



# Pharmaceutical Waste Management: Developing & Implementing Best Practices

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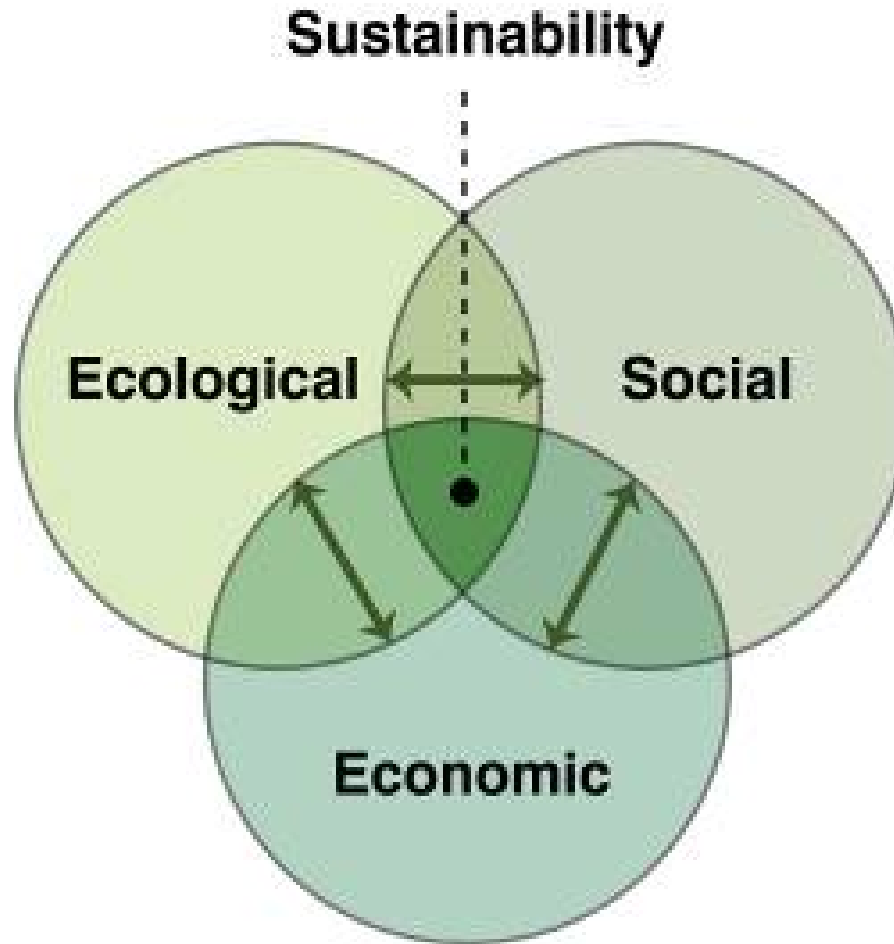


# UMMC

- 757 bed academic teaching hospital
- 8600 employees
- 2 million square feet
- \$14.9 million on energy bills a year
- 500,000 gallons of water a day
- 10.4 million pounds of waste a year



# Creating a Culture





# Green Team



- Cost Savings Initiative - 2006
  - Energy -- Green Building
  - Waste -- Supply Chain
- Sustainability Principles



Ensure the health and safety of our employees



Act in an ethical and compliant manner



Monitor the environmental impact of operations



Contribute to healthy communities locally and globally



Evaluate the performance of supply chain partners





# Key Decisions

- Why build an EPA pharmaceutical program?
- How do we get out of the starting block?
- Do we build this program internally or externally?
- How much and what do we collect?
- Do we segregate front-end or back-end?
- How many containers will we need?
- How do we train 2,000 nurses?
- How do we monitor compliance?



# Why

- Failure to comply with hazardous waste regulations under the Resource Conservation and Recovery Act (RCRA) may result in potentially serious violations and large penalties

***Currently fines average \$30,000 per violation and range up to \$100,000!***

- Reduce Risk associated with hazardous waste compliance
- Meet Joint Commission standards and compliance with EPA, DOT and state regulations



# Getting Started

- Outside consultant education
- Identify stakeholders
  - Pharmacy Department
  - Safety Department
  - Nursing
    - Oncology Nursing Leadership
    - Sustainability Manager
  - Employee Health
- Manage internal
- What will we collect?





# Hazardous Meds vs. EPA Regulated Hazardous Waste

- **Hazardous Medications**

- Certain medications possess properties that make them hazardous during routine handling
- These properties include: reproductive toxicity, teratogenicity, developmental toxicity, carcinogenicity, organ toxicity and/or genotoxicity

- **EPA Hazardous Waste**

- Some medications when discarded are considered regulated hazardous waste
- These medications may/may not be directly hazardous when handling but are hazardous to the environment





# Pharmacy Implementation





## Determine Steps

- Define list of medications to be treated as federally-regulated and non-federally regulated hazardous
- Determine how to dispose of and store hazardous medications in the pharmacy
- Determine labeling and dispensing of medications as hazardous
- Develop policy and procedure
- Educate staff



# Develop List of Hazardous Medications

- Use NIOSH recommendations and PharmEcology<sup>®</sup> vendor to analyze formulary
- Pharmacists are responsible per policy to utilize PharmEcology<sup>®</sup> to determine if the medication is a EPA-regulated waste for non-formulary medications
- PharmEcology<sup>®</sup> is available to all staff on the desktops in pharmacy satellites



Welcome : Henry Smith  
University of Maryland Medical  
Center  
Baltimore, MD  
Analysis for: MARYLAND

- [Change State](#)
- [Change Password](#)
- [What Products are in the Database?](#)
- [How Does the Search Logic Work?](#)
- [What Is "PharmE Hazardous® Waste"?](#)
- [What Containers Should You Use?](#)
- [What Does Your State Require?](#)
- [Product Questions? Contact Us](#)
- [Logout](#)

Individual Product Search

Batch Product Search

Search By NDC Number

NEW SEARCH

NDC number:

(For example: 1234045610 or 1234-456-10 or 1234-456)

Search by Product Name

Product name:

Strength (optional):

Search by Generic Name or Active Ingredient

Generic name:

Manufacturer (optional):

Strength (optional):

\*Hints

SEARCH >>

1. Enter a full or partial NDC number, with or without hyphens
2. Enter a full or partial product or generic name
3. Enter the beginning of the strength, ignoring the concentration or additional ingredients

Access to the PharmE® Waste Wizard is restricted to authorized individuals within the organization listed in the above Welcome message. Other individuals should contact PharmEcology for information about subscribing.

The PharmE® Waste Wizard is powered by Medi-Span's Master Drug Data Base (MDDB®), copyrighted by Facts and Comparisons, a Wolters Kluwer company.



# Determine How to Dispose Hazardous Medication Waste



- EPA-P listed waste
  - Dispose of containers and any unused medication in black bucket
- EPA-U and EPA-D listed waste
  - Dispose of any unused medication in black bucket
  - Empty containers may be placed in red bag waste
- Non-Federally Regulated Hazardous Medications
  - Treat waste as an EPA-U or EPA-D listed waste and dispose of any unused medication in black bucket
  - Empty containers may be placed in red bag waste





# Determine Labeling/Identification of Hazardous Medications

- Multiple dispensing and distribution systems created a challenge in labeling medications
  - Routine medications are dispensed through the pharmacy cartfill system and unit-based cabinets
  - First doses of oral medications and IV medications contain patient-specific PharmNet® labels
- Lack of color label printers also presented a challenge for labeling medications
  - We opted not to manually label medications with stickers because it allows for human error
  - We wanted an automatic system to ensure proper labeling



# Labeling and Storage of Hazardous Medications



- Medications dispensed with a PharmNet® label contain instructions for disposal on the label
- Medications dispensed from the robot or manual pick for delivery by cart contain “Haz Waste” on the package
  - Dispose any unused portion in black bucket
- Medications are stored in the pharmacy in black containers
  - Dispose expired medications that are unacceptable for return to manufacturer in black bucket
- Omnicell® alerts for hazardous medications in the Omnicell®



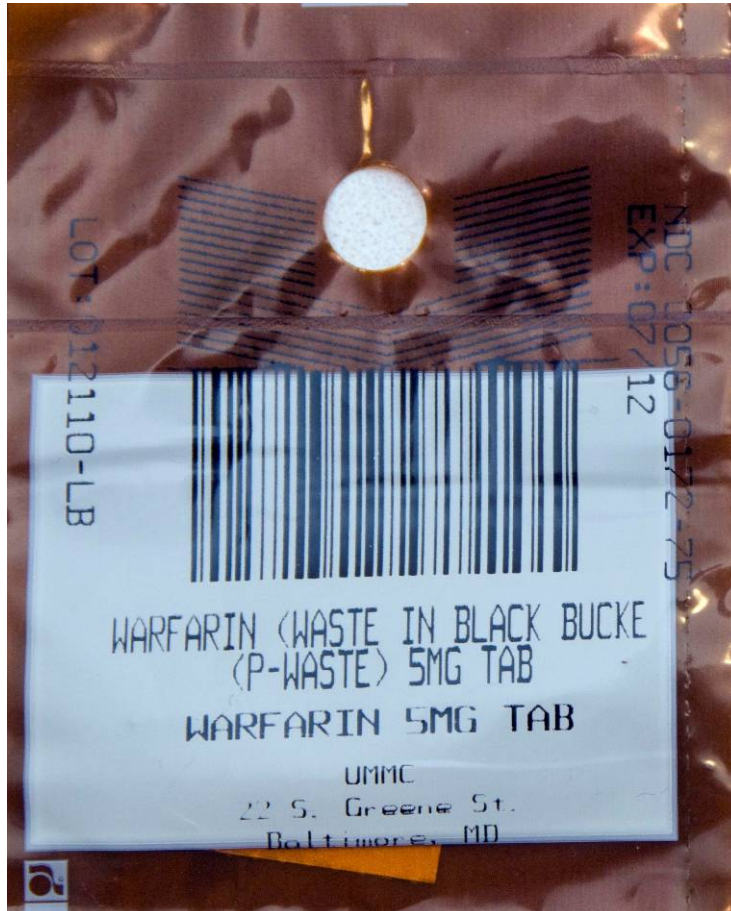
# Labeling First Doses and IV Medications



- **\*\*\* HAZ WASTE \*\*\***  
Identification directing how to dispose of properly
- **P-Listed:**
  - Black bucket (including package)
- **U, D-Listed & “Haz Meds”**
  - If not empty → Black bucket
  - If empty → **Red bag**

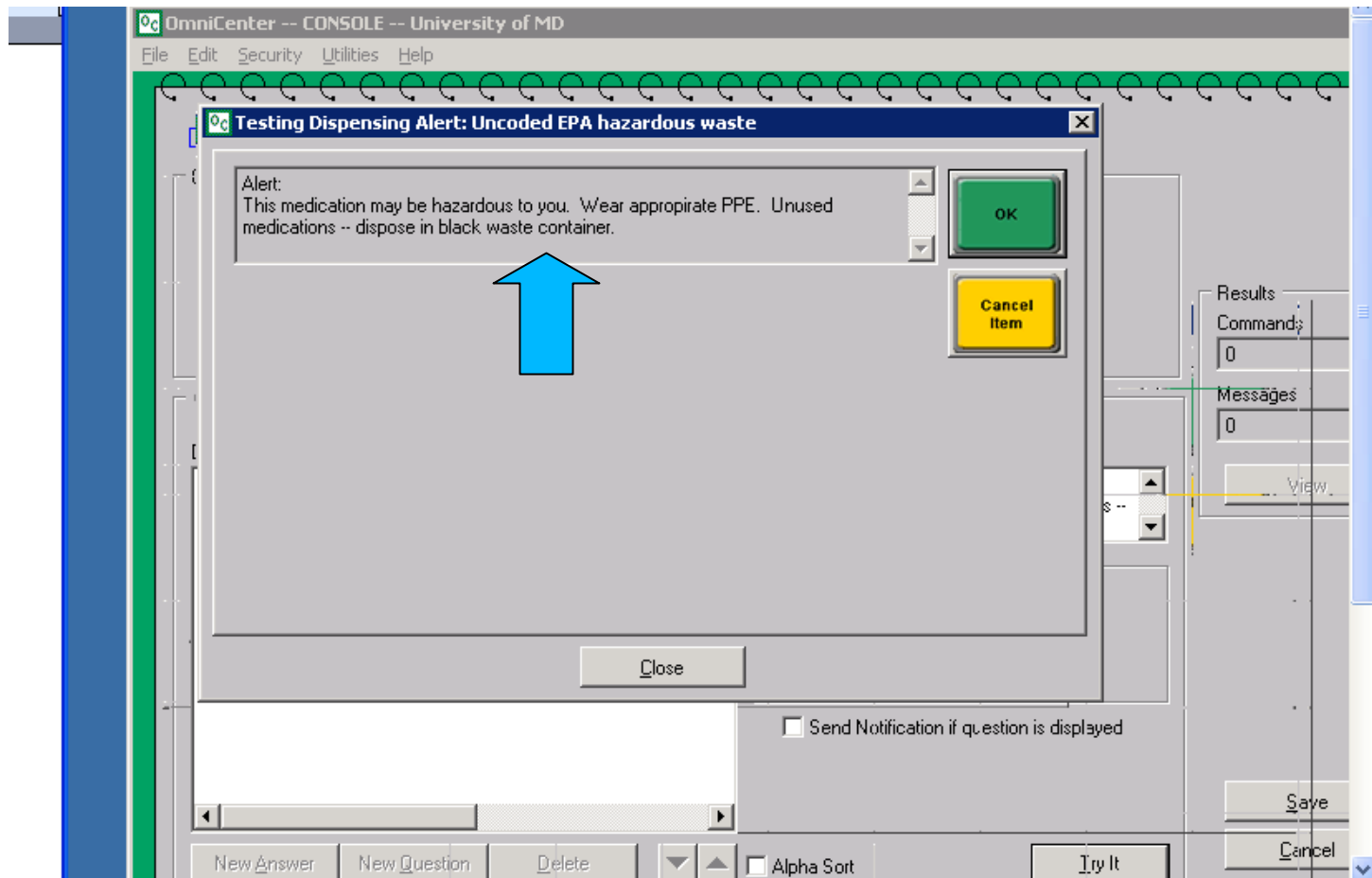
The image shows a white IV medication label with black text. At the top, "HAZ WASTE" is printed in bold, with asterisks on either side, and is circled in red. Below it, the date "10E/08-02" is printed. The patient information includes "TESTING, MIDAS", "MRN#: 1851889", "DOB: 05/12/1950", "WT: 67.7 kg", and "09/23 2229". The medication is ".ALDesleukin 100 millionunit" and "Dextrose 5% 50 mL", with a "Total Volume: 50 ml". The route is "intravenous". The infusion instructions are "Infuse over: 25 HR at 2 mL/hr every 8 hours", which is also circled in red. Below this, there are two paragraphs of disposal instructions: "Hazardous Medication - Use Precautions. Do Not Tube. Dispose of any unused medications in black waste container. Empty containers may go in red bag waste." and "Nonformulary drug. Do NOT shake. SALA Alert. Please make sure drug ordered is ALDESLEUKIN and NOT OPRESLEUKIN. (Neumega)". At the bottom, there is a barcode with the number "038036774" below it. The label also includes "Entered by: DGRIFFIN", "Prep by:", "Checked by:", and "Do not start after: 12/04/09 @ 20:00". The pharmacy information is "UMMC - Dept. of Pharmacy Services, 22 S. Greene St. Baltimore, MD 21201". At the very bottom, it says "For Pharmacy Use Only" and lists ".ALDesleukin 18 millionunit(s)/mL 5.45 mL" and "Dextrose 5% - 50 mL". There are also fields for "Prep date/time:" and "Initials:".

# Labeling of Medications from the Pharmacy Robot (Cartfill)





# Alerts for Hazardous Medications in the Unit-Based Cabinets





# Storage of Hazardous Medications in Pharmacy

- Hazardous medications stored in black bins on shelves in pharmacies for easy identification





# Develop Policy and Procedure and Educate Staff

- Policy and procedure reviewed yearly and contains addendum of hazardous medications
- Educated staff prior to implementation through mandatory in-services
- New medications added to formulary undergo review to determine if they are hazardous



# Collection



- Each nursing unit and pharmacy satellite has a black bucket placed in a central location
  - Medication Room
  - Dirty Utility Room
- Lined with a 4ml liner
- Safety Rounds
  - If full, a call is placed to “One Call”
- Picked up by Safety Specialist and bucket relined
- Items sorted





# Piloting the Process

- Oncology Units
  - 2 inpatient
  - 1 outpatient
  - Oncology Pharmacy
- Accustom to handling chemotherapy and the concepts of hazardous medication was not a new concept for staff to understand
- Education done by Safety Department and Nurse Leaders for the units
- 90 days
- No major issues





# Going Live - Education

- **Nursing committee structure**
  - Nursing Coordinating Council
  - Nurse Manager Meeting
  - Clinical Practice Council
  - Staff Nurse Council
  - Professional Development
  - Research Committee
  - Patient Education Committee
- **Pharmacy staff meetings**
  - Pharmacists led
- **Mass E-mail**
  - Safety Flash
  - Links to policy
  - Contact information
- **Putting it in Print**
  - Posters
  - News and Views
  - Clinical Practice Summit
- **Additional Inservices**
  - Nursing unit staff meetings
  - Green Team meetings
  - Department Safety Officer meeting
  - New nurse orientation



# Policy Education - Purpose

- To **protect** employees and the environment from the hazards presented by the **use** or **handling** of hazardous medications
- All medications are designed to have a physiological effect, therefore are potentially harmful when used or handled inappropriately
- Examples of medications:
  - Chemotherapy Agents
  - Antiviral Drugs
  - Hormones
  - Antibiotics





# Policy Education

## EPA's RCRA List (regulated)

- The disposal of these medications have potential harm on the environment
  - P-Listed
  - D-Listed
  - U-Listed

## UMMC Hazardous Med List (non-regulated)

- Characteristics of Hazardous
  - Toxic
  - Reactive
  - Corrosive
  - Ignitable
- Potentially harmful to the user with frequent exposure over time
- List included in the policy
- Proper PPE recommendations

# Policy Education - Disposal



- **P-Listed:**
  - Black bucket (including package)
- **U-Listed, D-Listed & “Hazardous Med”:**
  - If not empty → Black Bucket
  - If empty → **Red bag**
- **All other meds**
  - Red bag
  - No drain disposal



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# Ongoing Education – Know Where to Throw





# Safety First

- Policy includes how to safely handle hazardous medications
  - Proper PPE
  - Handling spills
- When caring for patients receiving hazardous medications, their bodily fluids are potentially hazardous



# Signage

- Signage was also developed and was distributed with the black boxes and electronically

UMMC WASTE DISPOSAL GUIDELINES								
Type of Waste	Sewer	Clear Bag Waste	Red Bag (infectious)	Sharps	Black HazWaste	Recycle Container	Confidential Document Destruction	Rep
IV solutions (electrolytes and sugars ONLY)	X							
Controlled substances - drain dispose with licensed witness. Refer to MM-002	X							
Non-recyclable refuse: such as food waste, packaging, styrofoam		X						
Personal protective equipment (PPE): such as used gloves, isolation gowns, chemotherapy gowns; cover gowns, masks, shoe covers, head covers, tyvek suits		X	Red bag only if visibly soiled with blood or OPIM					
Dressings and bandages, drapes, procedural sponges, lap pads, chux, diapers, wipes, etc.		X	Red bag only if saturated with blood or OPIM; if used for feces/urine, visible blood or known pathogen					





# Compliance

- Non-Compliant Findings:
  - Controlled substances
  - Non-hazardous meds
  - Needles
  - Trash
  - Blood vials
- Report to EOCC
- Reported back to Nurse Manager
- Re-educate staff as requested

**RCRA Hazardous Pharma Waste Only**

**NO Needles / Sharps**

**NO Blood / Body Fluids**

**NO Controlled Substances or Silver Nitrate**

**NO Empty Med Containers (Unless P-Listed)**

**NO Used EPI-PENS**





# Financial Impact

- Start-up Costs

- Containers = \$1,800
- Liners = \$260
- Signage = \$1,300
- Stickers/Labels = \$300
- Increased Disposal Costs

- Time

- Safety Specialist = 20 hrs/week
  - Separation
  - Investigation
  - Inspecting 90-day room
  - Education
  - Paperwork
- Sustainability Manager = 2 hrs/week





# Our Strengths

- Interdisciplinary team with leadership support
- Implemented “Best Practice”
  - ***Safe Handling*** and Disposal of Hazardous Medications
  - Includes non-regulated hazardous medications
- No drain disposal of any medications (except controlled substances)
- Collected at the point of generation
- Ongoing education
  - Professional Development engagement

# Questions?



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