

# IMPLEMENTING A PHARMACEUTICAL WASTE PROCESS

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AKPhA  
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Health-  
System  
Pharmacy

# DISCLOSURES

- **Authors of this presentation have no disclosures concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation**

# OBJECTIVES

- Review history of pharmaceutical waste disposal
- Review best practice and regulations for the disposal of pharmaceutical waste
- Identify medications and routes for disposal of pharmaceutical waste

# QUESTION FOR THE AUDIENCE

- Hospital vs Ambulatory
- How many have heard about RCRA hazardous waste?
- How many people have implemented a pharmaceutical waste program?
- How many people are in the process of implementing a pharmaceutical waste program?

# TEST YOUR KNOWLEDGE

- Which type of pharmaceutical waste does the EPA consider to be the most hazardous?
  - A. P-listed
  - B. U-listed
  - C. D coded
  - D. Controlled substances

# TEST YOUR KNOWLEDGE

- Which of the following are disposed in black containers?
  - A. Hazardous drug waste regulated by RCRA (P-listed, U-listed, and characteristic D coded wastes)
  - B. Bulk chemotherapy waste
  - C. Non-hazardous pharmaceutical waste
  - D. Biohazardous waste
  - E. A and B

# TEST YOUR KNOWLEDGE

- Which of the following can be disposed of down the drain?
  - A. D5W/NS with KCl 40meq
  - B. A partial PCA containing morphine
  - C. D5W 50ml w/ ampicillin 500mg
  - D. An unused TPN solution
  - E. A and B

# TEST YOUR KNOWLEDGE

- Which container should you use when discarding cleanup materials from a chemotherapy spill?

A.



C.



B.



D.





# TEST YOUR KNOWLEDGE

- Partial chemotherapy vial labeled with  is disposed in which container?

A.



C.



B.



D.



# TEST YOUR KNOWLEDGE

- Partial ampicillin vial with no label, is disposed in which container?

A.



C.



B.



D.



# PHARMACEUTICAL WASTE

- **Pharmaceutical waste is:**
  - No longer used for its intended purpose
  - Designated for discard
  - Not returnable for credit
- **Examples:**
  - Partial syringes, vials, tablets, creams, inhalers, IV bags, etc
  - Discontinued meds
  - Hospital repacks or pre-filled syringes
  - Expired or unusable compounded medications

# WHY IS THIS IMPORTANT?

## ■ Environmental

- Pharmaceuticals detected in soils and surface/ground waters
- A 2002 U.S. Geological Survey found organic waste water pollutants, including many pharmaceutical product contaminants, in 80% of streams sampled in 30 states
- Impacts include:
  - Effects on oocytes and testicular cells
  - Inhibition of growth in fish and plants

## ■ Regulatory Fines

- Noncompliance fines of \$37,500 per day, per incident

Boxall, A. The environmental side effects of medication. EMBO Reports. December 5, 2004. p. 1110-1116. Accessed 11/20/15 at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1299201/>

Halford, B. Side Effects. Chemical & Engineering News. February 25, 2008. Volume 86 Issue 8. p. 13-17. Accessed 11/20/15 at <http://cen.acs.org/articles/86/i8/Side-Effects.html>

# TOP 16 HOSPITALS WITH PENALTIES SINCE 1999

CONCORD HOSPITAL	\$205,000
NASSAU UNIVERSITY MEDICAL CENTER	\$124,000
RESEARCH MEDICAL CENTER	\$105,900
BARNES JEWISH HOSPITAL NORTH	\$90,176
CHILDRENS MERCY HOSPITAL THE	\$86,043
SHAWNEE MISSION MEDICAL CTR	\$83,488
FLORIDA HOSPITAL	\$69,958
AURORA BAYCARE MEDICAL CTR	\$66,500
FORMER WALTER REED ARMY MEDICAL CENTER	\$65,000
V A MEDICAL & REGIONAL OFFICE CENTER	\$50,000
USVA WILLIAM S MIDDLETON MEMORIAL HOSPITAL	\$48,000
MOUNTAINSIDE HOSPITAL	\$45,000
CLARKSON UNIVERSITY	\$45,000
ST ANTHONYS MEDICAL CENTER	\$42,952
DANBURY HOSPITAL	\$41,855
HUNTINGTON HOSPITAL	\$40,000

- 1. Getting Started**
- 2. Understanding Regulations and Best Managements**
- 3. Drug Inventory**
- 4. Assessing Current Practices**
- 5. Management Options**
- 6. Communication and Education Plan**
- 7. Audit and Follow-up**

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# GETTING STARTED

- Designing and implementing a successful pharmaceutical waste program starts with an interdisciplinary team
- Support from Senior Leadership
- Members of a pharmaceutical waste team
  - Pharmacy Managers
  - Environmental Services
  - Safety
  - Nursing
  - Educators
  - Infection Control

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# REGULATORY BODIES THAT OVERSEE PHARMACEUTICAL WASTE

- Environmental Protection Agency (EPA)
- Department of Transportation (DOT)
- Occupational Safety and Health Agency (OSHA)
- Drug Enforcement Administration (DEA)
- State Environmental Protection Agencies

## **OSHA Hazardous Drugs**

- Carcinogenicity
- Teratogenicity
- Reproductive toxicity
- Organ toxicity
- Genotoxicity

### Examples:

- Chemotherapy
- Estrogens

## **EPA Toxic Hazardous Drugs**

### Examples:

- Arsenic
- Cyclophosphamide
- Mitomycin
- Warfarin
- Bulk chemo

## **EPA Pharmaceutical Waste**

### P&U Listed Examples:

- Epinephrine
- Nicotine

# RCRA

- **Resource Conservation and Recovery Act (RCRA)**
- **Enacted in 1976**
- **Governs the management of solid and hazardous waste generated in the U.S.**
- **Regulated by the EPA**

# PHARMACEUTICAL WASTE CATEGORIES

- RCRA Hazardous Pharmaceutical Waste
- Best Management Practice (BMP) Hazardous
  - Non-RCRA Antineoplastic Hazardous
- Best Management Non-Hazardous
  - Controlled substances
  - Biohazardous
  - Non-hazardous sewerables
  - Non-hazardous

# EPA RCRA WASTE TYPES

## ■ Listed Wastes:

- P Listed
- U Listed

## ■ Characteristic Wastes:

- Exhibit hazardous properties
  - Ignitability
  - Corrosivity
  - Reactivity
  - Toxicity

# P LISTED WASTE



## Acutely Hazardous

Pharmaceutical	Waste Code
<i>Arsenic trioxide</i>	P012
Epinephrine base	P042
Nicotine	P075
Nitroglycerin	P081
Phentermine (CIV)	P046
Physostigmine	P204
Physostigmine salicylate	P188
Warfarin >0.3%	P001



# P LISTED WASTE

- Empty containers
  - Triple rinsed, and
  - The rinse is managed as hazardous waste
- **Bottom-line** **P**
  - Empty containers which held a P Listed medication **MUST** be managed as hazardous waste
- Dilute concentration
- Exceptions
  - Epinephrine Salt
  - Nitroglycerin

# P LISTED WASTE

## ■ Exceptions

### ■ Epinephrine Salt

- EPA's Memo from October 15, 2007
- EPA determined that the score of the P042 listing does **NOT** include epinephrine salt

### ■ Nitroglycerin

- Solely listed for its reactivity characteristic
- Removed medical grade nitroglycerin off the P list

Hale, Matt, Scope of Hazardous Waste Listing P042 (Epinephrine) Memorandum, United States Environmental Protection Agency, Office of Solid Waste, October 15, 2007. May be accessed at

<http://yosemite.epa.gov/osw/rcra.nsf/0c994248c239947e85256d090071175f/6a5dedf2fba24fe68525744b0045b4af!>



# U LISTED WASTE

Pharmaceutical	Waste Code	Pharmaceutical	Waste Code
Chloral hydrate	U034	Paraldehyde	U182
<i>Chlorambucil</i>	U035	Phenol	U188
<i>Cyclophosphamide</i>	U058	Reserpine	U200
<i>Daunomycin</i>	U059	Resorcinol	U201
Dichlorodifluoromethane	U075	Saccharin	U202
<i>Diethylstilbestrol</i>	U089	Selenium sulfide	U205
Hexachlorophene	U132	<i>Streptozotocin</i>	U206
Lindane	U129	Trichloromonofluoromethane	U121
<i>Melphalan</i>	U150	<i>Uracil mustard</i>	U237
Mercury	U151	Warfarin <0.3%	U248
<i>Mitomycin C</i>	U010		

# U LISTED WASTE



# U LISTED WASTE

- Empty containers
  - All contents have been removed
  - No more than 3% by weight remains
- Dilute concentration

# CHARACTERISTIC WASTE

- **Ignitability D001**
- **Corrosivity D002**
- **Reactivity D003**
- **Toxicity Multiple D Codes**

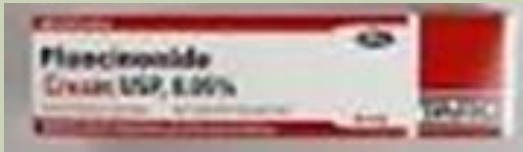
# CHARACTERISTIC WASTE

## ■ Ignitability D001

- Aqueous drug formulations containing 24% or more alcohol by volume and having a flashpoint of less than 140 °F or 60 °C
- Liquid drug formulations containing less than 24% alcohol with a flashpoint of less than 140 °F or 60 °C
- Oxidizers defined by DOT
- Flammable aerosol propellants defined by DOT

# CHARACTERISTIC WASTE

## ■ Ignitability D001



# CHARACTERISTIC WASTE

## ■ Corrosivity D002

- pH of less than or equal to 2 or greater than or equal to 12.5

## ■ Examples:

- Potassium hydroxide
- Trichloroacetic acid



# CHARACTERISTIC WASTE

- **Reactivity D003**
  - **Unstable under normal conditions**



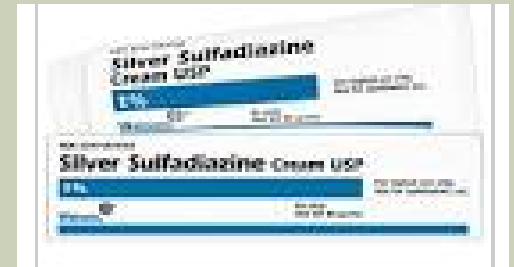
# CHARACTERISTIC WASTE

## ■ Toxicity Multiple D Codes

Pharmaceutical	Waste Code	Examples
Arsenic	D004	Arsenic trioxide
Barium	D005	Barium sulfate
Cadmium	D006	Mineral preparations
Chloroform	D022	No longer commonly used
Chromium	D007	Mineral preparations
Lindane	D013	Treatment of lice, scabies
M-cresol	D024	Preservative in human insulins
Mercury	D009	Vaccines with thimerosal, eye, ear preparations
Selenium	D010	Dandruff shampoo, mineral preparations
Silver	D011	Silver sulfadiazine cream

# CHARACTERISTIC WASTE

## ■ Toxicity Multiple D Codes



# CHARACTERISTIC WASTE

- **Empty containers**
  - All contents have been removed
  - No more than 3% by weight remains
- **Dilute concentration**

# PPE AND SPILL MATERIALS

- Personal protective equipment (PPE) and spill materials
  - P or U listed hazardous waste
  - Characteristic waste

# BEST MANAGEMENT PRACTICE HAZARDOUS PHARMACEUTICAL WASTE

- Antineoplastic
  - Trace
  - Bulk

# TRACE CHEMOTHERAPY

- Trace – Residual chemotherapy waste
  - 3% or less of the total volume by weight of the container
  - Examples
    - Empty vials
    - Gowns
    - Gloves
    - Needles and syringes
    - IV tubing and empty IV bags



# BULK CHEMOTHERAPY

- Bulk – More than residual chemotherapy waste
  - More than 3% of the total volume by weight of the container
  - Examples
    - Used chemo spill kits
    - Partial vials, bottles and IV bags
    - Partial chemo syringe
    - Saturated PPE



# BEST MANAGEMENT PRACTICE NON-HAZARDOUS PHARMACEUTICAL

- **Controlled Substances**
- **Biohazardous**
- **Non-Hazardous Sewerables**
- **Non-Hazardous**



# CONTROLLED SUBSTANCES

- Regulated by the DEA
- Disposal method must be render the controlled substance non-retrievable
  - Drain disposal





**U. S. Department of Justice**  
Drug Enforcement Administration  
Office of Diversion Control

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[www.dea.gov](http://www.dea.gov)

September 9, 2014

Dear Registrant:

On September 9, 2014, the Disposal of Controlled Substances final rule was published in the *Federal Register*. The final rule is available at <http://www.regulations.gov> and the Drug Enforcement Administration (DEA) website, <http://www.DEAdiversion.usdoj.gov>. The final rule will become effective on October 9, 2014.

These regulations implement the Secure and Responsible Drug Disposal Act of 2010 (Disposal Act). The Disposal Act was passed in an effort to curtail prescription drug abuse by authorizing regulations that outline methods for ultimate users to dispose of their unused or unwanted pharmaceutical controlled substances. The final rule authorizes ultimate users to transfer unwanted and unused pharmaceutical controlled substances in their lawful possession to an authorized collector for safe, secure, and responsible disposal. In addition to ultimate users, long-term care facilities and persons lawfully entitled to dispose of a decedent's property may also transfer pharmaceutical controlled substances to an authorized collector for the purpose of disposal.

**Destruction of Controlled Substances:** The final rule implements a standard of destruction: *non-retrievable*. The process utilized to render a substance "non-retrievable" shall permanently alter the substance's physical or chemical condition or state through irreversible means and thereby render the substance unavailable and unusable for all practical purposes. A substance is considered "non-retrievable" when it cannot be transformed to a physical or chemical condition or state as a controlled substance or controlled substance analogue.

# BIOHAZARDOUS

- Blood products and biohazardous waste
  - Examples:
    - Albumin
    - Rabies vaccine
    - Needles, sharps, ampules, empty vials
- No unused pharmaceuticals
  - Temperature during destruction insufficient to destroy most pharmaceutical ingredients



# NON-HAZARDOUS SEWERABLES

- Intravenous solutions with **NO ADDITIVES** may go in the sink
  - Sewerable 7:
    - Dextrose
    - Saline
    - Sterile water
    - Lactated ringers
    - Potassium
    - Magnesium
    - Calcium



# NON-HAZARDOUS

## ■ Non-hazardous waste pharmaceuticals

### ■ Examples:

- Partially filled:
  - Creams
  - Ointments
  - Vials
  - Tablets/capsules
  - Liquids



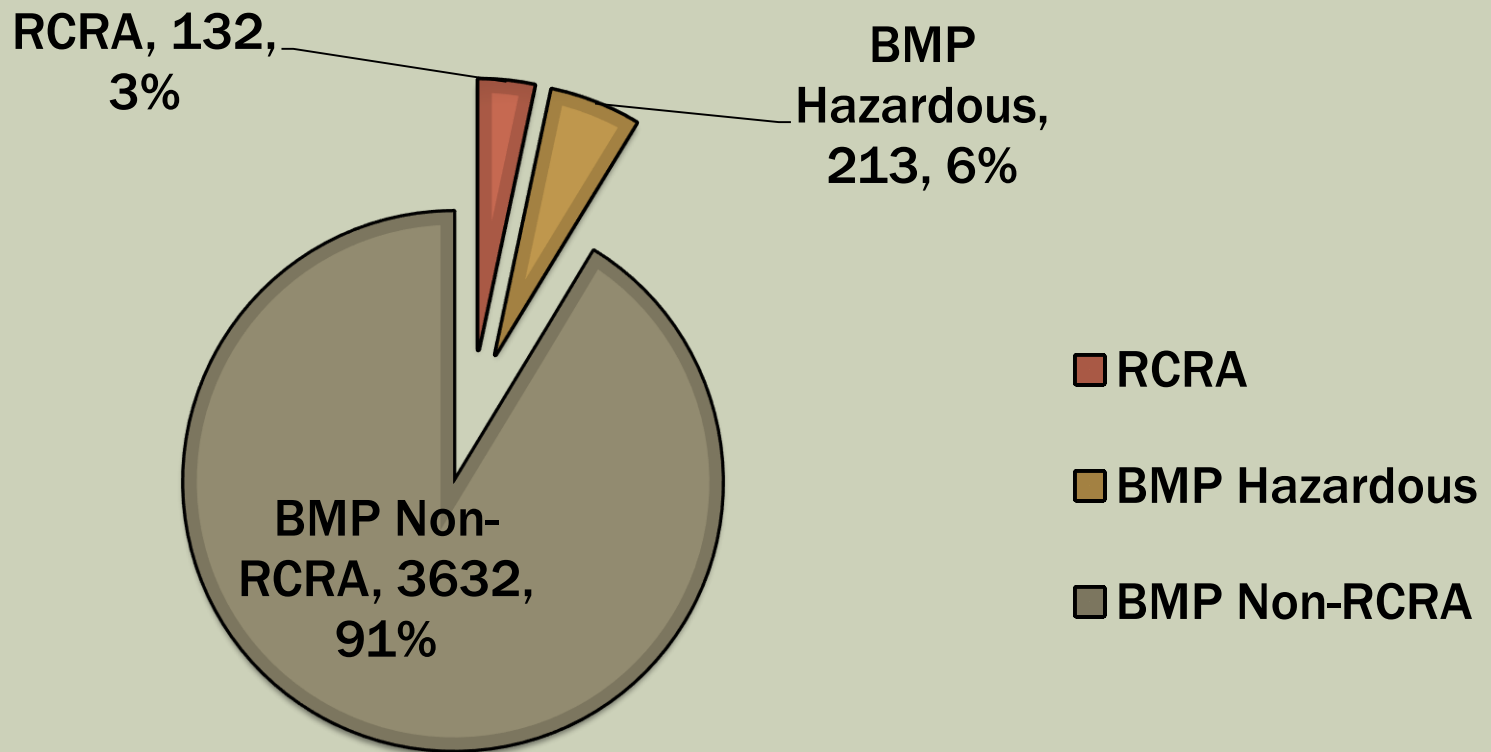
## ■ No needles or biohazardous medications

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# PERFORMING A DRUG INVENTORY

## Percent of Waste By Classification



# PERFORMING A DRUG INVENTORY

- Obtain a 12 month summary of purchased records from drug wholesaler(s) including
  - NDC
  - Brand name
  - Generic name
  - Manufacturer
  - Strength
  - Dosage form
  - Package size
- Identify all ingredients found in each drug formulation including preservatives, heavy metals and alcohol
- Consider all compounded products or IV admixtures



# PERFORMING A DRUG INVENTORY

- Compare inventory against
  - P and U Listed
  - Ignitability D001
  - Corrosivity D002
  - Reactivity D003
  - Toxicity Multiple D Codes
- Review inventory for Best Practice Management
- Document your findings
- Keep your inventory updated at least quarterly or when new medications are added

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# CURRENT PRACTICE

- Assess data from automatic dispensing cabinets
- Conduct interviews to assess the current disposal practices
  - Interviews should include pharmacy, all nursing units and all outpatient clinics
  - Interview should include supervisors and frontline staff
  - Discuss what drugs are being discarded and how medications are discarded

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# MANAGEMENT OPTIONS

- **Models for managing pharmaceutical waste**
  - Automatic barcode drive sorting device
  - Managing all pharmaceutical waste as hazardous waste
  - Manually segregating waste

# MANUAL SEGREGATION



- No Needles
- No Trash
- No Empty containers except P-listed
- No Controlled Substances

- P-listed medications
  - Including wrappers or empty containers
- U-listed medications
- D-listed medications
- Spill kits of hazardous waste
- Best Management Practice Hazardous
  - Bulk chemotherapy

# MANUAL SEGREGATION



■ **No Controlled Substances**

- Trace chemotherapy
- Empty chemotherapy IV bags, tubing
- Empty vials, syringes, needles
- Gloves and gowns
- Chemotherapy packaging

# MANUAL SEGREGATION



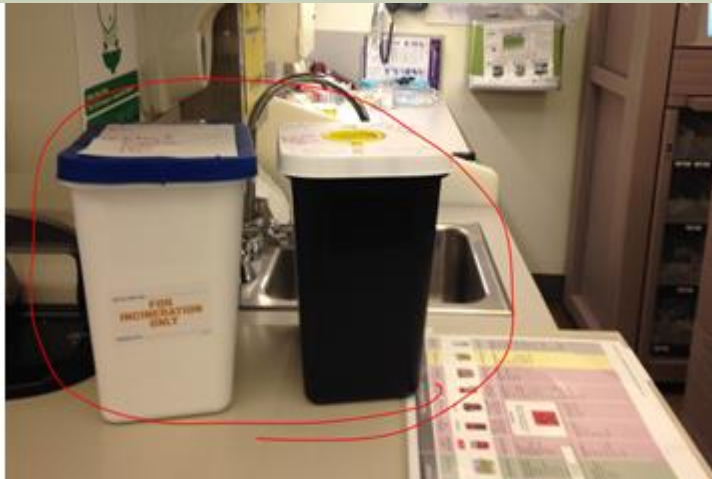
- Non-hazardous pharmaceutical waste
  - Partial drug left

- No Needles
- No Trash
- No Empty containers
- No Controlled Substances



# MANAGEMENT OPTIONS

- Placement of containers
  - Located near where pharmaceutical waste is generated
  - In secure locations



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# COMMUNICATION AND EDUCATION

- Once a model for managing pharmaceutical waste has been selected it **MUST** be communicated
- Communication options
  - Labeling medications
  - Using code names on medications
  - Messages on automatic dispensing units
  - Messages on the medication administration record
  - Posters

# COMMUNICATION AND EDUCATION



warfarin

History Details Additional Info Comments

MAR Note

**MAR Note**  
5/6/2015 7:17 AKDT [REDACTED]










HIGH ALERT MEDICATION - verify dose  
Do Not Crush or Chew  
Baseline TMR = [REDACTED]

**P listed: Dispose of unused drug and/or packaging in BLACK container.**





## WASTE STREAM DIAGRAM FOR PHARMACY DEPARTMENT

Pharmaceutical Hazardous Waste				Sewer System		Regulated Medical Waste		Solid Waste
Black *RCRA*	Black *RCRA*	Black *RCRA*	Non-hazardous Pharmaceutical	Drain/Sewer	Cactus Sink	Sharps	Chemotherapy	Trash Can
<b>P</b>	<b>AERO</b>	<b>OXID</b>				<b>BIO</b>		
								
Drugs that are reactive (ignitable, corrosive, or toxic) <b>! Keep lid closed !</b>	Aerosols <b>! Send to Pharmacy ! ! Keep lid closed !</b>	Oxidizers <b>! Send to Pharmacy ! ! Keep lid closed !</b>	All non-hazardous or non-biohazardous pharmaceutical waste items without label	Flush drain with water	Controlled Substances	Biohazardous Sharps	Chemotherapy Waste	Regular Trash
<p><b>EXAMPLES INCLUDE:</b></p> <ul style="list-style-type: none"> <li>- P list (including packaging):                             <ul style="list-style-type: none"> <li>o Werbrin</li> <li>o Nicotine gum/patch</li> <li>o Physostigmine</li> <li>o Arsenic</li> </ul> </li> <li>- Partially Filled:                             <ul style="list-style-type: none"> <li>o Insulin vials and pens</li> <li>o Chemo waste (vials/tablets/bags)</li> <li>o Chemo spill clean up material</li> <li>o Iodine containing Contrast</li> <li>o Silver sulfadiazine cream</li> <li>o Ammonia inhalant</li> <li>o Agatran vials</li> <li>o Trifluidine ophth</li> <li>o Betadine ophth</li> <li>o Fluoromethalone (FML) ophth</li> <li>o Fluoriprofen ophth</li> <li>o Neo/Poly/Hydrocortisone ophth</li> <li>o Neo/Poly/Gamicidin ophth</li> <li>o Desflurane</li> <li>o Calcipotriene cream</li> <li>o Clobetasol sojn</li> <li>o Clindamycin/Erythromycin</li> <li>o Permethrin cream and lotion</li> <li>o Podoflox</li> <li>o Forteo</li> <li>o Alprostadil</li> <li>o Chromium and Selenium</li> <li>o Benzoin Tincture</li> <li>o Dexamethasone oral concentrate</li> <li>o Addamell and Peditrace</li> <li>o Cyclosporine amps</li> <li>o Aquadeks oral sojn</li> <li>o Dehydrated alcohol vials</li> <li>o Duofilm</li> <li>o Selenium lotion</li> <li>o Kaletra oral sojn</li> <li>o Mequin HP</li> <li>o Dibenzylidene</li> <li>o Soriatane (acitretin)</li> </ul> <p><b>!No Biohazardous or Needles! !No Controlled Substances!</b></p> </li></ul>	<p><b>EXAMPLES INCLUDE:</b></p> <ul style="list-style-type: none"> <li>- Cetacaine</li> <li>- Hurricane</li> <li>- Pain Ease</li> <li>- Kenalog</li> </ul> <p><b>! Remove mouth piece before sending to Pharm!</b></p> <ul style="list-style-type: none"> <li>- Atrovent</li> <li>- Albuterol</li> <li>- Combivent</li> <li>- Dulera</li> <li>- Flovent</li> <li>- Proventil</li> </ul> <p><b>!No Biohazardous or Needles! !No Controlled Substances!</b></p>	<p><b>EXAMPLES INCLUDE:</b></p> <ul style="list-style-type: none"> <li>- Silver nitrate sticks, unused</li> </ul> <p><b>!No Biohazardous or Needles! !No Controlled Substances!</b></p>	<p><b>EXAMPLES INCLUDE:</b></p> <p>Partially Filled</p> <ul style="list-style-type: none"> <li>- Creams</li> <li>- Ointments</li> <li>- Vials</li> <li>- Ampules</li> <li>- Syringes</li> <li>- Tablets/Capsules</li> </ul> <p><b>!NO NEEDLES! IV and tubing with additives</b></p> <ul style="list-style-type: none"> <li>- Oxytocin</li> <li>- Dopamine</li> <li>- Dobutamine</li> <li>- Nitro</li> <li>- TPN</li> <li>- Heparin</li> <li>- Antibiotics</li> </ul> <p><b>Must NOT be any of the following:</b></p> <ul style="list-style-type: none"> <li>- Black waste</li> <li>- Yellow waste</li> <li>- Biohazardous waste</li> <li>- Sharps waste</li> <li>- Drain waste</li> </ul>	<p><b>*Liquid or Injectable Controlled Substances:</b></p> <ul style="list-style-type: none"> <li>- Diazepam</li> <li>- Fentanyl</li> <li>- Hydromorphone</li> <li>- Lorazepam</li> <li>- Midazolam</li> <li>- Morphine</li> <li>- Propofol</li> </ul> <p style="text-align: center;"><b>*Use Cactus Sink* when available</b></p> <p><b>Sewerable 7:</b></p> <ol style="list-style-type: none"> <li>1. Dextose solutions</li> <li>2. Saline solutions (NaCl)</li> <li>3. Sterile Water</li> <li>4. Lactated rings</li> <li>5. Potassium</li> <li>6. Calcium</li> <li>7. Magnesium</li> </ol>	<p><b>*Liquid or Injectable Controlled Substances:</b></p> <ul style="list-style-type: none"> <li>- Diazepam</li> <li>- Fentanyl</li> <li>- Hydromorphone</li> <li>- Lorazepam</li> <li>- Midazolam</li> <li>- Morphine</li> <li>- Propofol</li> </ul> <p><b>OPEN / USED Controlled Substances</b></p> <ul style="list-style-type: none"> <li>- Fentanyl patches</li> <li>- Capsules</li> <li>- Tablets</li> </ul>	<p><b>EXAMPLES INCLUDE:</b></p> <ul style="list-style-type: none"> <li>- Procrit</li> <li>- Betaseron</li> <li>- Kentra</li> <li>- Xeomin</li> <li>- Tice BCG</li> <li>- Prolestin-C</li> <li>- Botox</li> <li>- HyperHep B</li> <li>- Hyperrab</li> <li>- Hypertet</li> <li>- Win-Rho</li> <li>- Albumin</li> <li>- Rabies Vaccine</li> </ul> <p><b>BIOHAZARDOUS:</b></p> <ul style="list-style-type: none"> <li>- Needles</li> <li>- Syringes</li> <li>- Spikes</li> <li>- Glass slides</li> <li>- Sharp instruments</li> <li>- Vials</li> <li>- Ampules</li> <li>- Tubing</li> </ul>	<p><b>EXAMPLES INCLUDE:</b></p> <ul style="list-style-type: none"> <li>- Gowns</li> <li>- Gloves</li> <li>- Masks</li> <li>- IV Tubing</li> <li>- IVs (Empty/Trace)</li> <li>- Syringes/Needles (Empty/Trace)</li> <li>- Vials (Empty/Trace)</li> <li>- Chemo packaging</li> </ul>	<p><b>EXAMPLES INCLUDE:</b></p> <ul style="list-style-type: none"> <li>- Product packaging</li> <li>- Non-Chemo Gowns, gloves and masks (worn but not blood soiled)</li> <li>- Paper towels and tissues</li> <li>- Carbon Zinc batteries</li> <li>- Alkaline batteries (ex: AA, AAA, C, D)</li> </ul>

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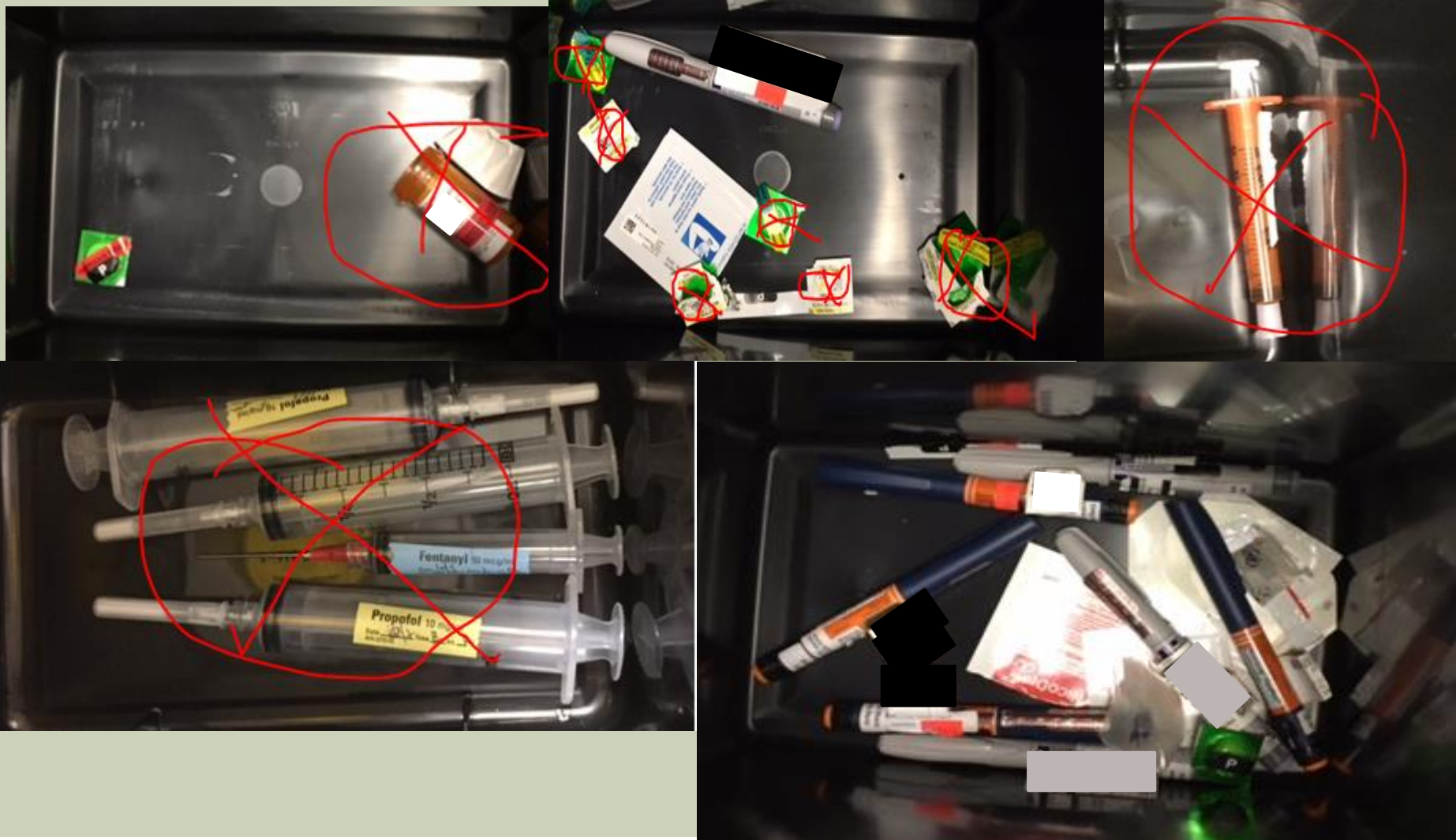
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# AUDIT AND FOLLOW-UP

- **Rounds**
  - Nursing Units
  - Pharmacies
- **Staff meetings**
  - Reviewing findings as a group
  - Staff feedback/input
- **Direct feedback to managers**
- **Checking bins**
  - Take pictures of examples



# AUDIT AND FOLLOW-UP



# TEST YOUR KNOWLEDGE

- Which type of pharmaceutical waste does the EPA consider to be the most hazardous?
  - A. P-listed
  - B. U-listed
  - C. D coded
  - D. Controlled substances

# TEST YOUR KNOWLEDGE

- Which of the following are disposed in black containers?
  - A. Hazardous drug waste regulated by RCRA (P-listed, U-listed, and characteristic D coded wastes)
  - B. Bulk chemotherapy waste
  - C. Non-hazardous pharmaceutical waste
  - D. Biohazardous waste
  - E. A and B

# TEST YOUR KNOWLEDGE

- Which of the following can be disposed of down the drain?
  - A. D5W/NS with KCl 40meq
  - B. A partial PCA containing morphine
  - C. D5W 50ml w/ ampicillin 500mg
  - D. An unused TPN solution
  - E. A and B

# TEST YOUR KNOWLEDGE

- Which container should you use when discarding cleanup materials from a chemotherapy spill?

A.



C.




B.



D.



# TEST YOUR KNOWLEDGE

- Partial chemotherapy vial labeled with  is disposed in which container?

A.



C.



B.



D.



# TEST YOUR KNOWLEDGE

- Partial ampicillin vial with no label, is disposed in which container?

A.



C.



B.



D.



**QUESTIONS/COMMENTS?**



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