Proper Disposal of Medications

The Risks of Improper Disposal and the Benefits of Take-Back Programs

Summary

Both prescription and non-prescription drugs are some of the most common items found in every American household. What many people fail to realize is that these medications have expiration dates and must be properly disposed of. As the use of medication becomes more prevalent in our society a major problem is occurring: what should a person do with expired medication? Recent trends in the United States have shown that children ages 12 to 17 are likely to abuse prescription drugs more than all other illicit drugs except marijuana. These same studies have shown that children in this age group are likely to obtain these drugs from the home. Other studies have been conducted, showing small amounts of antibiotics in groundwater. To combat these issues, the United States government has recently passed a law called The Secure and Responsible Drug Disposal Act. This law allows local pharmacies to take back prescription and over-the-counter drugs for proper disposal. Our goal for this project is to raise awareness among our friends, students, and peers about the dangers associated with improper medical waste disposal. We hope to accomplish this by writing to the corporate headquarters of local pharmacies, compiling this classepedia document, and through the production of documentary and instructional videos on how to properly and safely dispose of any drugs.

Video Link

Proper Disposal of Medications: http://www.youtube.com/watch?v=eNZSntGbDgA
The Issue: Drug Disposal

Prescription Drug Abuse among Teens (BE)
The abuse of prescription medication by children ages 12 to 17 is a growing problem in the United States. Recent studies have shown that young people ages 12 to 17 abuse prescription drugs more than all other illicit drugs except marijuana. It can be concluded that these adolescents are obtaining the drugs for free from their own homes’ medicine cabinets, and from friends from out of their medicine cabinets. The drugs that are abused the most include prescription drugs, such as pain relievers, tranquilizers, stimulants and sedatives. The most recent research on deaths in the United States due to poisoning over a five year period (1999-2004) shows that nearly all poison deaths in the country are attributed to drugs, and most drug poisoning result from the abuse of prescription and illegal drugs (http://www.theantidrug.com). The Figures below (obtained from http://www.theantidrug.com/pdfs/TEENS_AND_PRESCRIPTION_DRUGS.pdf) document the current drug use among teens 12 to 17 and the most commonly used drugs by children in this age group.

The development and implementation of national take back programs can hopefully alleviate the drug abuse problem that is currently occurring among teens. Implementation of these types of programs will, in effect, remove any potential chance for abuse by reducing the amount of prescription pills that are available in the home. Another of our objectives is to raise awareness that pharmacies usually accept these expired drugs and dispose of them safely and in an environmentally safe manner. If people were more consciously aware that these services are provided, the number of prescription abusers can be lowered dramatically.

Figure 1: This figure shows the top sources where pain relievers were obtained for non-medical users in the 12-17 age groups.
Figure 2: This figure shows the types of illicit drug use among teens aged 12-17.

Figure 3: This figure shows, by percentage, the top five drugs used by 12th graders in the past year.
Dangers of Expired Medication (KN)
When medications are distributed, they come with an expiration date that is set approximately a year following the date of purchase. It has been found that medications often last about five years following the expiration date if the seal has not been broken\[12\]. Once the seal is broken, the potency of the drugs greatly deteriorates, due to exposure to light, humidity, and temperature variations depending on how the medication is stored. Although the effects of consuming expired medications have not been greatly studied, it is suggested that taking expired medications is not worth the risk, especially medications that are essential and molecularly less stable. Some of the medications that are essential and degrade relatively rapidly consist of nitroglycerin, insulin, EpiPens, and liquid antibiotics, especially those that require refrigeration\[12\].

Those medications that may be safe to consume after expiration date, such as pain relievers, cold remedies, and sleeping pills, exhibit a decrease in potency and are liable to be abused\[12\]. If these medications are not used by the expiration date, it is safer to dispose of these medications properly. Left alone, they are prone to abuse by minors because of their ease of access. If, in the future, there is a need for these medications, it is better to obtain a new prescription. The new medication will be more potent and effective than the medication left in the home after the expiration date. And any other medications essential for health should be disposed of accordingly when it appears discolored, has a potent smell, or has turned powdery\[12\].

Because most drug prescriptions are not written for an excess of medication, they are intended to be used entirely. Since there should not be any extra medication, it is much safer to properly dispose of any extra medication than to store the medication in the home.

Bacterial Resistance: Kevin Ng

Flushing antibiotics down the toilet could lead to future health risks because sewage and wastewater treatment are not designed to cleanse water of passing antibiotics. When antibiotics are flushed down the toilet, the antibiotics are deposited into ground water, eventually making it into drinking water. It was once common practice for doctors to teach us to flush unused medicines and antibiotics down the toilet. It was thought safe, and was a better alternative to leaving the drugs in the medicine cabinet where they could be abused by adolescents. However, this old method for disposing antibiotics has been speculated to have an adverse effect on the environment. The concentration of antibiotics in the groundwater is currently at a harmless level, but given time to accumulate, the increase in the amount of antibiotics in groundwater can lead serious health problems in the future.

The main concern with the constant intake of antibiotics via drinking water deals with the human body and the many micro-organisms that exist within our bodies. With the constant increase of antibiotics in drinkable water, virulent strains of infectious bacteria can evolve to become resistant to antibiotics. If certain bacteria grow a resistance to antibiotics, the viability of antibiotics as an antibacterial greatly decreases, resulting in the nullification of antibiotics as a treatment for certain illnesses.

To present a little background on the beneficial aspects of bacteria and micro-organisms for humans, we look at what antibiotics can do to disrupt the homeostatic relationship between the human body and the micro-organisms that live within the body. The presence of bacteria within
our ground water is nothing out of the ordinary because they generally carry out beneficial processes, but certain bacteria and micro-organisms such as viruses have a harmful effect on the human body. The human body consists of many micro-organisms which have become key components to our bodies, competing with other micro-organisms that may cause disease and providing key mechanisms for the continuous functionality of the body. Groundwater can also be host to many pathogens that disrupt the homeostatic relationship between certain micro-organisms and the human body, which pose a great risk for the future when dealing with the rise of antibiotics within the groundwater. As the level of antibiotics within groundwater continues to rise, the constant exposure of antibiotics with certain pathogens allow the pathogens to mutate accordingly, increasing the pathogens’ immunity towards antibiotics. This nulls the effect of antibiotics to treat certain pathogens because the pathogens may have mutated to become resistant to the beneficial effects of antibiotics. The ability for pathogens to grow an immune response to antibiotics is of great concern. With the possibility of negating our current antibiotics in mind, we must deal with the problem before it becomes irreversible.

Environmental Concerns (BE and KN)
There are some environmental concerns that are raised in regards to how prescription medication is disposed. Recent studies have found that there is a trace amount of drug residue found in surface water, such as rivers and lakes, and in some community drinking water supplies. Despite this recent discovery the Federal Drug Administration and its own researchers remain adamant that this increase is caused primarily by people taking and naturally metabolizing drugs and then passing them into the environment by feces or urine.

Another source of antibiotics found within groundwater deals with the production of animals as food. The use of antibiotics as an additive to the feed for livestock has also been found as a source of antibiotics within groundwater. Like humans, remnants of the antibiotics are passed through the livestock to the environment and eventually into the groundwater via the livestock’s excrements. It was found that trace amounts of the antibiotics tylosin, tetracycline, and chlortetracycline were present in the groundwater and field runoff from livestock farms. Trace antibiotics were also found in agricultural fields that make use of livestock manure as fertilizer. Food livestock is another huge contributor to antibiotics in the environment.

Any medication seeking FDA approval must pass an assessment test, which tests how the medication’s use would affect the environment. Dr. Raanan Bloom, Ph.D., an Environmental Assessment Expert in FDA's Center for Drug Evaluation and Research, is quoted as saying, “For those drugs for which environmental assessments have been required, there has been no indication of environmental effects due to flushing.” This requirement does not take into account any supplements or other pills which do not require FDA approval for sale and distribution.

Some prescription drugs and over-the-counter medications are safe for disposal by flushing. The FDA has created a list of drugs which are safe for disposal by flushing that is constantly revised and updated. The list of these drugs was last revised on March 2010, and the list can be found below:
<table>
<thead>
<tr>
<th>Medicine</th>
<th>Active Ingredient</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Actiq</strong>, oral transmucosal lozenge</td>
<td>Fentanyl Citrate</td>
</tr>
<tr>
<td><strong>Avinza</strong>, capsules (extended release)</td>
<td>Morphine Sulfate</td>
</tr>
<tr>
<td><strong>Daytrana</strong>, transdermal patch system</td>
<td>Methylphenidate</td>
</tr>
<tr>
<td><strong>Demerol</strong>, tablets *</td>
<td>Meperidine Hydrochloride</td>
</tr>
<tr>
<td><strong>Demerol</strong>, oral solution *</td>
<td>Meperidine Hydrochloride</td>
</tr>
<tr>
<td><strong>Diastat/Diastat AcuDial</strong>, rectal gel</td>
<td>Diazepam</td>
</tr>
<tr>
<td><strong>Dilaudid</strong>, tablets *</td>
<td>Hydromorphone Hydrochloride</td>
</tr>
<tr>
<td><strong>Dilaudid</strong>, oral liquid *</td>
<td>Hydromorphone Hydrochloride</td>
</tr>
<tr>
<td><strong>Dolophine Hydrochloride</strong>, tablets *</td>
<td>Methadone Hydrochloride</td>
</tr>
<tr>
<td><strong>Duragesic</strong>, patch (extended release) *</td>
<td>Fentanyl</td>
</tr>
<tr>
<td><strong>Embeda</strong>, capsules (extended release)</td>
<td>Morphine Sulfate; Naltrexone Hydrochloride</td>
</tr>
<tr>
<td><strong>Exalgo</strong>, tablets (extended release)</td>
<td>Hydromorphone Hydrochloride</td>
</tr>
<tr>
<td><strong>Fentora</strong>, tablets (buccal)</td>
<td>Fentanyl Citrate</td>
</tr>
<tr>
<td><strong>Kadian</strong>, capsules (extended release)</td>
<td>Morphine Sulfate</td>
</tr>
<tr>
<td><strong>Methadone Hydrochloride</strong>, oral solution *</td>
<td>Methadone Hydrochloride</td>
</tr>
<tr>
<td><strong>Methadose</strong>, tablets *</td>
<td>Methadone Hydrochloride</td>
</tr>
<tr>
<td><strong>Morphine Sulfate</strong>, tablets (immediate release) *</td>
<td>Morphine Sulfate</td>
</tr>
<tr>
<td><strong>Morphine Sulfate</strong>, oral solution *</td>
<td>Morphine Sulfate</td>
</tr>
<tr>
<td><strong>MS Contin</strong>, tablets (extended release) *</td>
<td>Morphine Sulfate</td>
</tr>
<tr>
<td><strong>Onsolis</strong>, soluble film (buccal)</td>
<td>Fentanyl Citrate</td>
</tr>
<tr>
<td><strong>Opana</strong>, tablets (immediate release)</td>
<td>Oxymorphone Hydrochloride</td>
</tr>
<tr>
<td><strong>Opana ER</strong>, tablets (extended release)</td>
<td>Oxymorphone Hydrochloride</td>
</tr>
<tr>
<td><strong>Oramorph SR</strong>, tablets (sustained release)</td>
<td>Morphine Sulfate</td>
</tr>
<tr>
<td><strong>Oxycontin</strong>, tablets (extended release) *</td>
<td>Oxycodone Hydrochloride</td>
</tr>
<tr>
<td><strong>Percocet</strong>, tablets *</td>
<td>Acetaminophen; Oxycodone Hydrochloride</td>
</tr>
<tr>
<td><strong>Percodan</strong>, tablets *</td>
<td>Aspirin; Oxycodone Hydrochloride</td>
</tr>
<tr>
<td><strong>Xyrem</strong>, oral solution</td>
<td>Sodium Oxybate</td>
</tr>
</tbody>
</table>

*These medicines have generic versions available or are only available in generic formulations.

Further information on the disposal of medications was obtained from pharmacistsletter.com.
<table>
<thead>
<tr>
<th>Drug</th>
<th>Special Disposal Instructions</th>
</tr>
</thead>
</table>
| Actiq<sup>1</sup>  
(oral transmucosal fentanyl citrate) | - Do not flush entire unused units, handles, or blister packages down the toilet.  
- If there is any medicine remaining after the dose, place the handle under hot running water until the medicine is gone and throw the handle away out of reach of children and pets.  
- For unopened/unused Actiq units:  
  1. Remove one Actiq unit from its blister package and hold the Actiq by its handle over the toilet bowl.  
  2. Use wire-cutting pliers to cut the medicine end off so that it falls into the toilet.  
  3. Throw away the handle in a place out of reach of children and pets.  
  4. Repeat steps 2 to 3 for each Actiq unit.  
  5. Flush the toilet twice after 5 Actiq units have been cut. Do not flush more than 5 Actiq units at a time. |
| AndroGel<sup>2</sup>  
(testosterone gel) | - Unused gel should be disposed of by thoroughly rinsing down the sink or throw in the trash in a manner to avoid accidental exposure or ingestion by household members or pets. |
| Avinza<sup>3</sup>  
(morphine sulfate extended-release) | - Flush capsules down the toilet. |
<table>
<thead>
<tr>
<th>Drug</th>
<th>Special Disposal Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baraclude⁴ (entecavir)</td>
<td>- Flush tablets down the toilet or pour the oral solution down the sink.</td>
</tr>
<tr>
<td>Davitra³⁵ (methylphenidate)</td>
<td>- Fold the patch in half so that the adhesive side adheres to itself and flush down the toilet or dispose of in an appropriate lidded container.</td>
</tr>
<tr>
<td>Demerol⁶ (meperidine)</td>
<td>- Flush tablets/syrup down the toilet.</td>
</tr>
<tr>
<td>Diastat AcuDial⁷ (diazepam rectal gel)</td>
<td>- Any diazepam rectal gel remaining in the AcuDial applicator after use should be disposed of before the applicator is discarded.</td>
</tr>
<tr>
<td></td>
<td>- With the applicator tip pointed over the sink or toilet, the plunger should be pulled back then gently depressed until it stops to force gel from the applicator tip into the sink or toilet.</td>
</tr>
<tr>
<td></td>
<td>- Flush the toilet or rinse the sink with water until gel is no longer visible.</td>
</tr>
<tr>
<td>Dilaudid⁸/Dilaudid-HP⁹ (hydromorphone)</td>
<td>- Flush tablets or oral liquid down the toilet.</td>
</tr>
<tr>
<td>Dolophine¹⁰ (methadone)</td>
<td>- Flush tablets down the toilet.</td>
</tr>
<tr>
<td>Duragesic¹¹ (fentanyl)</td>
<td>- Fold sticky sides of the patch together and flush down the toilet.</td>
</tr>
<tr>
<td>Estrogel¹² (estradiol gel)</td>
<td>- Unused gel should be disposed of by thoroughly rinsing down the sink or throw in the trash in a manner to avoid accidental exposure or ingestion by household members or pets.</td>
</tr>
<tr>
<td>Fentora¹³ (fentanyl buccal tablets)</td>
<td>- Contact Cephalon at 1-800-896-5855 or flush unneeded tablets down the toilet.</td>
</tr>
<tr>
<td></td>
<td>- Do not flush blister packages or cartons down the toilet.</td>
</tr>
<tr>
<td>Ionsys¹⁴ (transdermal fentanyl)</td>
<td>- Handle Ionsys by the side or the top housing only since contact with hydrogel in Ionsys can be harmful to humans and animals.</td>
</tr>
<tr>
<td></td>
<td>- Disposal should be in accordance with state or federal regulations.</td>
</tr>
<tr>
<td></td>
<td>- Wear gloves to dispose of a used Ionsys unit:</td>
</tr>
<tr>
<td></td>
<td>1. Pull the red tab to separate bottom and top housing.</td>
</tr>
<tr>
<td></td>
<td>2. Fold the hydrogel-containing bottom housing in half with sticky side facing in.</td>
</tr>
<tr>
<td></td>
<td>3. Dispose of the bottom housing containing fentanyl by flushing down the toilet with another healthcare professional as a witness.</td>
</tr>
<tr>
<td></td>
<td>4. Dispose of the top housing containing electronics according to hospital procedures for battery-containing waste.</td>
</tr>
<tr>
<td></td>
<td>5. If hydrogel accidentally contacts the skin, rinse with water thoroughly. Do not use soap.</td>
</tr>
</tbody>
</table>
How to dispose of “Not safe for Flushing” Prescription Pills (BE)
The Federal Food and Drug Administration has on its main website an outline of how to properly dispose of prescription medication. This process was developed in conjunction with the White House Office of National Drug Control Policy (ONDCP) to create a guideline on how to dispose of any expired or unused medication. This guideline is outlined below:

- Follow any specific disposal instructions on the drug label or patient information that accompanies the medication. Do not flush prescription drugs down the toilet unless this information specifically instructs you to do so.

<table>
<thead>
<tr>
<th>Drug</th>
<th>Special Disposal Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opana/ Opana ER</td>
<td>• Flush tablets down the toilet.</td>
</tr>
<tr>
<td>(oxymorphone)</td>
<td></td>
</tr>
<tr>
<td>OxyContin (oxycodone)</td>
<td>• Flush tablets down the toilet.</td>
</tr>
<tr>
<td>Percocet (oxycodone)</td>
<td>• Flush tablets down the toilet.</td>
</tr>
<tr>
<td>Reyataz (atazanavir)</td>
<td>• Flush capsules down the toilet or pour down the sink.</td>
</tr>
<tr>
<td>Suboxone (buprenorphine/naloxone)</td>
<td>• Flush tablets down the toilet.</td>
</tr>
<tr>
<td>Subutex (buprenorphine)</td>
<td>• Flush tablets down the toilet.</td>
</tr>
<tr>
<td>Tequin (gatifloxacin)</td>
<td>• Flush tablets down the toilet. • Note that this product is no longer manufactured in the U.S. and Canada.</td>
</tr>
<tr>
<td>Tyzeka (telbivudine)</td>
<td>• Flush tablets down the toilet.</td>
</tr>
<tr>
<td>Videx/ Videx EC (didanosine)</td>
<td>• Flush tablets or capsules down the toilet or pour oral liquid down the sink.</td>
</tr>
<tr>
<td>Xyrem (sodium oxybate)</td>
<td>• Handle according to state and federal regulations. • Flush solution down the toilet or pour down the sink.</td>
</tr>
<tr>
<td>Zerit/Zerit XR ( stavudine)</td>
<td>• Flush capsules down the toilet or pour oral solution down the sink. (Please note Zerit XR has been discontinued)</td>
</tr>
</tbody>
</table>

a. This list is not all-inclusive.
b. Patients should follow specific drug disposal instructions found in the patient information from the manufacturer.
c. Many Schedule II drugs have special instructions to flush the drug down the toilet or pour down the sink.
d. Unless listed above, most topical patches, including hormone patches, are to be folded in half so that the sticky side sticks to itself and discard in the trash in a manner to prevent accidental ingestion by children or pets.
e. Estrin, Femring, and Navaring are to be disposed of in the trash. For Femring, wrap the used ring in tissue paper before throwing in the trash. For Navaring, wrap the used ring in the foil pouch it came with before throwing in the trash.
Before throwing out a medicine container, scratch out all identifying information on the prescription label to make it unreadable. This will help protect your identity and the privacy of your personal health information.

If no instructions are given, throw the drugs in the household trash, but first:
Take them out of their original containers and mix them with an undesirable substance, such as used coffee grounds or kitty litter. The medication will be less appealing to children and pets, and unrecognizable to people who may intentionally go through your trash.
Put them in a sealable bag, empty can, or other container to prevent the medication from leaking or breaking out of a garbage bag.
Take advantage of community drug take-back programs that allow the public to bring unused drugs to a central location for proper disposal. Call your city or county government's household trash and recycling service (see blue pages in phone book) to see if a take-back program is available in your community.
Do not give medications to friends. Doctors prescribe drugs based on a person's specific symptoms and medical history. A drug that works for you could be dangerous for someone else.

Current Legislation (MR)
A federal law concerning the appropriate disposal of unwanted and expired medications has been sought for a long time by those concerned about the environmental and health-related issues of improperly disposed-of medications. This law, called the Secure and Responsible Drug Disposal Act of 2010, has recently been passed by the United States Congress, on September 29, 2010. On October 14, 2010, President Barack Obama signed the “Safe and Secure Drug Disposal Act” into law.

Unregulated disposal of pharmaceutical drugs has been shown to cause environmental pollution, specifically water pollution, so it is hard to believe that a law concerning these adverse effects has taken so long to come about. And in addition to the environmental effects of these medications, the Secure and Responsible Drug Disposal Act also covers the health-related concerns that come with improper handling of medications.

Very often, people leave their unused medications at their home because they are not sure how to properly dispose of the medications. It becomes increasingly difficult for someone to keep track of all their current and expired medications when they are left to pile up like this. This situation can become dangerous because adolescents have access to these drugs and parents may not know the drugs are missing. Also, the tendency for people to use old medication without the consent of their physician increases when the drugs are left at home. Adverse health effects are a possible outcome for people who use old medication.

The Secure and Responsible Drug Disposal Act is a very important step towards helping resolve these issues. This act states:
1) An ultimate user who has lawfully obtained a controlled substance in accordance with this title may, without being registered, deliver the controlled substance to another person for the purpose of disposal of the controlled substance if--
(A) The person receiving the controlled substance is authorized under this title to engage in such activity; and
(B) The disposal takes place in accordance with regulations issued by the Attorney General to prevent diversion of controlled substances.

2) The Attorney General may, by regulation, authorize long-term care facilities, as defined by the Attorney General by regulation, to dispose of controlled substances on behalf of ultimate users in a manner that the Attorney General determines will provide effective controls against diversion and be consistent with the public health and safety.

This act gives the attorney general the authority to allow appropriate agencies and organizations to take back unused pharmaceuticals from patients. The attorney general must work within the boundaries of controlled substance act for the new act to be legal. The Safe Drug Disposal Act allows local agencies and organizations to set-up and run safe drug disposal efforts, like drop-off boxes and mail-in programs, in accordance with Drug Enforcement Agency (DEA) regulations.

Although the act is a great accomplishment, it does not provide an adequate solution to the problem. Many people probably do not know about this law, and those people would continue to handle the unused drugs as they are used to. It is important that people know about the risk of the improper disposal of drugs, and the availability of take-back programs at pharmacies or drug retailers, so that they deliver their unused and expired drugs to proper facilities. The easiest way to make people aware of this is by adding a label on the container or the packet of the medicine that outlines the proper procedure for taking back drugs. Also included on this label should be a brief outline of the risks of improper drug disposal. We believe that this act should be expanded to have manufacturer’s include this information on all of their labeling and packaging.


**State Legislation (MR)**

There are some forms of prescription drug take-back programs already existent in several states. The programs differ from state to state. Some states take back unused drugs only; while others may take back all kinds of prescription drugs. Some states only allow the drugs to be taken back by drug enforcement agency while others allow facilities like pharmacies, hospital and manufacturer to take drugs back for disposal, or redistribution.

The following is the list of states that allow pharmacies, hospitals, or other health care facilities to take back drugs for disposal, or donation from general people. Many other states, which are not listed here, allow pharmacies, manufacturer, or health care facilities to donate their drugs to other pharmacies, non-profit clinics, or state repositories for redistribution.

**Arizona:** Accepts drugs for take-back if they are in original sealed & tamper-evident unit dose packaging. Drugs can be taken back to Pharmacy, hospital, and nonprofit clinic by a person, or a manufacturer.

**Colorado:** Only cancer patients can donate their unused drugs to pharmacies, hospitals, or health care facilities.
**Florida:** Unused drugs that are in original sealed & tamper-evident unit dose packaging can be donated to a pharmacy, hospital, physician’s office, and health care facility by any person.

**Georgia:** Any unused drugs that can be donated to a pharmacy, hospital, or non-profit health care clinic by any person or an organization. The facility has to be in drug repository program to be eligible to take prescription drugs back. Controlled substances cannot be taken back.

**Iowa:** Allows prescription drugs, and supplies to be taken back by pharmacies, and hospitals that choose to be in the program.

**Louisiana:** In Louisiana prescription drugs can be donated by any person to charitable pharmacies.

**Maryland:** Prescription drugs and supplies can be dropped off into board approved drop-off sites, or repositories.

**Minnesota:** Only cancer drugs and supplies can be donated to pharmacies, or medical facilities.

**Missouri:** Unopened and sealed prescription drugs can be donated by any person to any pharmacy, hospital, or non-profit clinic.

**North Dakota:** Pharmacies that are in the program can take back prescription drugs, supplies, and devices from any person.

**Ohio:** Prescription drugs can be taken back from any person by any pharmacies, hospitals, or health care facility.

**Wyoming:** Any person or entity can donate prescription drugs to a pharmacy, healthcare facility, or physician’s office that chooses to take part in the program.


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**Success of DEA’s National Take Back Program and Other Programs (BE)**

On September 25, 2010 the United States Drug Enforcement Agency (DEA) conducted the first National Take Back Day. The aim of this program was to remove potentially dangerous controlled substances from our nation's medicine cabinets with the hope of also lowering the potential of prescription drug abuse and its consequences. This program was considered to be a great success. Approximately 4,094 collection sites and 2,992 state and local law enforcement agencies participated in this first-ever nationwide program. The drugs were said to be disposed of in a safe, legal, and environmentally sound way.

More recently, on November 13, 2010 another national take back program was conducted, called the “American Medicine Chest Challenge.” The mission statement of this program was to conduct a “community based public health initiative, with law enforcement partnership, designed to raise awareness about the dangers of prescription drug abuse and provide a nationwide day of disposal – at a collection site or in the home - of unused, unwanted, and expired medicine”. This initiative was provided without cost to any community, government, or law enforcement agency in the country. For more information of this program, you are encouraged to visit their website at: [http://www.americanmedicinechest.com](http://www.americanmedicinechest.com).

**What Happens to All that Pharmaceutical Waste After Collection? (BE)**

Once the pharmaceutical waste is collected from pharmacies and drug pickup stations, they are collected by companies whose job it is to properly destroy these substances. One of the leading providers of destruction service to the pharmaceutical industry is Strong Pharmaceutical Services™, a division of Strong Environmental, Inc. One of the services this company provides
is secure transportation of hazardous waste. Once collected, pharmaceutical waste is incinerated. Incineration provides several benefits, such as the proper destruction of pharmaceuticals to ensure non-entry of these drugs into the marketplace, as well as destroying any identifying material connected to the medications. This also relieves some of the pressure placed on local communities to reduce land disposal, as well as limit any potential spread of waste into community water systems. The pharmaceutical drugs that are disposed of in this manner include prescription drugs, over-the-counter materials and commodities, and non-DEA controlled substances. Returned or expired products, prepackaged returned goods, pallets, drums, roll-offs, and mixed hazardous/non-hazardous substances are also collected for incineration.

Controlled substances, or drugs that are monitored and regulated by the government, require different protocol for destruction. The collection and destruction of controlled substances is a far more extensive process which requires careful monitoring from the site of collection, all the way to the point of incineration. For more information on how Strong Pharmaceutical Services conducts the destruction of controlled substances please visit (http://www.strongpharma.com/WasteTech/04_ControlledSubst-Witness.pdf) for more information.

Retail Solution (BE and MR)
With the enactment of this new legislation, several retail pharmacies have already begun to serve local communities in the drug collection effort. Pharmacy chain Walgreens is credited as the first chain to launch the first ongoing, nationwide “Safe Medication Disposal Program”. This program is described as a safe and environmentally responsible way to dispose of unused or expired medications. The program consists of the customers purchasing a specially designed, inexpensive envelope, which is available at any Walgreens pharmacy. This allows the customer to place, seal and mail prescription or over-the-counter medications they no longer use for safe, eco-friendly disposal. Controlled substances are excluded from this program due to current regulations. Once securely sealed, the envelope can be dropped into any U.S. Postal Service mailbox where it will be sent to an approved medication incinerator. All envelopes remain sealed while incinerated. Ashes from the incinerated envelopes can be used for making “green” related building materials rather than going into a landfill (http://news.walgreens.com/article_display.cfm?article_id=5343).

Summary of what is Collected by Pharmacies (MR)
Our overall research, which consisted of visiting local pharmacies in the New Brunswick, New Jersey area and asking the pharmacists what is typically collected, has shown that there are general items which they typically accept. Typical items that are collected include prescription medications (except narcotics), over-the-counter medications, medicated ointments and lotions and, liquid medication that are kept in a sealable container. What the pharmacies will not accept are needles, thermometers, personal care products, and any controlled substances such as prescription narcotics.

Ideas and Solutions (BE, MR, and KN)
Along with use and abuse of expired prescription drugs among teenagers, the improper disposal of medications can cause other problems. One of the problems associated with the improper disposal of the expired medications is that many people are not aware that the pills are expired.
One way to solve this problem would be to provide larger labels that clearly indicate when the medication has expired and how to properly dispose of the medication. This would be most ideal for prescription medications because most of the labeling is done by the pharmacies. Requiring larger labeling would help alleviate the problem of children and minors abusing the expired pills because parents would be more aware of when the prescriptions have expired, as well as how to expose of the medication. The main drawback to this requirement lies in getting large manufacturers and packaging operations of over-the-counter medications to make changes to their packaging. Companies may be unwilling to add new labels or show a more prominent expiration because of the potential cost in changing the display of the bottle.

Another way to resolve this issue would be to provide drug take-back programs on a regular basis. Currently the United States Drug Enforcement Agency (DEA) has a yearly drug take back program that occurs every September. The collection of the drugs is overseen by local police stations. A better alternative to these yearly programs would be to provide them on a more frequent basis because it will allow people a better opportunity to collect expired drugs and dispose of them properly. The best solution would be to have local drop boxes at pharmacies and police stations. These drop boxes would allow people to leave any old medications all-year round at these locations, eliminating the need for the improper disposal of the medication. These drop boxes should have specific guidelines as to what can be deposited in them, such as the type of drugs allowed and how to leave them properly in the box. And, if any of these drugs have prescription labels, the label with the name and address should be removed before disposal to ensure anonymity.

We also believe more attention to this matter should be given by the media so the general public is made aware of the seriousness of the issue. If this take-back program can be covered by mass media, knowledge of the program will be made available to the general public. The more people that know about the drug take-back program, the more successful it can be. The law regarding the take-back program is a new one, and it is the responsibility of those who know about this to inform others. Pharmaceutical companies can help disseminate this information by adding a label on the packaging of the medicine that says to take the unused drug to the proper facilities for disposal. There should also be a brief warning label about the risk of improper disposal of drugs. The government could also get involved in this issue by expanding the proper disposal law to make the drug manufacturer to put these labels on the containers and packets of medicine. The government could also promote educational programs and infomercials to raise awareness about the issue.

The Service Project: Raising Awareness

The goal of our project is to help raise awareness of the current legislation that was passed which allows for the collection of expired pharmaceuticals by pharmacies. We hope to accomplish this by informing our classmates and friends with the filming of our documentary video. In this video we interviewed some of friends to get an understanding of what the typical person does with expired medication. We also spoke to a person who worked at a local pharmacy to see what drugs, if any, they collect. In a separate video our group made, we outline and demonstrate how to properly dispose of drugs, at your home, which are not safe for flushing. Lastly, in a collective effort our group sent a letter to the corporate head quarters of Target and Wal-Mart, urging them
to increase their efforts in advertising the fact that it is now legal for their pharmacies to collect certain drugs. Hopefully, the effort put forth by our group has made our fellow students and friends more aware of the dangers associated with the improper disposable of medication and the proper methods to dispose of these expired drugs.

Letter to Target and Walmart Headquarters
To whom it may concern:

Hello. Our names are Minhazur Rahman, Kevin Ng, and Brian Estrella. We are currently seniors at Rutgers University in New Brunswick, New Jersey. As part of our core curriculum we are required to take an Ethics in Science course, in which we are required to address a certain issue that is affecting our communities. We are interested in bringing to your attention the recently passed law stating that your pharmacy is required to collect any expired prescription and over-the-counter medications and properly dispose of them.

We believe this measure is important for good reasons. Many people do not realize that medications expire, and the medications wind up collecting dust in medicine cabinets and closets. Eventually the medications are forgotten about and the collection builds up. Having a lot of medications around the house can be tempting for teenagers, both to use the drugs and to sell them. Children ages 12 to 17 are especially likely to abuse these drugs since they are just lying around the house, free of charge and easily accessible. Studies have shown that this age group abuse prescription drugs more than any other illicit drug, except marijuana, and that nearly all poisoning deaths from 1999 to 2004 were caused by prescription drugs.

It seems that a simple solution to getting rid of the prescription drugs in the house is to just flush them down the toilet. Many concerned parents will do this, because to them, the drugs are better in the sewer than they are in a child or teenager. However, flushing antibiotics down the toilet in this way can lead to future health concerns. Medications have been discovered in sources of drinking water, and though the consequence of this has not been fully determined, it is widely believed that these dissolved drugs are being consumed by people and will lead to a medication resistance in people, especially for antibiotics.

Very recently, the United States Congress passed the “Secure and Responsible Drug Disposal Act of 2010.” This bill gives the attorney general the authority to allow appropriate agencies, such as pharmacies, to take back unused medications from people. This bill also works in conjunction with the Controlled Substances Act and the Drug Enforcement Agency to ensure the bill is used legally and safely.

Very shortly before this bill was passed, the United States Drug Enforcement Agency conducted the first ‘National Take-Back Day.’ This program was set up to remove potentially dangerous medications from homes across the country, with the hope of helping to lower the potential for prescription drug abuse. The program was considered a great success, with over 4,000 collection sites set up.

We believe these programs are a big step in the right direction, but because they were only held for one day, they were not as effective as they could have been. Because this “Secure and
Responsible Drug Disposal Act” allows for any pharmacy to have an ongoing take-back program, we are encouraging your pharmacy to get involved. In the pharmacies of your chain that we visited, we found that there was a lack of advertising in the drug collection area. We have outlined some general ideas that can help make people aware of the new law, which allows for pharmacies to take back unused or expired drugs. Our ideas can be found below:

- Have posters or signs showing people that your pharmacy now collects any used and unwanted drugs. Also in any of your local advertising, such as newspapers or magazine ads, dedicate a small portion of that ad to saying that you collect expired or unused drugs.

- Make it mandatory for your pharmacists or pharmacy technicians to state, after dispersal of the drugs to the customer, that your pharmacy collects any unused medications.

- Establish an automated e-mailing system, under consent of the customer, which notifies the customer that his or her prescription medication has expired. In the email also include that your pharmacy will collect any medication that is unused.

- Make the labels of the prescriptions, which show the expiration date on the bottle, slightly larger to make customers more aware that the medication they have in their medicine cabinets has expired.

- Create a drop box system, where customers can anonymously drop off any unused or expired medication into a labeled container that is kept in the pharmacy area of the store. In these drop boxes, people should be allowed to dispose of prescription medications (except narcotics), over-the-counter medications, medicated ointments and lotions and liquid medication in glass or leak-proof containers. The drop box should not accept needles, thermometers, controlled substances, and personal care products. We feel these guidelines should be met to ensure the safety of the customers.

We encourage your pharmacy to get involved, because we believe that it will benefit the overall health of the community, both physically and environmentally. This take-back program gives people a safe way to rid their medicine cabinets of all unused medications, which have the potential to be abused by children and teenagers. This is also a more environmentally safe alternative to flushing the medications down the toilet, where they enter the drinking water and could adversely affect the health of those who drink that water. Please consider setting up this type of program at your stores’ pharmacies. The benefits of a medication take-back program are both immediate and far-reaching for the health of our communities.

Sincerely,
Brian Estrella
Kevin Ng
Minhazur Rahman
### References

5. http://thomas.loc.gov/cgi-bin/query/D?c111:1.:temp/~c111rUMRd0:
   <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1247553/>.

### Editorials

Brian Estrella  
Submitted as an Open Letter to the Editor of “The Clifton Journal”

When it comes to the major environmental issues that are plaguing our country, what are the first of these issues that come to mind? Is it recycling or global warming? How about protection of our forests or air pollution? What about proper disposal of over-the-counter and prescription medications? This issue is very often overlooked by everyone, but affects the environment in a big way. Before you dismiss what I say, do me a small favor. Go into your medicine cabinets and browse through some of the medication that is in there and check when they expire. Next, ask yourself, how do I usually get rid of expired pills or medications? I am assuming that most of the people reading this are adults, so an expected answer would be to dispose of these pills by simply flushing them down the toilet or throwing them in the garbage. Now, this response is completely understandable. Many of you reading this have children and need to quickly remove these drugs from the home so that your children may not get their hands on the medication and abuse it. The harm in flushing medication down our toilets is the potential that lies in the future. By flushing these pills down the toilet, we are doing considerable damage to our water sources.
The blame for this problem cannot be laid on one person. Everyone that has flushed drugs into the sewer system has contributed to the pollution of our water in some way. But we have water treatment plants, right? We do, but most water treatment plants do not or are unable to completely remove the drugs from our drinking water. What essentially happens is that you end up taking in very minute doses of all these drugs. There is still an ongoing debate as to the effect that this will have on a community.

Another issue that can potentially occur when a high accumulation of expired drugs enters our water occurs at the microscopic level. In our body, primarily our intestinal tract, there are many helpful and beneficial bacteria. Because of the accumulation of these drugs in the water supply, our constant consumption of this water could lead to the bacteria in our bodies building resistance to antibiotics. If the micro-organisms become resistant to antibiotics, antibiotics will no longer be a viable option for the sick, because the drugs become less potent and effective.

What upsets me the most about this problem is that there is an easy solution. Just recently, the United States Drug Enforcement Agency coordinated, for the first time, a nationwide program called “National Take Back Day.” The objective of this program was to collect and remove potentially dangerous controlled substances from people’s homes with the hope of lowering prescription and over-the-counter drug abuse. I believe that this same program can be applied to reduce the possibility of expired drugs reaching our drinking water. The only flaw with this solution is that “National Take Back Day” occurs only once a year. How should people go about disposing of their drugs the other 364 days of the year?

I realize that it is not feasible to ask for a take back program that is available every day. However, I do not think it too much to ask for a program available on either a monthly or tri-monthly cycle. This will give people the opportunity to get rid of their expired medication more often. Ideally, I would like to see the pharmacies that sell these drugs get involved. If they were able to take back the drugs when they expired, then people would have a very convenient way to rid themselves of all the expired drugs they would normally flush down the toilet. This solution eliminates any potential abuse of the drugs if they are left around the house, and greatly reduces the contamination caused by flushing them.

Ideals are always hard things to achieve, that is why they are called ideals. I realize that people won’t always check the expiration date of their drugs, or if they do, they may take the easy way out and flush the drugs down the toilet. But I feel that if we give people a safe, environmentally-healthy way to dispose of their expired drugs, they will take advantage of it. “National Take Back Day” has the right idea; the Drug Enforcement Agency has the means to properly dispose of the drugs. If we can have “National Take Back Day” occur more often, or better yet, have the pharmacies’ cooperation in taking back expired drugs, the problem of drug contaminated water is greatly reduced, and we are healthier for it.

Sincerely,
Brian Estrella

Minhazur Rahman
Submitted to “The Targum”

Dear Editor,

Although many people do not realize it, the proper disposal of pharmaceutical drugs is a very important issue. It is safe to say that one of the most common items found in every
American household are pharmaceutical drugs. The proper disposal of the expired and unused drugs is important because environmental and health related issues could arise from the lack of it. Many people think that flushing the drugs down the toilet is a safe thing to do but in reality this produces adverse effects on environment. A law regulating the proper disposal of drugs has been highly desired by the people concerned about this matter. A fight to establish a state-wise or federal law has been going on for a long time, and although it took quite a long time, victory was achieved as the Secure and Responsible Drug Disposal Act was signed into a law by president Obama in the month of October 2010. This is a federal law which will allow people to drop off their expired and unused drugs to authorized facilities.

Establishing a law on proper drug disposal is half the battle. The other half is making general people aware of the existence of the law, and the negative consequences of improper disposal of drugs. The main risk having a cabinet full of drugs is the abuse of those drugs. The rate of prescription drug abuse has been rising alarmingly in the country. Kids can easily get a hold of the drugs and use those drugs. The adults may not even realize that the kids in the house are taking the drugs since it becomes harder to keep a track of the drugs as expired and unused drugs pile up in the medicine cabinet. As a result, children in a household may develop the habit of drug abuse. Many adults also develop the habit of drug abuse as sometimes it is just hard to resist the temptation when drugs are so readily available. Sometimes people just re-use a drug for another disease which might have similar symptoms of the disease that the particular drug is made for. Consumption of drugs without a physician’s consultation may cause serious health hazards. Improper disposal of drugs hurts humans indirectly by creating adverse effects on the environment. Excess pharmaceutical ingredients in medications end up entering the environment by disposal of leftover medicines which are flushed down the toilets or ground in garbage disposals. Pharmaceuticals can affect the environment in many ways. It has been found out that pharmaceuticals in water reduce fertility of many fish species. Pharmaceuticals affect other marine organisms by disrupting the marine ecosystem such as causing mutation and alteration in feeding system. As the sewage and wastewater treatment are not designed to cleanse water of antibiotics, the pharmaceutical molecules eventually can end up in drinking water. The consistent increase of antibiotics within drinkable water would eventually lead to the development of anti-biotic resistance in humans, and we will not be able to use antibiotics to fight off sickness as a result.

These are some of the common adverse effects that results in from the improper disposal of pharmaceutical products. More attention on this matter should be given by the media so the masses know about the seriousness of the issue. If the subject is covered widely by mass media then more and more people would know about it, and would come forward to make proper disposal of drugs a success by adopting the take-back program. The law regarding the take-back program is a new one, and it is the responsibility of those who know about this to make other people informed. One of the things that the pharmaceutical companies could do to help the cause is by adding a label on the container or the packet of a medicine that says to take the unused drug to the proper facilities for disposal. There should also be a brief warning label about the risk of improper disposal of drugs. The government could help the cause by expanding the proper disposal act to make the drug manufacturer to put these labels on the containers and packets of medicine. The government could also promote educational programs and infomercials to raise awareness about the issue. It will take concerted efforts from all sides to make the take-back program a success, and it is important that we do so that we can reduce the rate of drug abuse and create a better future in terms of environment.
After years of flushing medicines and prescription drugs down the toilet, a very familiar chemical has been on the rise in our drinking water: antibiotics. Although the presence of antibiotics may seem harmless at first glance, the steady rise of antibiotics in our drinking water has been found to be more harmful than helpful to the human body. Antibiotics are an asset in preventing human sickness, but with a constant intake of antibiotics from drinking water it has been found to have long-term effects for our bodies.

Antibiotics kill or prevent bacteria from growing which provides humankind with a solution for certain bacterial illnesses, but when the intake of antibiotics becomes daily (through drinking water) the body's response to illness in the future can be weakened. The microorganisms that are beneficial to our bodies can grow a resistance to the antibiotics which can weaken the potency antibiotics have in treating illnesses. This is a growing concern for the future of what antibiotics can do for humankind.

The presence of residual antibiotics within groundwater can be maintained with the prevention of flushing medicines and over the counter drugs down the toilet. Correctly disposing of medicines is an easily prevented task so why not restrain from further harming the environment and our bodies? A new law signed by President Obama under the Secure and Responsible Drug Disposal Act was just recently signed which provide authorized facilities for individuals to dispose of unused or expired medications, but how many of the general public are aware of the this? Certain laws that are not of high concern to the general public tend to fly under the radar, but by exposing the public to proper methods of disposing medications we can experience both immediate and long term advantages.

Prescription drugs are given out on a daily basis and drugs go unused or become expire quite often. Would it be feasible to keep expired drugs in the medicine cabinet that have decreased in potency or become unusable? The accessibility of unused drugs brings up many other issues which include ease of access to children and abuse of unused drugs and the possible health concerns of certain drugs that are unstable due to certain storage conditions. In order to keep these drugs out of the hands of those who would abuse them many would rather flush them down the toilet. This should not be the most viable option as it has been proven to be harmful to the environment. The general public should be informed on how to properly dispose of drugs to keep both the Earth and ourselves healthy. All it takes is a simple question to your pharmacists and you will be making this Earth a little more environmental friendly for the rest of us.

Sincerely,

Kevin Ng