Implementing a Standardized Home Chemotherapy Spill Kit: A Nurse-Led Interprofessional Approach to Best Practice

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Chemotherapy administration in the home setting poses risks to patients, caregivers, and the environment, particularly in the event of spills. Although the response to chemotherapy spills in the hospital setting is vigorous and includes standard disposal practices for contaminated items, the management of spills in the home setting may vary. A standardized method for managing chemotherapy spills at home that includes education and distribution of spill cleanup materials is imperative to reduce these risks.

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Since it was first implemented in the 1970s (DeMoss, 1980), the practice of administering chemotherapy in the home setting has been associated with greater satisfaction with the treatment process and potentially fewer complications than chemotherapy administration in the hospital (Garvey, 1987; Rischin et al., 2000; Teich & Raia, 1984). As in any setting, chemotherapy administration at home carries risks of hazardous medication exposure for patients, caregivers, and healthcare providers, particularly exposure resulting from chemotherapy spills. Although recommendations for the management of chemotherapy spills at home have evolved and are now standardized, as in the Chemotherapy and Biotherapy Guidelines and Recommendations for Practice (Polovich, Olsen, & Lefebvre, 2014), inconsistencies remain in how patients and caregivers are educated about and provided with resources to manage spills at home. When the authors of this article conducted an informal survey of 11 peer institutions, a majority of them responded that they do not provide spill kits to patients receiving IV chemotherapy at home. At the authors’ National Cancer Institute–designated comprehensive cancer center, patient and caregiver education about home spill risks recently became standardized, as did the provision of spill kit materials for patients receiving chemotherapy in the home setting.

Identification of the Practice Issue

The educator responsible for nursing education in the ambulatory treatment centers at the cancer center observed that, although patients were well educated about their chemotherapeutic regimens, the IV equipment they would use at home, and issues to report to the healthcare team, inconsistencies arose in how patients were advised to handle chemotherapy spills at home and the materials they were given to do so. Patients were given spill supplies when receiving chemotherapy at home, yet not all patients received the same amount and type of supplies, and not all patients received consistent education regarding safe handling of chemotherapy at home.

In a typical month, more than 800 individuals are sent home from the authors’ institution with chemotherapy infusing via IV. The chemotherapy is initiated by a nurse at the clinic, and the patient is sent home with a backpack containing an ambulatory chemotherapy pump. Patients and caregivers are trained in the management of the pump, and they attend a central venous catheter class which uses a teach-back method to verify that they are able to complete dressing changes and disconnect infusions from the catheter. This education is also provided in a video format that may be accessed from any location. Patients have the option to have the chemotherapy disconnected and the dressing changed in the clinic if they feel unable to do so or do not have a trained caregiver who can assist. Spills, although infrequently reported, have largely been from connection issues or pump malfunctions that led to small-volume leaks that often were reported as being absorbed by the patient’s clothing or collected within the backpack. The authors’ institution saw an opportunity to improve patient and caregiver safety by standardizing education and materials.
Review of the Evidence

This need for standardization of spill supplies and associated education was presented to the hospital’s nursing self-governance body, the Nursing Practice Congress. A professional action coordinating team (PACT) was formed to investigate the issue and make recommendations. The PACT included members from the nursing, pharmacy, patient education, environmental health and safety, case management, and materials management departments.

One of the PACT’s first actions was to review best practices and safety standards for spills at home. Both the Oncology Nursing Society (Polovich et al., 2014) and the Association of Pediatric Hematology/Oncology Nurses (Kline, 2011) emphasized the importance of educating patients and their families about chemotherapy spills and providing a spill kit for patients receiving chemotherapy at home. Recommendations for spill kit contents included surgical latex gloves, a disposable gown, chemical splash goggles, a respirator mask, sheets of absorbent materials, large disposable plastic bags, and labels for toxic waste (Blecke, 1989; Kline, 2011; Parker, 1992).

In addition to patient and caregiver safety and exposure, the environmental implications of chemotherapy waste disposal were also of concern. Antineoplastic or cytotatic agents (and their metabolites) have been specifically identified as a class of pharmaceuticals found in water sources throughout the United States at levels high enough to have noticeable adverse impacts on the environment and public health (Herberer, 2002; Verlicchi, Al Aukidy, & Zambello, 2012; Zuccatto, Calamari, Natangelo, & Fanelli, 2000). Applicable local, state, and national policies, as well as those of governmental agencies including the United States Environmental Protection Agency (EPA), U.S. Food and Drug Administration, U.S. Drug Enforcement Administration, Texas Department of State Health Services, and Texas Commission on Environmental Quality, were evaluated to ensure that the newly developed patient educational materials properly educated patients to dispose of cytotoxic waste in a manner consistent with regulatory requirements.

Finally, PACT members sent out inquiries to 20 local, state, and national cancer care institutions to assess the implementation of the practice of providing a spill kit. Of the 11 institutions that responded to this inquiry, five reported that they provide home chemotherapy spill kits for patients receiving chemotherapy in the home setting and six reported that they do not provide a kit.

Standards and Policies

Having determined that the provision of a home spill kit is well supported in the literature, the PACT resolved to create and adopt an institutional policy reflecting best practices regarding home chemotherapy spills, including the adoption of a standardized home spill kit and standardized patient teaching about such spills. The PACT investigated whether current institutional policy conformed to best practices with regard to providing home spill kits. No standardized institutional policy was in place to address home chemotherapy spills, nor did any acknowledgement form exist to indicate that patients and their families had received instruction on cleaning up these spills and the supplies for doing so. The institutional policy regarding home chemotherapy was amended to reflect the safety changes requiring the distribution of the home spill kit and corresponding patient education and was approved by the institutional policies committee.

A key consideration in making recommendations for the home spill kit was its cost to the institution and the patient. At the time of the practice evaluation, some ambulatory care centers at the institution distributed an inpatient chemotherapy spill kit, which was the only standardized spill kit available, at a cost of $14.45 per kit to the institution. This kit included materials not indicated for use in the home setting. Scoopers, for example, are not necessary in home kits, as patients are not sent home with glass vials. Similarly, home kits did not need to include hall-way signs warning of a spill.

The institution’s patient care value analysis team (VAT), which is responsible for determining the costs and value of materials, assisted in the financial analysis of the potential spill kit contents. The content of the discharge spill kit was selected by the team based on the recommendations from Oncology Nursing Society guidelines and was approved by the institution’s VAT. It includes two pairs of nitrite gloves, one disposable gown, one surgical mask, and two chemotherapy waste bags with closure and instructions for use (see Figures 1 and 2). Absorbent pads and spill pillows were omitted from the kit, as patients have been instructed to use paper towels or disposable rags, items readily available in most homes as permitted by the Oncology Nursing Society guidelines (Polovich et al., 2014). Given that the average volume of chemotherapy sent home with patients is 250 ml, this decision was believed to be cost effective and derived from practice-based evidence, which suggested most chemotherapy spills in the home were of a sufficiently small volume to be safely and easily managed with paper towels or disposable rags.

Prices and bids for this standardized home chemotherapy spill kit were sought from multiple vendors. One vendor was selected to manufacture the chemotherapy spill kit. The kit was designed to contain two pairs of nitrile gloves, two disposable rags, two pairs of nitrile gloves, one surgical mask, one disposable gown, one pair of nitrile gloves, one pair of nitrile gloves, one pair of nitrile gloves, one pair of nitrile gloves, and one pair of nitrile gloves. The kit was tested to ensure that it met regulatory requirements.

FIGURE 1. Chemotherapy Spill Kit Contents
Note. Image courtesy of Gustavo Serrano and the University of Texas MD Anderson Cancer Center. Used with permission.
spill kit for home use at a cost to the institution of $3.27 per kit.

Educational Initiatives

Once the spill kit and policy were finalized, educational content was developed for patients and their caregivers as well as for staff members to ensure consistent implementation and use of the home spill kits. Patient education materials were developed or modified through collaboration between clinicians and the Patient Education Department. Four educational components were addressed: (a) existing patient education handouts on safe handling of chemotherapy infusions were revised to include reference to using the home spill kit and safely cleaning spills; (b) a new one-page patient education handout providing a step-by-step procedure for actions to take in case of a spill, how to clean up the spill using the spill kit, and how to dispose of contaminated materials was created to be placed in each spill kit; (c) the form used by nurses to document patient education was revised to include reference to instruction about the home spill kit use; and (d) a form for patient acknowledgment of receipt of the kit and teaching about safe handling of chemotherapy spills at home was created with input from the legal department.

These educational documents were added to an online database accessible to clinicians. The documents comply with institutional standards for health literacy, including standardized font size and style, use of bullets and white space, and accessible reading-level restrictions (below eighth grade). The revised education includes specific instructions for patients and their families on how to properly dispose of cytotoxic waste in the most environmentally responsible manner possible. These instructions are compliant and consistent with all specific federal and state regulatory requirements regarding the management and disposal of hazardous wastes, as well as the EPA’s guidance regarding best management practices for disposal of unused pharmaceuticals from healthcare facilities and households (EPA, 2003, 2010).

Spill Kit Implementation

Implementation of the standardized home spill kit includes the following.

- All patients who are discharged from any area with infusion chemotherapy will go home with a discharge chemotherapy spill kit.
- Along with the chemotherapy spill kit, the patients are given a set of instructions regarding how to clean a chemotherapy spill using the materials provided.
- All patients are instructed to return any and all materials that come in contact with chemotherapeutic content resulting from a spill to the clinic in the biohazard bag included in the home spill kit, allowing for proper disposal according to state and federal guidelines.
- All patients being discharged home with infusion chemotherapy sign an acknowledgment form indicating they have been given a home spill kit or that they already have a spill kit at home.

![FIGURE 2. Home Chemotherapy Spill Kit Content Descriptions](Note: Based on information from Cardinal Health, 2014.)

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
<th>Quantity</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tamper-evident bag</td>
<td>3 ml, 10 x 15 in</td>
<td>One</td>
<td></td>
</tr>
<tr>
<td>Self-lock ties</td>
<td>4 ml, 12 x 15 in</td>
<td>One</td>
<td></td>
</tr>
<tr>
<td>Fluid-resistant procedure mask with fog-free foam</td>
<td>8 in</td>
<td>One</td>
<td></td>
</tr>
<tr>
<td>Impervious chemotherapy gown</td>
<td>2 ml, 25 x 34 in</td>
<td>One</td>
<td></td>
</tr>
<tr>
<td>Blue with knit cuffs</td>
<td>Fog-free foam</td>
<td>One</td>
<td></td>
</tr>
<tr>
<td>Large, powder-free, blue nitrile gloves</td>
<td>Particulate filtration efficiency: 99%</td>
<td>Two pairs</td>
<td></td>
</tr>
<tr>
<td>Impervious chemotherapy gown</td>
<td>Bacterial filtration efficiency: 99%</td>
<td>One</td>
<td></td>
</tr>
</tbody>
</table>
| Biohazard procedure mask                   | All patients being discharged home with infusion chemotherapy sign an acknowledgment form indicating they have been given a home spill kit or that they already have a spill kit at home.

Implications for Practice

Standardization and implementation of the home chemotherapy spill kit has proven advantageous in empowering patients and their caregivers to manage chemotherapy spills at home. In addition to promoting safe practice, provision of the kit may ultimately prove cost effective compared with the higher-priced home spill kit that had previously been provided and compared with the miscellaneous materials for spill management that had been distributed from various clinics as a result of inconsistent practice.

Ultimately, the change has been highly beneficial for staff and patients as these care processes have successfully been standardized across treatment settings. This benefit has been reflected in subjective feedback from patients and caregivers saying that they feel more confident in managing potential chemotherapy spills in the home setting owing to not only the provision of the kit itself but also the thorough patient education provided by nursing staff. The success of this change process affirms the efficacy of interdisciplinary collaboration and patient-provider partnerships to promote safe and effective care for patients with cancer.

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