

## Disposal of Pharmaceutical Waste: What a Technician Should Know

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## Conflicts of Interest

- The speaker has nothing to disclose in relation to this subject matter.



## Learning Objectives

- Identify at least three Federal and State agencies interested in the proper disposal of outdated and unwanted pharmaceuticals.
- State the three categories of listed waste that pharmacies are likely to generate.
- Recognize the appropriate disposal containers (colors) for sharps, used items with trace contamination of chemotherapy, bulk disposal of hazardous pharmaceutical waste, dual waste as well as suggested containers for non-hazardous pharmaceutical waste.



## Who is interested in proper pharmaceutical waste disposal?

- US Environmental Protection Agency (EPA)
- Drug Reinforcement Agency (DEA)
- Department of Transportation (DOT)
- Fish and Wildlife Service (FWS)
- State of Illinois
- And, the Joint Commission (JC)



## What is Pharmaceutical Waste?

- Pharmaceutical waste includes expired, unused, spilt, and contaminated pharmaceutical products, drugs, and vaccines, that are no longer required and need to be disposed of appropriately.
- This category also includes discarded items used in the handling of pharmaceuticals, such as bottles or boxes with residues, gloves, masks, connecting tubing, and drug vials.
- Pharmaceutical waste is classified as hazardous and non-hazardous waste.



## What is Hazardous Pharmaceutical Waste?

- Hazardous pharmaceutical waste is defined as liquid or solid wastes that contain properties that are dangerous or potentially harmful to human health or the environment.
- The Resource Conservation and Recovery Act of 1976 (RCRA – “rick-rah”) creates several categories of “listed” hazardous waste, three of which apply to pharmaceutical waste: P, U, and D.



### What NOT to do with pharmaceutical waste?

- DO NOT pour down the sink
- DO NOT flush down the toilet
  - Illinois now has a law prohibiting health care workers pouring meds down the sink or flushing down the toilet (except I.V. meds and controlled drugs)
- DO NOT give to a reverse distributor (outdated pharmaceuticals that are not waste should be given to them for removal)



### Proper Segregation is Key



### What SHOULD you do with pharmaceutical waste?

- Separate and collect at the source of generation (Nursing Unit, Pharmacy)
- Non-hazardous waste goes into proper containers (blue/white buckets)



### What SHOULD you do with pharmaceutical waste?

- Hazardous waste goes into proper containers (black buckets) – NO sharps
- Separate P listed from other hazardous waste to minimize disposal costs
  - Do not mix incompatible materials in the same bucket
  - Some vendors are now using reusable black containers



### What SHOULD you do with pharmaceutical waste?

- Trace amounts (< 3% of original dose) of chemotherapy goes into the proper containers (yellow buckets) –NO sharps
- Gloves, gowns, empty syringes, etc.

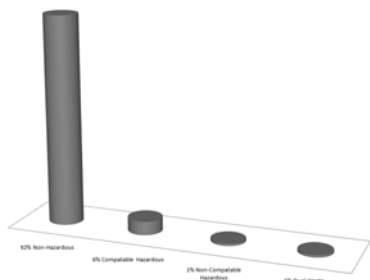


### What SHOULD you do with pharmaceutical waste?

- Dual waste (hazardous + infectious) goes into proper containers (purple buckets)
- e.g. Live vaccine and RCRA Hazardous
  - Tetanus Toxoid
  - Decavac



## Breakdown of Pharmaceutical Waste



## What is a P listed waste?

- “acutely hazardous” waste LD50 < 50 mg/kg like
  - Arsenic trioxide
  - Nitroglycerin
  - Phentermine
  - Physostigmine
  - Warfarin
  - Empty containers of P listed medications



## What is a U listed waste?

- Hazardous waste as defined by RCRA
  - Selenium containing shampoos
  - Lindane containing shampoos
  - Many chemotherapy medications
    - Treat all chemotherapy as U listed waste, even though that are currently not on the governmental list.
  - Chloral hydrate
  - Reserpine



## What is a D listed waste?

- Drugs that are either:
  - Ignitable (D001)
    - Aqueous Solution containing 24% alcohol or more by volume & flash point < 140° F.
  - Corrosive (D002)
    - Includes oxidizers like AgNO<sub>3</sub>, K Permanganate
    - Corrosive waste has a pH of 2 or less or a pH of 12.5 or above.
  - Reactive (D003)
    - Nitroglycerin is exempt
  - Toxic (D004+)
    - Selenium, Chromium, Silver, Mercury (thimersol preservatives)



## Why not throw everything into a black bucket?

**Inappropriate Waste Segregation**  
Can be costly!

Biohazard Infectious Waste (Regulated Medical)	Blood products, sharps, items contaminated with liquid blood, etc.	\$0.04/pound
Hazardous Waste	Empty chemotherapy vials, syringes, IVs, tubing, gowns, packaging, gloves, etc.	\$0.40/pound
RCRA Hazardous Waste	Bulk chemo in vials, unused IV's, P, U, toxic & ignitable. Overly contaminated gowns, glove, chemo spill clean up materials	\$4.00/pound



## Consolidating pharmaceutical waste in the Pharmacy

- Each Pharmacy department needs to find a secure location (it can be outside the Pharmacy) to store pharmaceutical waste prior to transfer to the licensed treatment storage and disposal facility (more about them later).
- A special permit is needed for waste stored on-site for more than 90 days.



## Labeling Hazardous Waste

- Containers need to be properly labeled before transferring off-site.



RCRA Hazardous Waste



## Manifest "Destiny"

- A cornerstone of RCRA is the manifest system.
- This is similar to drug pedigree tracking.
- The manifest is a six part data sheet that identifies the contents and quantities hazardous substance in each waste shipment.
- The manifest accompanies the waste from the generating facility to the final disposal site and allows for "cradle to grave" tracking of the waste.
- Manifests can only be prepared and signed by personnel who have received DOT training for handling hazardous substances.
- A copy of the manifest is returned to the generator after destruction of the hazardous waste where it is kept on file.




## Licensed Treatment Storage and Disposal Facility (TSDF)

- Any company or person who wishes to transport, store, treat or dispose of hazardous waste (put in a landfill, dump, ground, air, water, etc.) must have a RCRA permit for that activity.
- Such a licensed company is known as a Licensed Treatment Storage and Disposal Facility (TSDF).
- Companies are licensed for a period of five years.
- Be sure to use a reputable TSDF, because the generator is ultimately responsible for hazardous waste improperly packaged or labeled, or for improper disposal.



Any questions?



Post Test Questions

1. “Cradle to grave” refers to:
  - A. Proposed national health insurance
  - B. The extent of responsibility of pharmacies for the medications they purchase and distribute
  - C. The life story of Jonathan Roberts, America’s first hospital pharmacist
  - D. The name of a rock group discussed in the article
  
2. Organizations that have interest in regulating the transportation and disposal of outdated and unwanted pharmaceuticals include all listed agencies EXCEPT:
  - A. The Environmental Protection Agency
  - B. U.S. Department of Education
  - C. Drug Enforcement Agency
  - D. The Joint Commission
  
3. The Resource Conservation and Recovery Act of 1976:
  - A. Is a federal law governing the proper disposal of solid and hazardous waste
  - B. Was signed into law by President John F. Kennedy
  - C. Was superseded by state laws governing the disposal of pharmaceutical waste
  - D. Recognizes six categories of hazardous waste: F, K, P, U, D and X
  
4. Medications considered hazardous pharmaceutical waste include:
  - A. Medications set aside for return to the manufacturer
  - B. Medications set aside for return through a reverse distributor
  - C. Used transdermal patches disposed of by the patient at his home
  - D. Medications opened on a nursing unit but not administered to the patient
  
5. A manifest as discussed in the presentation is:
  - A. A list of cargo or passengers on a ship or plane
  - B. An invoice of goods carried on a truck or plane
  - C. A list of railroad cars according to owner and location
  - D. A list of hazardous substances waiting for transport for destruction
  
6. Blue or white/blue buckets are for the disposal of:
  - A. Used items contaminated with trace amounts of chemotherapy
  - B. Containers of hazardous medications containing > 3% of their original contents or P-listed waste
  - C. Dual waste (infectious + hazardous waste)
  - D. Non-hazardous pharmaceutical waste
  
7. Yellow buckets are for the disposal of:
  - A. Used sharps
  - B. Used items contaminated with trace amounts of chemotherapy
  - C. Containers of hazardous medications containing > 3% of their original contents or P-listed waste
  - D. Dual waste (infectious + hazardous waste)

ICHP Annual Meeting 2010  
McEvoy – Disposal of Pharmaceutical Waste  
121-000-10-055-L03-T

8. Black buckets are for the disposal of:
  - A. Used sharps
  - B. Used items contaminated with trace amounts of chemotherapy
  - C. Containers of hazardous medications containing > 3% of their original contents or P-listed waste
  - D. Non-hazardous waste
  
9. Disposal of hazardous pharmaceutical waste should be done by:
  - A. Reverse distributors
  - B. Drug Wholesalers
  - C. A licensed treatment and storage facility (TSDF)
  - D. Municipal trash haulers
  
10. Filled black buckets may be sent for destruction by:
  - A. UPS
  - B. A licensed hazardous waste hauler
  - C. U.S. First Class Mail
  - D. FedEx Ground