Ensuring Healthcare Worker Safety When Handling Hazardous Drugs and Therapies

Joint Position Statement from the Oncology Nursing Society (ONS) and the Hematology/Oncology Pharmacy Association (HOPA) Ensuring Healthcare Worker Safety When Handling Hazardous Drugs and Therapies

Hazardous drugs (HDs) are chemicals that demonstrate one or more of the following characteristics: carcinogenicity, genotoxicity, developmental toxicity including teratogenicity, induces organ toxicity at lose doses, or has a structure and toxicity profile that mimics drugs determined to be hazardous (National Institute for Occupational Safety and Health [NIOSH], 2024). Any HD-handling activity can result in exposure for healthcare workers, as documented in a multitude of case reports and studies. Exposure to HDs has been associated with many adverse health effects, including an increase in the risk of leukemia and other cancers, a risk of damage to organs or organ systems, and a risk to the ability to reproduce (NIOSH, 2023).

The Occupational Safety and Health Administration (OSHA,1986) acknowledged the occupational risks of HDs and issued recommendations for their safe handling almost 40 years ago. Updated guidelines from NIOSH (2024) and professional societies have been published (Olsen & Walton, 2024; Power & Coyne, 2018). All guidelines address the need for HD-related policies and procedures, education and training, and safe handling precautions in settings in which HDs are present. Safe handling precautions include the use of engineering controls, safe work practices, and personal protective equipment (PPE). When used appropriately and consistently, compliance with recommended precautions reduce occupational HD exposure (NIOSH, 2004).

NIOSH (2024) does not address safe handling of substances that are not classified as drugs by the U.S. Food and Drug Administration. Data continue to emerge surrounding the occupational risks associated with exposure to biohazardous agents (Wang et al., 2025). Out of an abundance of caution, this statement should apply not only to HDs but also to biohazardous agents, including infectious agents and gene therapies.

It is the position of ONS and HOPA that:

- Settings in which HDs are present will establish evidence-based policies and procedures for safe handling that comply with regulatory requirements and standards.

- Settings in which HDs are present will ensure that PPE indicated for handling HDs is readily accessible for all staff to utilize to minimize exposure.

- Settings in which antineoplastic HDs are prepared and administered will provide and maintain primary engineering controls, such as exhausted biologic safety cabinets and compounding aseptic containment isolators, in conjunction with secondary engineering controls, such as buffer rooms or segregated compounding areas, consistent with USP chapters.

- Settings in which HDs are administered will ensure the use of supplemental engineering controls at the point of compounding and administration when the dosage form allows.

- Settings in which HDs are present will provide education and training specific to each staff member whose work puts them at risk for exposure to HDs. Initial and ongoing education, training, and competency validation will encompass the risks of exposure, including the reproductive and developmental effects, the recommended precautions for specific handling activities, safe handling of contaminated patient excreta, proper disposal of contaminated waste, spill management, and how to handle acute exposure.

- Settings in which HDs are present will have a set policy to ensure staff acknowledgment of risk associated with HD exposure. Settings in which HDs are present may utilize an assessment of risk to guide safe handling practices for certain dosage forms of HDs. When an assessment of risk is utilized, it must be done within the parameters outlined in U.S. Pharmacopeia (USP) chapter <800> (U.S. Pharmacopeial Convention, 2019) and be based on available literature regarding the hazard risk of each HD.

- Settings in which HDs are present will protect the rights of staff who are trying to conceive, who are pregnant, or who are breastfeeding, and where feasible to engage in alternative duty that does not require HD handling. The process for requesting accommodation should be described in policy.

- Settings in which HDs are present will ensure that patients who receive these drugs and their caregivers receive education about safe handling of HDs, body secretions, and waste to minimize unintended exposure in both the institutional and home settings.

- Settings in which HDs are present will ensure that HD waste is disposed of according to regulatory guidelines and in a manner that protects staff and the environment.

- Settings in which HDs are present should have medical surveillance accessible for staff, either in-house or outsourced, on a periodic basis.

- Settings in which HDs are present will periodically conduct surface wipe testing as a measure of exposure control to aid in the continuous process improvement for handling HDs.

- Our professional societies support and encourage continued research and the generation of new knowledge about the risks of HD exposure and the efficacy of risk-reduction strategies.

- Our professional societies will continue to explore evidence-based strategies for mitigation of risk associated with handling HDs and share recommendations with our respective members.

- Our professional societies recognize that therapies are continuing to evolve and recommend standard-setting bodies or specialty organizations with a focus on employee safety or industrial hygiene that provide a routinely updated list of drugs and therapies that are considered hazardous to those handling them.

- Our professional societies recommend manufacturers of products that support the safe handling of HDs (e.g., closed-system transfer devices, PPE) and validate the effectiveness of their products using available accepted testing protocols.

- Our professional societies support and encourage compliance with all NIOSH recommendations, USP compounding standards, and regulatory requirements.
- Our professional societies support and encourage advocacy efforts to make recommendations and standards into enforceable laws that best protect staff and the environment.

Approved by the ONS Board of Directors, July 2019.

Approved by the HOPA Board of Directors, August 2019. Revised and approved by both boards, October 2021, March 2022, August 2025.

References

Connor, T.H., & McDiarmid, M.A. (2006). Preventing occupational exposures to antineoplastic drugs in health care settings. *CA: A Cancer Journal for Clinicians, 56*(6), 354–365. https://doi.org/10.3322/canjclin.56.6.354

National Institute for Occupational Safety and Health. (2004). *Preventing occupational exposure to antineoplastic and other hazardous drugs in health care settings* [NIOSH Publication No. 2004-165]. U.S. Centers for Disease Control and Prevention. http://www.cdc.gov/niosh/docs/2004-165

National Institute for Occupational Safety and Health. (2023). *Managing hazardous drug exposures: Information for healthcare settings.* [NIOSH Publication No. 2023-130]. U.S. Centers for Disease Control and Prevention. https://www.cdc.gov/niosh/docs/2023-130/

National Institute for Occupational Safety and Health. (2024). *NIOSH list of hazardous drugs in healthcare settings, 2024* [NIOSH Publication No. 2025-103; supersedes 2016-161]. U.S. Centers for Disease Control and Prevention. https://www.cdc.gov/niosh/docs/2025-103/default.html

OSHA [1986]. Guidelines for cytotoxic (antineoplastic) drugs. Washington, DC: Department of Labor, Occupational Safety and Health Administration, Office of Occupational Medicine Publication No. 8-1.1.

Olsen, M.M., & Walton, A.L. (2024). *Safe handling of hazardous drugs* (4th ed.). Oncology Nursing Society.

Power, L.A., & Coyne, J.W. (2018). ASHP guidelines on handling hazardous drugs. *American Journal of Health-System Pharmacy, 75*(24), 1996–2031. https://doi.org/10.2146/ajhp180564

U.S. Pharmacopeial Convention. (2019). *USP general chapter <800>: Hazardous drugs—Handling in healthcare settings*. https://www.usp.org/compounding/general-chapter-hazardous-drugs-handling-healthcare

Wang, A., Ngo, Z., Yu, S.J. & MacDonald, E.A. (2025). Implementing standard practices in the safe handling of gene therapy and biohazardous drugs in a health-system setting, *American Journal of Health-System Pharmacy, 82(*15), e716–e722. https://doi.org/10.1093/ajhp/zxaf026