



SAFE HANDLING Q&A

MANAGING WASTE CONTAMINATED WITH HAZARDOUS DRUGS

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Equipment that is used in hazardous drug (HD) compounding and administration (e.g., syringes, tubing, IV bags, closed system drug transfer devices) are contaminated with HDs and must be disposed of properly. Empty vials, syringes, tubing and IV bags retain small amounts of HDs after use and can be a source of exposure to healthcare workers and others. Personal protective equipment (PPE) worn during HD compounding and administration should always be considered contaminated even in the absence of known spills or leaking and should be discarded immediately upon being removed. Failure to carefully discard HD-contaminated items can result in drug leaking or the transfer of HD residue that contaminates the environment.

HAZARDOUS DRUG WASTE IS NOT THE SAME AS HAZARDOUS WASTE

The Environmental Protection Agency (EPA) in the Resource Conservation and Recovery Act (RCRA) defines hazardous waste. Many hazardous chemicals become hazardous waste when they are discarded. The RCRA regulations were written for industrial waste and not pharmaceutical waste. Hazardous waste is defined as follows (Pines & Smith, 2008):

- P-listed chemicals that are acutely hazardous
- U-listed chemicals that are toxic
- Characteristic hazardous waste, which possess one of the properties of ignitability, corrosivity, reactivity or toxicity (including drugs formulated in alcohol, such as paclitaxel)

Drugs that meet one of the EPA definitions of hazardous waste may or may not be designated by the National Institute for Occupational Safety and Health as HDs and vice versa. For drugs that do meet one of the EPA's (2019) definitions of hazardous waste, the EPA prohibits the drain disposal of unused drugs. Hazardous pharmaceutical waste must be discarded in a special waste container (often a black bin). Materials used in spill cleanup of HDs that meet one of the EPA's definitions of hazardous waste should also be discarded in a special container. Contents of this designated container undergo incineration with restricted emissions, limiting the impact on the environment.

Chemotherapy drugs that meet one of the EPA's definitions of hazardous waste and therefore must be discarded as haz-

ardous waste are arsenic trioxide (P-listed); chlorambucil, cyclophosphamide, daunomycin, melphalan, mitomycin C, and streptozotocin (U-listed). Empty IV bags, tubing, syringes, and PPE used when handling these drugs do not need to be handled as hazardous waste. The U.S. Food and Drug Administration has approved more than 100 chemotherapy agents since the RCRA regulations were introduced. Organizations may choose to treat other drugs that are not U- or P-listed drugs as hazardous waste. Follow organizational policy for proper disposal.

TRACE HAZARDOUS DRUG WASTE

HDs that do not meet the EPA definitions of hazardous waste still must be discarded carefully to protect workers from exposure. Empty IV bags, tubing, syringes, and PPE used when handling HDs should be discarded in a trace HD or chemotherapy waste container. Although there is no standardized color, these designated waste containers are usually white or yellow to distinguish them from other types of waste in a healthcare facility. Sharps used when handling HDs must be discarded in containers that protect workers from needlestick injuries and HD exposure by injection.

HD waste is not biohazardous waste, which is waste contaminated with blood and body fluids. This may be referred to as "red-bag waste." HD waste should not be discarded in a biohazardous waste container for two reasons: (a) those handling the containers will wear PPE that protects them from blood and body fluids, which will not protect against HD exposure; and (b) biohazardous waste may be autoclaved or microwaved to kill pathogens, so it can be disposed of with other medical waste. Such treatment does not deactivate HDs.

HD waste containers should not be overfilled, which can result in spills and exposure. Workers should wear PPE while disposing of HD waste, remove the PPE and discard it immediately, and wash hands with soap and water after PPE removal. Be aware that the cover of an HD waste container may be contaminated with HD residue.

State regulations may be stricter than federal regulations. Some states have different requirements for managing pharmaceutical waste. This may affect how HD waste is handled once it leaves a healthcare facility.

FURTHER CONSIDERATIONS

For patients at home, healthcare providers should do the following before patients leave healthcare facilities:

- Teach patients/caregivers how to safely dispose of PPE used to handle HDs at home.
- Ensure patients who are taking HDs at home have a spill kit and understand how to use it.
- Teach patients/caregivers what they should do with leftover or unused HDs at home.

The following should be considered regarding safe handling of HD-contaminated waste in a healthcare facility:

- Does the organizational policy address disposal of HD waste?
- Does orientation for staff include safe handling of HD waste?

- How is HD waste identified (e.g., color of containers)?
- How are unused HDs handled if they are to be discarded?

REFERENCES

Environmental Protection Agency. (2019). *Management Standards for Hazardous Waste Pharmaceuticals and Amendment to the P075 Listing for Nicotine*. (84 FR 5816). Washington, DC: Federal Register.

Pines, E., & Smith, C.A. (2008). *Managing pharmaceutical waste: A 10-step blueprint for healthcare facilities in the United States*. <https://www.hercenter.org/hazmat/tenstepblueprint.pdf>

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