

BDM INFORMATION SYSTEMS

RxTFC® Pharmacy Information System

Contributions to Oncology Medication Safety

BOTH LOW AND HIGH-TECH TOOLS CAN HELP PREVENT CATASTROPHIC CHEMOTHERAPY ERRORS

PHARMACY PRACTICE NEWS

The Institute of Medicine's report, *To Err Is Human*, estimates that 7,000 deaths result from medication errors in the United States each year. Not all mistakes, or drugs, are equivalent in their ability to cause harm. Chemotherapy drugs can be particularly troublesome. They are highly toxic, and their safe dose ranges are narrow; doses of the same drug can vary 100-fold for different malignancies. A "normal" dose of Methotrexate, for example, can range from 10 mg for intrathecal administration to 20 grams for osteosarcoma. Thus, when an error in dosing is made, the outcome is usually catastrophic.

A particularly simple but potentially disastrous mistake is the administration of an entire course of chemotherapy in a single day or repeatedly over multiple days. That very mistake has claimed life in the past despite the best efforts of medical specialists.

That is why it is crucial for health-system pharmacies to have rigorous systems in place for ensuring the accuracy of chemotherapy dosing, according to Raymond J. Muller, MS, RPh, Associate Director, Division of Pharmacy Services at Memorial Sloan-Kettering Cancer Center, New York City. Mr. Muller believes that medication administration errors may be avoided by the use of a standardized medication order form, an increasingly popular tool at Sloan Kettering.

The form can be likened to a preflight checklist that forces physicians, pharmacists and others in the prescription chain to ensure that orders are written and reviewed in a structured sequence. This process makes certain that a prescriber remembers to include important aspects of care that might otherwise be overlooked. Standardization guides the thought process and makes it harder to forget critical elements. Moreover, it helps to ensure accuracy of the calculation and interpretation of drug doses.

SUGGESTIONS TO HELP PREVENT CHEMOTHERAPY ERRORS

DO

ALWAYS DOUBLE-CHECK THE DOSE AGAINST THE DRUG REGIMEN OR PROTOCOL.

ALWAYS USE FULL GENERIC NAME OF THE DRUG.

PRESCRIBE ALL DRUG DOSES CLEARLY IN TERMS OF DOSE (E.G., μg , mg, g, ETC.).

DATE ALL ORDERS WITH MONTH, DAY AND YEAR

USE A LEADING ZERO WHEN THE DOSE IS LESS THAN A WHOLE UNIT (E.G., 0.1 mg, NOT .1 mg).

USE BODY-SURFACE AREA (BSA) DOSING (mg/m^2 OR g/m^2) OR, WHEN APPLICABLE, $\mu\text{g}/\text{kg}$. INCLUDE THE DAILY DOSE AND THE SPECIFIC NUMBER OF DAYS THE DRUG IS TO BE GIVEN. (DO NOT WRITE THE COURSE DOSE.).

LIST A ROUTE OF ADMINISTRATION AND AN INFUSION DURATION FOR INTRAVENOUS SOLUTIONS.

INCLUDE THE PATIENT'S HEIGHT, WEIGHT AND BSA WITH THE CHEMOTHERAPY ORDER.

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Mr. Muller said that the standardized medication form has become a stalwart defense against medication errors at Sloan Kettering. Since the facility introduced a single order form condensed from 14 separate documents in 1995, he said, the monthly number of clinical interventions in the oncology pharmacy satellites dropped from 60 to the current six to eight. Mr. Muller noted that these errors never reached the patient, but were caught during repeated human and computerized safety checks. "I believe that is dramatic proof that our system works," he said.

The standard forms used by Sloan Kettering are designed to ensure that all chemotherapy orders include information that is indispensable for accurate drug selection, dosing and administration, including patient weight, height, age, body surface area (BSA), dose by mg/m² (or by kg/m² when applicable), therapy cycle number, pertinent lab data, and notations of all hydration fluids and supportive care medications. Only generic drug names are allowed, and drug abbreviations are forbidden. Incomplete orders are returned to prescribing physicians.

The standardized forms can help ensure that multiday, multidose regimens are accurately recorded, with descriptions of dose per meter squared and calculations for dose per day clearly noted. The total cycle dose and number of days a drug is to be administered should also be included.

To develop the standardized medication form, practitioners at Sloan Kettering first conducted frank, open reviews of actual mistakes discovered during the prescription sequence. Such reviews are now a routine part of orientation and quality improvement. Mr. Muller underscored the need to avoid blame, which is neither productive nor instructive and discourages staff members from reporting mistakes. "Whenever an error occurs, it's rarely the result of a single individual's actions. It's almost always a system-wide issue," he said, adding that every chemotherapy prescription involves up to 140 separate judgments.

To augment its personnel based system, Sloan Kettering has implemented a computerized backup. Its automated maximum-dose system, for example, flags chemotherapy doses that exceed preset limits. The doses may well be legitimate, but the pharmacist still must receive written approval from one of only five oncologists (out of a medical staff of 400) authorized to override the halt.

SUGGESTIONS TO HELP PREVENT CHEMOTHERAPY ERRORS

DO

ALWAYS PRINT CRITICAL INFORMATION SUCH AS DRUG NAMES AND DOSES.

BEFORE SIGNING AN ORDER, DOUBLE-CHECK ALL DRUGS AND DOSES, AND VERIFY THAT THEY ARE WHAT IS INTENDED FOR THE PATIENT TO RECEIVE.

MAKE SURE THAT THE MEDICATION ORDER SHEET HAS THE CORRECT PATIENT'S NAME ON IT, EITHER HANDWRITTEN OR BY ADDRESSOGRAPH PLATE. (DO NOT LEAVE ORDERS ON A BLANK ORDER SHEET FOR SUBSEQUENT STAMPING BY ADDRESSOGRAPH.)

ROUND TOTAL DOSES ABOVE 5 mg TO THE NEAREST WHOLE NUMBER (E.G., 5.8 mg = 6 mg)

DO NOT

DO NOT REFER TO DRUGS BY BRAND NAMES, NICKNAMES, COMPANY NAMES OR ABBREVIATIONS. FOR EXAMPLE, DOES "PLATINUM" REFER TO CISPLATIN OR CARBOPLATIN? SIMILARLY, AREDIA (PAMIDRONATE), WHEN WRITTEN ILLEGIBLY, COULD BE MISREAD AS ADRIA (ABBREVIATING THE DOXORUBICIN BRAND ADRIAMYCIN).

DO NOT GIVE VERBAL ORDERS FOR CHEMOTHERAPY

DO NOT USE A TRAILING ZERO WHEN WRITING AN ORDER (E.G., 10.0 mg CAN BE MISREAD AS 100 mg).

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Memorial Sloan-Kettering Cancer Center is the world's oldest and largest institution devoted to prevention, patient care, research and education in cancer. Memorial Sloan-Kettering's scientists and clinicians generate innovative approaches to better understand, diagnose and treat cancer. Its specialists are leaders in biomedical research and in translating the latest research to advance the standard of cancer care worldwide.

"We selected BDM because of their longstanding dedication to the field of Pharmacy information systems, and their willingness to customize their product to meet the unique needs of our patients" says Charles Lucarelli, Director of Pharmacy at Memorial Sloan-Kettering Cancer Center.

"Working with Memorial Sloan-Kettering demonstrates our pharmacy software's ability to meet the most stringent functionality standards in cancer care today and speaks highly of the quality of our professional resources and support services, which Memorial Sloan-Kettering Cancer Center reviewed thoroughly," says BDM President and C.E.O. Dallas Howe.

In addition to its state-of-the-art design and features and extensive list of major hospitals users across the United States and Canada, RxTFC® provides key patient safety features of special interest to cancer patient care, including the support of extensive dose checking over and above that provided by drug databases, the tracking of life-time dosing and an option allowing pharmacy professionals to predefine protocols for oncology treatment. Numerous oncology wards use BDM's RxTFC® in general hospital settings; however, Memorial Sloan-Kettering is among an extensive BDM user group including some of the United States and Canada's leading cancer institutions.

SUGGESTIONS TO HELP PREVENT CHEMOTHERAPY ERRORS

DO NOT

DO NOT USE DANGEROUS ABBREVIATIONS (E.G., "U" FOR UNITS CAN BE READ AS A ZERO AND THE PATIENT COULD GET A TENFOLD OVERDOSE).

DO NOT USE A SOFT-TIP FELT PEN. WHEN ORDERS ARE WRITTEN ON MULTI-LAYER CARBONLESS PAPER, COPIES OF THE DRUG ORDER MAY BE ILLEGIBLE OR INVISIBLE.

DO NOT SIGN A BLANK COPY OF A MEDICATION ORDER FOR AN ALLIED HEALTH PROFESSIONAL TO FILL IN LATER. MEDICATION ORDERS SHOULD REFLECT INFORMATION DIRECTLY INTENDED AND CHECKED BY THE LICENSED PRESCRIBER.

DO NOT ABBREVIATE "DAILY" AS "qd," WHICH HAS BEEN MISTAKEN FOR "qid." SIMILARLY, DO NOT ABBREVIATE "EVERY OTHER DAY" AS "qod."

DO NOT WRITE DRUG ORDERS IN TERMS OF NUMBER OF AMPULES OR VIALS. IF DRUGS COME IN MORE THAN ONE VIAL OR AMPULE SIZE, THE RESULT COULD BE ADMINISTRATION OF DOSES NOT INTENDED BY THE PRESCRIBER. FOR EXAMPLE, CARBOPLATIN AND CISPLATIN BOTH COME IN THREE DIFFERENT VIAL SIZES.

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