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April 2009 "Pharmaceutical Waste: Impact on Pharmacy" #707-000-09-004-H01-P

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THIS MONTH  
"Pharmaceutical  
Waste"

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**HAVE YOU RECENTLY MOVED? PLEASE NOTIFY US.**

As a result of your suggestions, we're presenting a topic that we've never covered before. The goals are to review the risks associated with pharmaceutical waste, the federal regulations that govern disposal and provide suggestions on how pharmacists can work to decrease inappropriate disposal of unused medications. This lesson provides 1.25 hours (0.125 CEUs) of credit, and is intended for pharmacists in all practice settings. **The program ID # for this lesson is 707-000-09-004-H01-P. Pharmacists completing this lesson by April 30, 2012 may receive full credit.**

**To obtain continuing education credit for this lesson**, you must answer the questions on the quiz (70% correct required), and return the quiz. Should you score less than 70%, you will be asked to repeat the quiz. Computerized records are maintained for each participant.

If you have any comments, suggestions or questions, contact us at the above address, or call toll free 1-800-323-4305. (In Alaska and Hawaii phone 1-847-945-8050). **Please write your ID Number (the number that is on the top of the mailing label) in the indicated space on the quiz page** (for continuous participants only).

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**The objectives of this lesson are such that upon completion the participant will be able to:**

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1. Discuss the environmental impact of pharmaceutical waste.
  2. Describe practices that contribute to the problem of pharmaceutical waste.
  3. Identify common pharmaceuticals that are P-listed RCRA waste.
  4. Explain current recommendations for disposal of household pharmaceutical waste.
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**All opinions expressed by the author/authors are strictly their own and are not necessarily approved or endorsed by W-F Professional Associates, Inc. Consult full prescribing information on any drugs or devices discussed.**

## BACKGROUND

The proper disposal of medications is an important issue that has received significant attention in the last several years. Approximately 5,000 tons of pharmaceuticals and personal-care-products are disposed of each year in the US. This includes prescription medications as well as non-prescription products, diagnostic agents, veterinary-use chemicals, homeopathic products and fragrances. In addition to the amount of medications actually discarded, large quantities of expired or unwanted prescription drugs may be stashed in consumers' (who may not want to throw out these expensive medications) homes. One of the larger sources of unused prescription and non-prescription medications is nursing homes. One source suggests that nursing homes alone may account for more than 70 tons of waste medication annually. Currently many nursing homes return unused prescription drugs to the pharmacy service provider. In many states, nursing homes are exempt from regulations related to pharmaceutical waste, as the waste they create is considered household waste.<sup>1</sup>

One of the major concerns with unused medication stored in the home is accidental poisoning, particularly in children. In addition to the potential for poisonings, pain medications and other products can be diverted for recreational use. Recent media reports have highlighted the increase in prescription drug abuse by teenagers. One of the top 4 abused drug classes by teenagers is psychotropic medications. Therefore it is important for consumers to remove unused medications from the home.<sup>1</sup>

Most pharmacies will agree that they have a policy in place for handling undispensed medications that are outdated or unwanted; however, they generally do not have a clear recommendation for how consumers should dispose of unused medications in the home. Surveys have shown that most consumers throw their unused prescription medications in the trash or flush them down the toilet.<sup>1</sup>

This lesson will review the risks associated with pharmaceutical waste, the federal regulations that govern disposal of pharmaceutical waste and provide suggestions on how community pharmacists can work to decrease the inappropriate disposal of unused medications.

## PHARMACEUTICALS IN THE WATER

In 2002, the United States Geologic Society conducted a study to determine the amount of organic wastewater contaminants (OWC). Organic wastewater contaminants include pharmaceuticals, hormones, and other organic impurities. This study sampled 139 different streams in 30 states and found more than 95 OWCs. Over 80% of these streams were contaminated with more than 1 OWC. These pharmaceuticals enter the wastewater treatment plants through either excretion or disposal of unwanted medications. The excretion pathway is when humans and livestock excrete pharmaceuticals which then end up in either sewage pathways or in surface runoff, such as with livestock. The second method is by direct disposal of unwanted medications to septic tanks, sewers or landfills. When pharmaceuticals are disposed of through the sewer system, they enter the wastewater treatment plants. Although there are several levels of treatment within wastewater plants, none of them are designed to eliminate pharmaceuticals from the water.<sup>2</sup>

In 2008, a 5 month investigation was conducted by the Associated Press to determine the contamination of our drinking water by pharmaceuticals. This study found that 80% of the watersheds tested contained traces of drugs. The drugs found in the water-sources included: narcotics, antibiotics, corticosteroids, anticonvulsants and oral contraceptives. There is concern that these drug contaminants can have a negative effect on animals and humans. Some pharmaceutical waste may contain mercury, selenium or other heavy metals. Some pharmaceuticals act as endocrine disruptors that may result in reproductive changes of fish. Antimicrobial agents found in the water supply may increase the risk for development of resistant bacteria.<sup>3</sup>

When products are dumped into landfills, the pharmaceuticals may leach out into the surrounding soil. The water that carries this leachate is often sent to the same treatment plants resulting in more pharmaceutical contamination. Currently the most effective

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way of removing unwanted pharmaceuticals is by incineration at appropriate high temperatures. Although this is the most effective method, cities and states do not have the resources and staff to incinerate all unwanted medications.<sup>2,3</sup>

Historically, pharmacists have primarily focused on ensuring that unused medications did not get into the hands of children or diverted for recreational use. Although both of these goals are important, there are now federal and state laws that demand we dispose of these agents in a safe and responsible way.

#### **IMPACT ON THE ENVIRONMENT**

A number of researchers have identified the potential risks to the environment associated with pharmaceutical waste. There is concern that the dumping of drugs, particularly hormones, into the water and landfills can have effects on animals as well as humans. Reports have shown feminization of male fish, sluggish activity of aquatic animals and decreased appetites of animals exposed to contaminated water.<sup>4</sup>

Antibiotic resistance is increasing throughout the United States. In a study by Heberer, water samples from rivers in Ohio revealed *E. coli* organisms with resistance to penicillin, vancomycin and tetracycline. Reports of the greatest resistance were in those samples that contained high concentrations of antibiotics.<sup>5</sup>

Not only is there concern about antibiotic resistance, endocrine disrupters (pharmaceuticals that can affect the endocrine system) have been collected in water samples. These agents can have an effect on the thyroid, adrenal glands and reproductive tracts of men and women. Endocrine disrupters can have an impact on future generations as their levels continue to appear in the water samples. Since 1939, there has been a 50% drop in human male sperm count, as well as an increase in cancer caused by hormones (breast, testicular and prostate).<sup>4</sup>

#### **FEDERAL REGULATIONS**

In 1976, the federal government approved the Resource Conservation and Recovery Act (RCRA), which regulates the transport, treatment and disposal of hazardous waste in the United States. This act also encourages the minimization of hazardous waste and requires tracking of hazardous waste from the originator until it is destroyed. It was designed to address the appropriate handling of "industrial" hazardous waste and was not originally designed to address pharmaceutical waste. Hazardous waste was defined as those chemicals that have such a significant impact on the environment that they must be disposed of through a specific separate channel and not permitted in the waterways or landfills. The Environmental Protection Agency (EPA) is responsible for the implementation and enforcement of this act.<sup>6</sup>

It is important to be aware that there are significant civil and criminal fines associated with violations of RCRA. Corporations can be fined \$32,500 per violation per day and individuals can be fined or imprisoned.<sup>6</sup>

The RCRA requirements are intended for organizations that generate hazardous waste. This law was enacted as a response to national environmental disasters, such as Love Canal and Three Mile Island. It was not designed to address household waste, and households are EXEMPT from RCRA.

When describing hazardous waste as defined by EPA in RCRA, the focus is on hazardous waste that may impact humans as well as the environment. EPA regulations do not include the infectious wastes or biohazardous wastes that are addressed by OSHA. There are specific definitions of hazardous waste within RCRA. RCRA waste is defined as P-list agents, U-list agents and agents that fall into any of the four characteristics of hazardous waste. The four characteristics of hazardous waste are ignitability, corrosiveness, reactivity and toxicity.<sup>6</sup>

P - listed chemicals are defined as those agents that are acutely hazardous. Agents that are P-listed must be the sole active ingredient in the product. Any empty containers that were used to store P-list agents are also considered RCRA hazardous waste.<sup>6</sup> Table 1 lists examples of P-list pharmaceutical waste.

**Table 1. P-Listed Pharmaceutical Waste<sup>6</sup>**

Pharmaceutical	P-list number
Arsenic trioxide	P012
Epinephrine (non-salt)	P042
Nicotine	P075
Nitroglycerin*	P081
Phentermine (C IV)	P046
Physostigmine	P204
Physostigmine Salicylate	P188
Warfarin >0.3%	P001

\*Exempt federally (and some states) if in final dosage form

U-listed agents are toxic with more chronic exposure. Many U-listed chemicals are chemotherapy agents commonly used in hospital and cancer-care clinics. It is important to note that both the P-listed and U-listed agents have not been updated since 1976. Therefore, agents marketed after 1976 may fall into the final category of RCRA hazardous waste - those agents that have specific dangerous characteristics:<sup>6</sup>

- Ignitable-compressed gas, strong oxidizers, aqueous solutions with 24% or more alcohol and flashpoint < 140°F, non-aqueous drug with flashpoint < 140°F
- Corrosive-pH ≤ 2 (highly acidic) or pH ≥ 12.5 (highly basic)
- Reactive-explosive or water reactive waste. Nitroglycerin formulations exempted.
- Toxic-heavy metals, silver, barium, arsenic, lindane, mercury

Table 2 describes examples of U-listed pharmaceutical agents. One of the dilemmas that pharmacists face is that over 100 chemotherapy agents are not regulated by EPA or RCRA. Examples of agents that are not regulated include methotrexate, cisplatin, and tamoxifen. Although these agents are not categorized as RCRA hazardous waste, they are considered chemotherapy waste and are handled as dangerous waste in hospitals and clinics.

**Table 2. U-listed Pharmaceutical Waste<sup>6</sup>**

Chloral hydrate (C IV)	U034	Streptozotocin	U206
Chlorambucil*	U035	Lindane	U219
Cyclophosphamide*	U058	Saccharin	U202
Daunomycin*	U059	Selenium Sulfide	U205
Diethylstilbestrol*	U089	Uracil Mustard*	U237
Melphalan*	U150	Warfarin < 0.3%	U248
Mitomycin C*	U010		

\*chemotherapy agents

### STATE REGULATIONS OF PHARMACEUTICAL WASTE

As a pharmacist, it is important to be aware of state environmental protection agency regulations. State regulations may be more rigid than federal requirements. Contact your local or state EPA to determine if there are more stringent requirements in your state.

Nine states have investigated or enacted legislation to determine the need to establish a study commission or have drug man-

ufacturers become more involved in medication disposal. In Washington State, a proposed stewardship program is under consideration that would require all producers of drugs sold there to be required to participate in the funding of a drug return program. Maine has developed a drug return program that is managed by the State Drug Enforcement Agency. Residents can obtain pre-paid mailing envelopes and send unwanted drugs to a central collection site. In addition to this program, the state is considering one that requires drug manufacturers to pay for the costs of disposal of their products.<sup>3,7</sup>

In California, Governor Schwarzenegger has established model drug take-back programs that ensure the proper disposal of unused medications. These programs will be expanded into clinics, pharmacies and other healthcare locations. California is also considering legislation to require drug manufacturers to take a more active role in funding programs that address the health hazards caused by medications in the water supply.<sup>3</sup>

**IMPACT FOR THE COMMUNITY PHARMACY**

One of the common questions that community pharmacists are asked is "Can I return unused prescription medication?" When consumers have medications that they no longer need or want, the initial action is to try to return the medication to the dispensing pharmacy. In many states, pharmacists are not permitted to accept prescription or non-prescription medications for return. The Controlled Substance Act (CSA) prohibits pharmacists from receiving controlled substances from a consumer for return or destruction. Only law enforcement agents are permitted to accept controlled substances from consumers. The CSA considers nursing homes to be households so that law enforcement may accept controlled substances from nursing homes for destruction.<sup>1</sup>

Reverse distributors, who receive undispensed, expired medications from pharmacies for credit, cannot accept any medications from consumers. They are not licensed to receive and dispose of household waste.

So when a consumer arrives at the pharmacy with a bag of unused or expired medication, how can the pharmacist handle the situation?

**RECOMMENDATIONS FOR DISPOSAL**

Various agencies and organizations have recommendations for consumers on how to handle unwanted or expired medications. The Food and Drug Administration (FDA) recommends that medications be removed from their original container and mixed with kitty litter or coffee grounds to discourage diversion. The FDA also recommends that drugs with a high abuse potential be disposed of by flushing the product down the toilet.<sup>8</sup>

Table 3 lists those agents the FDA recommends to be flushed to prevent diversion.

**Table 3. Medications to be destroyed by flushing down the toilet**

Actiq (fentanyl)	Avinza (morphine)
Daytrana patch (methylphenidate)	Duragesic patch (fentanyl)
Fentora (fentanyl)	Meperidine
Oxycontin (oxycodone)	Percocet (oxycodone & acetaminophen)
Reyataz (atazanavir)	Tequin (gatifloxacin)
Xyrem (oxybate sodium)	Zerit (stavudine)

The EPA recommends that unused medication be kept in its original container for purposes of identification, but that any specific patient information (name, address) be removed or covered with black marker. It is critical to keep the medication in the original container so that the agent can be quickly identified in the case of an accidental poisoning. These medications can be mixed with water, salt or charcoal to prevent diversion. The product should then be placed in a container (empty yogurt container or margarine tub) and disposed of in household trash. Community pharmacists can provide copies of these guidelines to customers to encourage proper disposal of unwanted or expired medications. **See Reference # 8. From the indicated website you can access the White House Office of Drug Control Policy Statement. It can be reproduced & shared with patients.**

### MEDICATION COLLECTION PROGRAMS

Pharmacists may consider developing a medication collection program in the community. It is important to understand federal, state and local regulations when designing a medication collection program. RCRA can affect medication collection programs since some medications may be hazardous waste (nicotine patch, lindane, Alkeran<sup>®</sup>). Other products may be hazardous due to ignitability (rubbing alcohol) or toxicity (mercury from thermometer). As stated earlier, waste generated by an individual is exempt from RCRA, but companies or pharmacies that collect hazardous waste from households may be required to obtain a permit to do so. Be aware of state regulations that may impact developing a medication collection program.<sup>7</sup>

When developing a program to collect hazardous waste, you must also have a plan to dispose of the waste properly. Contact a licensed hazardous waste hauler prior to the event to determine what your transportation and disposal requirements will be. Confirm that the waste hauler will bring empty drums or containers for collection of the non-controlled substance hazardous waste, and finalize a contract for waste removal.<sup>9</sup>

Since it is nearly impossible to prevent controlled substances from coming to your collection site, it is imperative that law enforcement officials be on-site at your medication collection program to take possession of any controlled substances. Law enforcement agents may take possession of controlled substances at the medication collection program and move them to a secure location at the police station (evidence locker) until destruction. It is prudent to have a discussion about your plan to collect unused medication with your local Drug Enforcement Agency and police department during the planning stages to ensure you are in compliance with all laws and regulations.<sup>9</sup>

When scheduling a medication collection program it is critical to have proper staff available. A law enforcement agent must be available to collect controlled substances. The pharmacist(s) sort medications as controlled and non-controlled substances. They can also use available resources to identify medications that are not in their original container. Any medication that cannot be identified using available resources should be handled as a controlled substance. The pharmacist is also responsible for creating an inventory of controlled substances, including the name of the drug, dosage and amount received. Many hazardous waste haulers will also require a manifest of hazardous material be created. Finally, it is necessary to have an approved hazardous waste hauler remove the product from the collection site and dispose of it properly. It is important to have ancillary staff available as well to serve as greeters, data entry staff and to answer general questions from the public. Proper planning of a medication collection program can ensure a smooth and successful program.<sup>9</sup>

### EXAMPLE OF MEDICATION COLLECTION PROGRAM

#### Ukrops

On September 25, 2007 the Ukrops supermarket in Richmond Virginia conducted a medication collection program in their Brook Run Richmond store. The Ukrops store manager arranged with county police to be present to take possession of controlled substances collected. A hazardous waste hauler was contracted and provided empty containers for the store. The hazardous waste hauler also removed all products from the collection site at the end of the program. Pharmacy students from the local college of pharmacy assisted the pharmacist in counting non-controlled substances and identifying unknown tablets. This collection program resulted in 14.5 gallons of returned, non-controlled medication and 2 gallons of returned, controlled substances. The lessons learned from this program included the following:

- Better promote the program using press releases, public service announcements, store circulars, and websites
- Encourage pharmacy student participation. They were an asset to the program, assisting the pharmacist in inventory and identification of unknown drugs
- Ensure that the program is scheduled on a big shopping day to ensure high traffic

#### CVS-Connecticut

The Windsor, CT CVS pharmacy developed an "**unwanted medication collection event**" in conjunction with the Farmington River Watershed Association and the local Fire Department. This program was held at the community room of the Fire Department. One benefit of combining the resources of these 3 organizations was the well coordinated promotion of the event. Advertising as well as community outreach occurred prior to the event. The CVS pharmacy provided 2 pharmacists, 2 pharmacy students and 5 pharmacy technicians to oversee the medication return. Due to the Connecticut state law, a local DEA agent was required to be onsite to take posses-

sion of the controlled substances.<sup>9</sup>

This program collected 170 gallons of returned, non-controlled medications, and 10 gallons of controlled substances from over 25 communities. On average, participants brought 20 medications for return.<sup>9</sup>

### **Pharmacist Case Scenarios**

**Jack Wister**, a longtime customer of your pharmacy, recently lost his wife to cancer. He is very concerned because he has a number of narcotic pain pills (Oxycontin) at home from his wife's prescription. He wants to give them to you to destroy. He is afraid that someone may try to break into his home and steal them to sell on the street.

What do you tell Mr. Wister?

Reassure Mr. Wister that you will help him with his problem. Explain that you are not permitted by law to take back narcotics from patients. However, you can communicate to him that his wife's pain medication is a drug on the FDA list that can be flushed down the toilet. You have made several copies of the FDA list of drugs that can be flushed and you give a copy of this list to Mr. Wister.

**Mrs. Jackson** has a prescription for Cardizem. Her doctor has switched her to a different medication and she no longer needs the Cardizem. She wants to dispose of the medication but is unclear of what she should do. What do you tell her?

Since this is not a controlled substance or RCRA listed hazardous substance, you can recommend that Mrs. Jackson follow some basic recommendations. Place some kitty litter or used coffee grounds with the prescription container with the Cardizem. She should use a black marker to block her name and address on the label. She can then place this prescription container in an opaque container, such as an empty yogurt container or margarine tub. Seal the container and dispose of with her household trash.

**Mr. Wilson** has a number of prescriptions that he no longer is using. He is interested in disposing of them and heard something about a community program that takes unwanted medication in the Salt Lake City area. Can you help him?

You locate the local household hazardous waste collection events by going to the website: [www.takebacknetwork.com](http://www.takebacknetwork.com). You scroll over the map to the state of Utah and click on the icon. You scroll down and determine that the 4<sup>th</sup> Thursday of the month (April-September) there is a collection event where Mr. Wilson can drop off his unwanted medications. You provide him with the address and hours of the event.

### **Impact for the Hospital Pharmacy**

The impact of pharmaceutical waste management for the hospital pharmacist is quite complex. Most hospitals generate significant hazardous waste in the form of biohazardous waste, infectious waste, universal waste and pharmaceutical waste. As with other complex processes in hospital pharmacy practice, the department of pharmacy has specific policies in place that regulate proper disposal of these hazardous materials. Historically hospitals and other healthcare providers were not held to the same standards for hazardous waste as chemical plants and other producers of hazardous waste. This has changed and the Environmental Protection Agency is now looking more closely at how hospitals and healthcare providers dispose of pharmaceutical waste. Hospitals are now evaluating their pharmaceutical waste management practices to ensure compliance with both federal and state regulations.<sup>10</sup>

In order for a hospital pharmacy to be fully compliant with RCRA, there are significant operational and financial barriers to overcome. Pharmacists have not been educated on the state and federal regulations and may not understand the requirements. In addition, if drugs must be sorted into different disposal processes, there is significant risk to the individuals sorting material and will require additional labor. Compliance with RCRA regulations has a financial impact on the organization. Maintaining various waste streams with appropriate containers at the nursing unit will result in additional expense. Red bag waste (sharps containers) cost the institution around 20-30 cents for each pound, while chemotherapy waste is \$4 per pound and RCRA waste is up to \$8 per pound. An additional financial burden can be incurred if an organization is fined for non-compliance with the regulations. Fines can be \$32,500 per day.<sup>10</sup>

One significant role for the hospital pharmacist is determining the appropriate waste stream for new drugs. As a new drug is added to the formulary and placed into pharmacy inventory, the pharmacist can pro-actively determine how it will impact the hospital waste stream. It may be necessary to restrict access of the new drug to specific prescribers or nursing units to ensure compliance with regulations.

## CHANGES ON THE HORIZON

### City of Chicago

The Chicago Department of Environment and the Chicago Police Department launched a new program in November 2008 that addresses the disposal of expired or unused prescription drugs by offering permanent prescription drop box locations at five Chicago Police Department Area Centers. Chicago is the first big city to offer permanent drop-off locations. Other cities are considering similar programs for permanent drop boxes.<sup>11</sup>

### Product Stewardship Institute

The Product Stewardship Institute is a not-for-profit organization that works with state and local agencies to reduce the health and environmental impact of consumer products. The Pharmaceuticals Project of the Institute is responsible for evaluating the need for a nationwide system for the management of unused pharmaceuticals. The Project involves 43 state members and is working to increase the safe, legal, and environmentally appropriate collection and disposal of unused pharmaceuticals through the development of best management practices.<sup>12</sup>

### Environmental Protection Agency

In December 2008, the EPA announced two proposed regulations that may directly impact hospitals and healthcare providers. The first proposed rule addresses the emission levels from medical/infectious waste incinerators. This proposed change will require a reduction in emissions of 9 pollutants from medical waste incinerators and would require improved record-keeping and inspections of these incinerators.<sup>13</sup>

The second proposal has to do with pharmaceutical waste. This proposal would actually reclassify pharmaceutical waste as universal waste and prevent its mismanagement. Currently a significant amount of pharmaceutical waste is disposed of in the sewer system. This regulatory change would address that issue.<sup>13</sup>

## CONCLUSION

Consumers, although very interested in environmental issues, currently dispose of pharmaceuticals in the trash or down the toilet, contaminating landfills and water supplies. This may be due to a lack of understanding of the risks of pharmaceutical waste or a lack of education regarding the regulations. Pharmacists are in a unique position to educate the consumer about the risks associated with improper disposal of pharmaceutical waste and provide guidance to the consumer on how best to dispose of unwanted medications.

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**ADDITIONAL RESOURCES AND LINKS**

<http://www.takebacknetwork.com/index.html>. Information on medication take-back programs throughout the United States.  
[www.productstewardship.us](http://www.productstewardship.us). An organization that is working on development of a nationally coordinated pharmaceutical waste program.  
[www.symposia.ashp.org/pharmawaste](http://www.symposia.ashp.org/pharmawaste). This is a site for additional information about managing pharmaceutical waste for the health system-pharmacist.  
[www.epa.gov](http://www.epa.gov). Search this website for additional information regarding RCRA requirements.

**REMAINING TOPICS FOR 2009**

<b>Herbals</b>	<b>Update on the HPV Vaccine</b>
<b>Contemporary Parkinson’s Therapy</b>	<b>Commonly Acquired MRSA</b>
<b>Current Status of Hormone Replacement Therapy</b>	
<b>Update: Chronic Fatigue Syndrome &amp; Fibromyalgia</b>	<b>Review &amp; Update on Immunizations</b>

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NAME \_\_\_\_\_ (ID # 1st line on label) \_\_\_\_\_

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CHECK IF NEW ADDRESS  **ARE YOU LICENSED IN FLORIDA? IF YES FL LIC** \_\_\_\_\_

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**LESSON EVALUATION**

Please fill out this section as a means of evaluating this lesson. The information will aid us in improving future efforts. Either circle the appropriate evaluation answer, or rate the item from 1 to 7 (1 is the lowest rating; 7 is the highest).

1. Does the program meet the learning objectives?

- |  |     |    |
|--|-----|----|
| Discuss environmental impact of pharmaceutical waste                           | Yes | No |
| Describe practices that contribute to the problem of pharmaceutical waste      | Yes | No |
| Identify common pharmaceuticals that are P-listed RCRA waste                   | Yes | No |
| Explain current recommendations for disposal of household pharmaceutical waste | Yes | No |

2. Was the program independent & non-commercial Yes No

	Poor		Average		Excellent
	1 2 3		4 5		6 7

3. Relevance of topic

4. What did you like most about this lesson? \_\_\_\_\_

5. What did you like least about this lesson? \_\_\_\_\_

**Please Select the Most Correct Answer**

- |   |   |
|---|---|
| <p>1. Impact of disposing of medications in the water system may include:<br/>                 A. Increase in antibiotic resistance<br/>                 B. Feminization of male fish<br/>                 C. Negative effects on the thyroid, ovaries, &amp; testicles<br/>                 D. All of these</p> <p>2. Which of these is not a P-listed drug?<br/>                 A. Nicotine<br/>                 B. Warfarin&gt;0.3%<br/>                 C. Saccharin<br/>                 D. Epinephrine</p> <p>3. About how many tons of pharmaceutical waste are discarded annually?<br/>                 A. 10,000<br/>                 B. 5,000<br/>                 C. 1,000<br/>                 D. 22,000</p> <p>4. Which of these may be disposed of by flushing down the toilet?<br/>                 A. Percocet<br/>                 B. Oxycontin<br/>                 C. Duragesic<br/>                 D. All of these</p> <p>5. In order to prevent diversion of unwanted prescriptions, the FDA recommends mixing with kitty litter or coffee grounds.<br/>                 A. True      B. False</p> | <p>6. When asked, consumers generally say they dispose of drugs by throwing in trash or flushing down the toilet.<br/>                 A. True<br/>                 B. False</p> <p>7. The EPA can levy a fine against an individual or corporation for violations of the pharmaceutical waste disposal regulations of up to \$32,500 per day.<br/>                 A. True<br/>                 B. False</p> <p>8. When planning a medication collection program, the pharmacist should:<br/>                 A. Develop an inventory of controlled substances returned<br/>                 B. Contact local law enforcement<br/>                 C. Contract a hazardous waste hauler<br/>                 D. All of these</p> <p>9. In a survey of 139 streams, the US Geologic society found 80% of streams tested positive for organic contaminants<br/>                 A. True      B. False</p> <p>10. A recent proposal by the EPA is to reclassify pharmaceutical waste as:<br/>                 A. Red bag waste<br/>                 B. Chemotherapy waste<br/>                 C. Universal waste<br/>                 D. None of these</p> |
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