

# Ten Simple Strategies to Prevent Chemotherapy Errors

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Chemotherapy error prevention has received considerable attention since 1995, when reports of patients' deaths from overdoses of chemotherapy were highly publicized in the media (Knox, 1995; Smaragdis, 1995). These lethal errors prompted many cancer centers to examine their policies, procedures, and practices. In many settings, heightened measures to prevent chemotherapy errors were implemented.

Following the anecdotal reports of patients' deaths, several journal articles about chemotherapy error prevention were published. Safety measures advocated by the authors of these articles included using preprinted chemotherapy order forms, systematically calculating and verifying doses, establishing dosage limits, eliminating the use of trailing zeros in doses (e.g., 2.0 mg), standardizing the prescribing vocabulary, requiring nurse certification in chemotherapy administration, and improving communication (Cohen et al., 1996; Fischer, Alfano, Knopf, Donovan, & Beaulieu, 1996; Kohler et al., 1998; Olsen, 1997; Schulmeister, 1997, 1999a).

In addition to the error-prevention strategies published in journals, guidelines and recommendations that address chemotherapy administration have been published by various organizations, such as the Oncology Nursing Society (Brown et al., 2001), Infusion Nurses Society (2000), and American Society of Health-System Pharmacists (ASHP, 2002). These guidelines often serve as the basis for an institution's policies and procedures and can be adapted to meet the needs of each particular institution.

Safety experts currently recommend using technology to prevent medication errors. Computerized prescriber order entry, automated medication-dispensing machines, and bar coding are a few of the technologies being advocated to promote safety. Simple, easily implemented safety strategies to prevent chemotherapy errors should not be overlooked and include consistent use of a reliable method to verify patient identity, metric measurement, and workplace illumination and organization. Other strategies are elimination of abbreviations and acronyms, provision of up-to-date information at the point of care, and partnering with patients for safety. These strategies can be customized for use in a variety of practice settings. Oncology nurses are at the forefront of chemotherapy error-prevention initiatives and play a key role in implementing safety measures.

More recently published literature on error prevention emphasizes the use of technology to reduce the potential for error. Examples include computerized prescriber order entry (CPOE), chemotherapy-specific software programs, computerized nursing documentation systems with links to pharmacology references, automated medication-dispensing machines, electronic medical records, linked networks of patient databases, computerized clinical decision support systems, personal data assistants, use of robots in pharmacies, and bar coding (ASHP, 2002; Bates & Gawande, 2003; Chung, Choi, & Moon, 2003; Gray & Felkey, 2004; Hagland, 2004; Kaushal, Shojania, & Bates, 2003; Larrabee & Brown, 2003; Oren, Shaffer, & Guglielmo, 2003).

The U.S. Food and Drug Administration (FDA) asserted that bar codes on medications would help to prevent medication errors when used with a bar code scanning

system and computerized database. On February 25, 2004, the FDA published a rule titled "Bar Code Label Requirements for Human Drug Products and Biological Products" that requires linear bar codes on prescription medications and over-the-counter medications commonly used in hospitals and dispensed by medication orders. Manufacturers of new medications had 60 days from the February 25, 2004, implementation date to include bar codes on their products. Medications previously approved by the FDA, blood, and blood products must have bar codes within two years of the implementation date. A bar code must contain, at a minimum, the medication's national drug code number, which

uniquely identifies the medication. Pharmacy use of bar codes and scanners helps to ensure that the right drug and correct dose are dispensed. Use of bar code technology in patient care areas reduces the risk that a patient will receive the wrong medication or wrong dose or that the wrong patient will receive a medication (FDA, 2004a). The FDA estimated that the bar code rule will result in more than 500,000 fewer medication-associated adverse events through 2024 and a 50% reduction in medication errors that otherwise would occur when medications are dispensed or administered (FDA, 2004b).

Chemotherapy error-prevention strategies have evolved from simple practice

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