Why Didn't I Think of That...?

Handling Hazardous Waste in a Large Tertiary Care Institution

IN LIGHT OF THE NIOSH HAZARDOUS DRUG ALERT, the handling of hazardous waste has gained significant attention. At New York's Mount Sinai Medical Center, we realized that, like other health systems, our established waste-management protocols were no longer adequate. In response to the need for greater standardization in our waste-management program, we created a new program that meets NIOSH guidelines, without requiring extensive practice changes from our staff.

We developed a system to identify agents that require special handling or waste management at all points in the medication management system. We began by establishing four categories of drugs:

- Non-hazardous
- Cytotoxic medications
- Medications requiring use of personal protective equipment (PPE)
- Medications requiring treatment as hazardous waste

Because the waste-management requirements for some products include the management of waste generated on the nursing units, we met with the nursing department, as well as environmental services and safety, while reevaluating our waste-management program. This type of waste must be removed from the nursing units within three days, and although handling it as hazardous waste is more expensive, it was determined that all cytotoxic waste generated on nursing units would be handled as hazardous waste.

For the pharmacy department, we separated the pharmacy into three distinct areas—the storeroom, the dispensing areas, and the chemotherapy preparation area—based on their functions and the volume of waste they come into contact with. We also decided to utilize highly visible cues to ensure that the products are properly handled. A system of coded, orange dots was implemented:

- A plain orange dot signifies a standard cytotoxic agent.
- An orange dot marked "PPE" signifies an agent that requires use of PPE when handling the product or cleaning a spill.
- An orange dot marked "P" signifies an agent that must be handled as hazardous material, and its waste must be handled as hazardous waste.

Storeroom

In the storeroom, both the packaged product and the shelf label are marked with the appropriate dot. When the product is issued to another area, it is placed in a plastic bag with the proper dot affixed to the outside. All injectable antineoplastic agents are immediately delivered to the chemotherapy preparation area.

Dispensing Areas

In all dispensing areas, similar identification processes are used for the shelf locations and the external packaging. For non-unit dose solids, the appropriate dot is affixed to the final external container prior to dispensation to the unit. Products that require compounding or manipulation are prepared in a biological safety cabinet, and the final external container is labeled with the appropriate dot prior to dispensing to the unit. Unit dose solids require no additional labels. Partially used products must be placed in the nearest hazardous waste container, either on the nursing unit or in the chemotherapy preparation area. Returned products are placed in the "hazardous" section of our quarantined area for return to our reverse distributor. All investigational products and associated waste are treated as hazardous waste, with their investigational-use-only label serving as a reminder to the staff to handle the products appropriately.

Chemotherapy Preparation Area

In the chemotherapy preparation area, all products are handled with PPE. All storage shelves are labeled as above, except that only P-labeled drugs have the orange dot affixed to the external container. During preparation, four waste containers are used: hazardous, cytotoxic sharps, cytotoxic non-sharps, and regular waste.

In the hazardous container, we place:

- All empty vials and ampules for P-labeled drugs
- Gloves used to open P-labeled ampules
- All partially used vials and ampules, syringes, needles, and filters used to prepare P-labeled drugs
- All unused chemotherapy preparations
- All partially used chemotherapy prepartions
- Contaminated gloves, gowns, chemo drapes, as well as any that have been used to clean a spill
- All spill clean-up materials

The hazardous container is labeled with the day of first use and a listing of the drugs in the container. It must be kept closed at all times, except when objects are being placed in it, and it must be replaced every three days, regardless of its contents.

Cytotoxic sharps containers are used for all syringes, needles, and filters used to prepare plain- and PPE-labeled drugs. Cytotoxic non-sharps containers are used for gloves, gowns, and chemo drapes without obvious contamination, and empty vials from plain- and PPE-labeled drugs. Both of these containers can remain in the work area until they require

PLAIN DOT DRUGS (STANDARD CYTOTOXIC AGENTS)	PPE DOT DRUGS (PPE REQUIRED FOR HANDLING OR CLEANING)	P DOT DRUGS (HAZARDOUS MATERIALS)
Chloral (Hydrate)	Ganciclovir suspension	Arsenic
Cyclophosphamide	Tacrolimus suspension	Epinephrine
Daunomycin	Non-coated tablets	Mercury
DES		Nicotine
Lindane		Physiostigmine
Melphalan		Warfarin (>0.3%)
Mitomycin C		
Phenol		
Selenium		
Streptozotocin		
Warfarin (<0.3%)		
Ganciclovir		
Mycophenolate		
Thalidomide		
All other AHFS 10:00 agents		

The use of PPE labels on the final preparation's container ensures that any hospital staff member called to manage a spill or exposure will be properly protected.

For more information on the NIOSH Hazardous Drug Alert, visit www.cdc.gov/niosh/docs/2004-165/

replacement based on volume. All chemotherapy products are dispensed in plastic chemotherapy bags to clearly identify them as cytotoxic agents. In addition, drugs that require PPE or P dots have the appropriate dot affixed to the final preparation.

The pharmacy staff has been educated on the system, and nursing in-services are ongoing. Although the use of hazardous drug waste containers on all nursing units that handle chemotherapy is costly, we believe that utilizing the same system both on the nursing units and in the pharmacy's chemotherapy preparation areas would have limited success. Factors that could limit the probability of success include the high turnover of nursing staff, the need for nurses to "float" to different units with little notice, and the large overall number of nurses. Obtaining initial competency would be difficult, and establishing a system to ensure continuing competency could also be problematic. The use of PPE labels on the final preparation's container for all drugs, except unit dose solids, ensures that any other hospital staff member called to manage a spill or exposure will be properly protected. PR&P

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