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• Identify at least three Federal and State agencies interested in the proper disposal of outdated and unwanted pharmaceuticals.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 Enforcement 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- DO NOT give to a reverse distributor (outdated pharmaceuticals that are not waste should be given to them for removal)

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 thought 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 AgNO3, 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?

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](image)

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 superceded 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)
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