Safe Handling of Hazardous Drugs: The Implementation of a Closed-System Drug Transfer Device to Reduce Hazardous Drug Related Occupational Exposure in a Research Environment
Amy Callahan, MSN, RN, APN-BC, AOCNS®, Helen Mayberry, MSN, RN, and Daniel Zlott, PharmD, BCOP

Abstract

Objectives:
- Describe the process of choosing and implementing a closed-system drug transfer device at the National Institutes of Health Clinical Center based on national recommendations.
- Describe standardization of hazardous drug infusions in research environment.
- Explain the implementation and evaluation of the system and process.

Background: The Oncology Nursing Society, the National Institute for Occupational Safety and Health, and the American Society of Health-System Pharmacists recommend using closed-system transfer devices (CSTD) to decrease exposure to hazardous drugs (HDs) during preparation and administration. A CSTD is a device that mechanically prevents contamination of the care environment by HDs via the release of HD-containing droplets, aerosols, or vapors.

Purpose: Nurses at the National Institutes of Health Clinical Center administer an average of 1,100 HDs, including both FDA-approved and investigational drugs, each month placing them at high risk for HD exposure. The purpose of this intervention was to limit occupational exposure and standardize the administration of HDs. An interdisciplinary team, including nursing, pharmacy, and hospital epidemiology evaluated four CSTD products for safety, infection-control properties, cost, and versatility. The system had to accommodate the variety of administration techniques required by various investigational drugs.

Intervention: Nursing and pharmacy assessed current HD administration processes and identified the spiking of IV bags on nursing units as a potential source of HD exposure. To minimize risk during spiking, pharmacy agreed to spike all HD IV bags and prime selected HDs in the controlled environment of the biological safety cabinet. It was also determined that the use of a CSTD would decrease nursing exposure when administering HDs. The system that was selected for evaluation included a male luer-locking device, which is applied by pharmacy to all HDs, and a female luer-locking device applied by nursing to the vascular access device. An interdisciplinary team, including nursing, pharmacy, and hospital epidemiology evaluated four CSTD products for safety, infection-control properties, cost, and versatility. The system had to accommodate the variety of administration techniques required by various investigational drugs.

Evaluation: Through the first year of use, including the pilot, voluntary reporting of HD related events increased from 13 to 37 incidents. This is attributed to heightened reporting during implementation. Since hospital-wide implementation, there have been 26 spills, 80% < 5mL in volume. User error accounted for 66% of incidents and was addressed through follow-up education. Stakeholder satisfaction surveys, including nursing and pharmacy, were completed, and a staff led committee was created to review HD spills, ongoing product concerns, educational needs, and future initiatives.

Problem

- Nurses and pharmacists come in contact with hazardous drugs in numerous ways. Preparation, administration, and disposal of hazardous drugs places clinicians at risk for occupational exposure everyday.
- Choosing the right closed system drug transfer device for the National Institutes of Health Clinical Center required involvement of multiple stakeholders, especially nurses and pharmacists who use the product daily (Figure 3, 4, & 5).
- Enhancing the safe handling of hazardous drugs and decreasing infusion errors through standardization of the infusion procedure were additional priorities for this quality improvement project.

Methods

- Literature review completed.
- Review of national standards and studies was performed to review recommendations from nursing and pharmacy professional organizations in order to update the nursing standard of practice and procedures.
- A multidisciplinary team was used to identify a CSTD that met the specified requirements of each stakeholder.
- Versatility and ease of use were priorities for nursing.
- The ability to disinfect the connections easily was a priority for infection control.
- Cost of the system was evaluated.

Outcomes

- CSTD implementation was completed at the NIH, Clinical Center.
- The administration of hazardous drugs is now standardized.
- Hazardous drug spills continue to be monitored.
- Education continues to address user error.
- Nursing and Pharmacy reported overall satisfaction with the CSTD.

Figures 1 and 2. Primary Infusion (left) and Secondary Infusion (right) with Closed System Transfer Devices

References


We would like to acknowledge Claudia Peng—thank you for your commitment to this project!