sharps include syringes, lancets, needles and other types of medical equipment that are used in the treatment of diabetes, allergies or other forms of home health care. Discarding loose sharps or syringes in the trash poses a risk to the people that collect and handle the trash. Used sharps can pass on germs and diseases. Even a single needle stick from a contaminated sharp can transmit diseases like Hepatitis B or HIV, the virus that causes AIDS.

Several million people inject medicines into themselves or someone for whom they act as a care giver. It has been conservatively estimated that more than 3 billion needles are produced each year. All of them will have to be disposed of after their useful life has ended. In years past, it was recommended that the user simply dispose of his or her needles and other sharps in the trash. For years, it has been recommended to place the items in a household plastic container or coffee can, secure the lid and write “do not recycle” on the outside

and simply place it in the household trash. However, this method does not really remove the sharp from the solid waste stream and it results in an increased risk of needle stick injuries for trash haulers, children and even animals.

Disposing of sharps in residential trash is the least preferable disposal alternative. However, if no other options are available, place the used needles and other sharps in a 2 liter (#1 plastic PETE) soda bottle. Keep the bottle capped when not in use. PETE (#1) is recommended because it has been shown to be more puncture resistant than other types of plastic bottles. Check the bottom of the bottle for the #1 PETE chasing arrow symbol.

When the bottle has been filled, cap it tightly and seal it with heavy tape (duct tape is a good choice) and label it: **WARNING: SHARPS! DO NOT RECYCLE!**

***Never place a container with sharps into the recycling stream.***

There are much better methods for disposing of sharps, however. There are a number of commercially available mail-in programs. Among the leading firms that have such products available are: Becton-Dickinson (<http://www.bd.com/sharps/>) which not only has mail-in containers designed for the safe transfer of sharps, they also provide some excellent consumer education information; Sharps Compliance Corporation (<http://www.sharpsinc.com/>) also provides a useful consumer tutorial; and Medasend Mailback, Inc, (<http://www.medasend.com/>) also provides a variety of specially designed container systems.

Some pharmacies also stock container systems, needle clipping devices and products that melt the needle and its syringe into a plastic disk, and other devices that render a needle harmless.

Many communities are now sponsoring Household Hazardous Waste collection programs, and Colorado Recycles attempts to list those events on its web site and in its monthly newsletter. Some of these programs will accept sharps and unused medications, but it is important to verify that in advance. In addition to the information that we collect and post, the Colorado Department of Public Health and Environment is an excellent source of information about HHW round up events. CDPHE posts that information on its web site at <http://www.cdphe.state.co.us/hm/hhwcollect.htm>.

## **MERCURY CONTAINING DEVICES**

Mercury is a very problematic element. Mercury cannot be destroyed, it cannot be combusted and it does not degrade. When mercury is deposited in waterways, bacteria convert it to methyl mercury, which builds up in the tissues of fish. Contaminated fish can then be eaten by other wildlife or by people. Mercury is a potent neurotoxin, meaning that it interferes with the way nerve cells function. Mercury poisoning causes a decreased ability to see, hear, talk and walk. It can

cause personality changes, depression, irritability, nervousness, and the inability to concentrate. It can also cause damage to the brain, kidneys and lungs. Mercury is a particularly serious problem for pregnant women and children.

The most likely mercury containing device that consumers will encounter is the standard mercury thermometer. Everyone remembers being ill and having a concerned parent pull out the thermometer, shake it down and say "Hold this under your tongue; I'll be back in a few minute to read it." The design of a mercury thermometer makes it a good candidate for being broken. The tube in which the mercury resides is made of glass, and shaking down the mercury poses the risk that the thermometer will be dropped and broken. Broken mercury thermometers are notoriously hard to clean up.

The Colorado Department of Public Health and Environment has an excellent guide to proper handling of mercury containing devices (including devices that are not medical in nature). The Department has undertaken a comprehensive program called "Mercury Free Colorado"

<http://www.cdphe.state.co.us/hm/mercury/index.htm>.

Many Household Hazardous Waste programs will accept mercury thermometers for disposal. There are some local public health departments that sponsor thermometer exchange programs that accept the mercury thermometers and issue a non-mercury containing thermometer (often a digital thermometer) to replace it. Colorado Recycles maintains a list of recyclers who accept mercury containing devices.