

# Improving Compliance With Personal Protective Equipment Use Through the Model for Improvement and Staff Champions

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Although the known risks of exposure to hazardous drugs have been well documented and disseminated, certain barriers remain in the use of personal protective equipment (PPE) by nurses administering chemotherapy. At Dana-Farber Cancer Institute, a program was developed that incorporated not only monitoring and reporting compliance of the use of PPE, but also engaged the staff in audit and reporting activities. Compliance rates improved dramatically over time and have remained at high levels.

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The first reported risk to humans handling antineoplastics was published in a study that found mutagenic activity in the urine of nurses working in oncology units (Falck et al., 1979). This finding led to the hypothesis that merely handling chemotherapeutic agents leads to exposure and absorption. Some years later, this hypothesis was validated in a study demonstrating an association between the degree of skin contact or exposure and the presence of acute symptoms experienced by nurses (Valanis, Vollmer, Labuhn, & Glass, 1993). Inadvertent exposure to these drugs has serious health consequences. Common acute symptoms include nausea, vomiting, headache, dizziness, hair loss, and liver damage. In addition, long-term effects have been documented, including increased chromosomal alterations, hepatotoxicity, and abnormal reproductive outcomes (Martin, 2005).

The National Institute for Occupational Safety and Health (NIOSH, 2004) defined recommended exposure limits as concentrations of substances that are

without adverse effect. To date, no identified threshold limits exist for workplace exposure to hazardous drugs. According to the American Society of Health-System Pharmacists (2006), hazardous drugs include chemotherapy, hormones, anesthetic agents, and antiviral agents that have one or more of the following attributes: carcinogenicity, teratogenicity or other developmental toxicity, reproductive toxicity, organ toxicity at low doses, genotoxicity, and structure and toxicity profiles of new drugs that mimic existing drugs determined hazardous by this criteria.

Despite increasing awareness of known exposures and adverse outcomes, resistance to the use of safe-handling systems or their components continues. This resistance may be based on denial of risk, insufficient information, lack of policy enforcement or regulation, or lack of provision of safe-handling devices. An exploration of barriers may be helpful in allaying myths and misconceptions and empower nurses to take more responsibility for their own safety and that of others.

## Risk of Exposure

In general, exposure risks for nurses are related to the preparation, transport, administration, and disposal of chemotherapy waste and bodily fluids. In addition, exposure risk is present when handling and opening drug cases and packages prior to preparation. Except for treatments given intramuscularly or subcutaneously, accidental injection is much rarer because of the use of needle-free administrations. The highest risk of exposure for nurses is associated with preparation and administration, primarily through inhalation of aerosolized drug, direct contact (through eyes, skin, or mucosa), and ingestion of an improperly handled drug.

In an article regarding the safe handling of hazardous drugs, Polovich (2004) highlighted a 1999 report by the Department of Commerce estimating that 5.5 million healthcare workers are in a position to be exposed to hazardous drugs in the workplace. Since then, NIOSH (2008) has estimated that the number of workers at risk of exposure is closer to 8 million. That estimate includes employees who directly purchase, store, prepare, deliver, administer, and discard chemotherapy, as well as those who risk exposure by working in the vicinity of these drugs.

## Current Guidelines

The NIOSH (2004) recommendations fall into three categories: Assess the hazards in the workplace, handle drugs safely, and use and maintain equipment properly. The recommendations also provide more detailed guidelines for appropriate use of personal protective equipment (PPE), receiving and storage of