

# Medication Safety Alerts

Jason C. Volling, Sylvia Hyland, and David U

This column draws on US and Canadian experience and includes, with permission, material from the *ISMP Medication Safety Alert!*, a biweekly bulletin published by the Institute for Safe Medication Practices (ISMP), Huntingdon Valley, Pennsylvania.

## EXTRA-DOSE ERRORS

### Impact of the Problem

Hospitals have traditionally recorded extra doses as a type of medication error. In many cases such errors do not lead to patient harm, but for selected medications they can result in significant morbidity. Investigation and analysis of the contributing factors and root causes of extra-dose errors may identify system failures that increase the risk of recurrence of such errors.

In a previous article, we discussed the problems associated with first-dose delays, in particular with anticoagulants and antibiotics.<sup>1</sup> Here, we address the problem of extra doses, which may occur because of weaknesses in a hospital's medication use system.

High-alert medications such as cancer chemotherapy agents, cardiovascular agents, narcotics, insulin, and heparin have a narrow margin of safety.<sup>2</sup> Dosing errors with these drugs can lead to a high risk for patient injury. In addition, the new less-frequent dosing regimens that have been designed for convenience and cost-effectiveness can also lead to increased risk of patient harm from extra-dose errors. The low-molecular-weight heparins (LMWH) provide a good example. Once-daily or twice-daily LMWH treatments were developed to replace cumbersome continuous IV infusions of unfractionated heparin. LMWHs have standardized dosing regimens that can increase the overall safety profile of anticoagulant treatment relative to dosing nomograms for unfractionated heparin. The potential problem with higher doses given at longer dosing intervals, however, is the increased risk associated with extra-dose errors. The new long-acting and controlled-release drug formulations of narcotics and cardiovascular agents are other examples of drugs for

which the risk of patient harm increases when extra doses are accidentally administered.

### Case Example (Reported to ISMP Canada)

A patient with a clinical diagnosis of pulmonary embolism received dalteparin (Fragmin) 8000 units subcutaneously at 1500, as ordered in an emergency department. The patient was then admitted to an inpatient unit with an admission order for "dalteparin 8000 units subcutaneously bid". Following transfer to a nursing unit, the patient mistakenly received a second dose of dalteparin 8000 units (at 1800). Serious bleeding complications developed. Although there were directly causative clinical risk factors for the bleeding, the unintended extra dose of dalteparin led the hospital to review opportunities for improvements to its medication system.

Hospital pharmacists are in an ideal position to promote system redesigns for the prevention of extra-dose medication errors.

## Strategies for Prevention of Extra-Dose Errors

### Medication Distribution System

A unit-dose distribution system in which the pharmacy provides prepared doses of medication continues to be the "gold standard" of medication distribution systems. In some cases, the initial dose is prepared by a nurse for reasons of efficiency; however, subsequent regularly scheduled doses are prepared and dispensed by the pharmacy. Because of the risk of injury from errors, many hospitals incorporate preparation of subcutaneous doses of LMWHs into the pharmacy's centralized sterile-product distribution process.

Automated dispensing cabinets offer many advantages and safeguards. However, not all such units



are designed to warn a nurse of previously administered drug doses. Automated dispensing cabinets without complete patient profiles provide only limited system safeguards. Ideally, the cabinets interface with the pharmacy computer system and use the patient profile to authorize removal of medications.

### **Communication**

The written order is often the first opportunity to clearly communicate the intended treatment. Notation in the order of when the first dose was given or when the next dose is due can facilitate preparation of an accurate medication administration record and ensure that treatments are administered as intended. The use of a computerized physician order entry system integrated with a clinical decision support system can help to clarify the dosing regimen.

The availability of a pharmacist in the emergency department and on nursing units allows for discussion of the timing of doses and facilitates the timely clarification of orders to ensure appropriate dosing regimens.

Documentation of medications that have been administered must be clear, available, and easily accessible. Verbal reinforcement at the time of patient transfers is critical, and hospital processes should be designed to ensure optimal communication during transfers.

### **Education**

Hospital pharmacists are ideally positioned to educate patients, nurses, and physicians about high-alert drugs, new drug formulations, and higher-risk dosing regimens. Education provided to patients can arm them with information that can help to prevent errors. Education provided to nurses might include real-life example quiz questions that promote a better understanding of the hospital's medication administration policies and that can help identify situations when a nurse might want to clarify dosing schedules with a pharmacist. Orientation programs provided to physicians and teaching staff might include examples of both poorly written and well-written medication orders.

The sharing of information about errors and near misses in a hospital newsletter can increase awareness of the contributing factors and root causes of errors. Such exchanges can encourage multidisciplinary suggestions for medication system improvements.

[Note: References are listed on page 228.]

## **SPECIAL FEATURE**

The special feature presented below is taken directly from *ISMP Medication Safety Alert!* volume 8, issue 3, February 6, 2003.

### **Don't Lose Track of Orders During Clarification**

**PROBLEM:** Errors of omission can occur when therapy is unnecessarily delayed because of efforts to clarify an order. A recent report provides an example. A hospitalized patient was prescribed warfarin 2.5 mg every other day, alternating with 5 mg every other day, just as it had been taken prior to admission. The pharmacist who processed the order did not know which dose to use first to start the alternating schedule. He placed the order in a bin reserved for problems and called the unit to ask a nurse to obtain clarification. Unfortunately, he did not enter a note into the patient's drug file as a reminder that follow-up was needed. When the nurse did not call back with the clarification, the order was overlooked in the pharmacy, and also on the nursing unit since the order did not appear on the computer-generated MAR [medication administration record]. Four days later, another pharmacist discovered the error after he happened to see the order in the problem bin.

**SAFE PRACTICE RECOMMENDATION:** When clarifying an order, pharmacists in this hospital will now place an electronic note in the patient's drug file so that a reminder appears on the screen and an alert appears on the MAR for nurses to keep everyone apprised of the problem. The notations also can alert nurses to important reasons a drug dose has not been dispensed and why it should not be administered from floor stock without further information. Some computer systems might allow these reminders to be printed daily for follow-up.

This incident also illustrates the value of providing prescribers with a daily computer-generated list of each patient's medications. By reviewing the list, prescribers can assure that ordered medications have been properly processed, and discontinued medications have been stopped. If such a list cannot be printed, a copy of the MAR from the previous 24 hours can serve the same purpose, and also allow prescribers to view the actual doses administered. An effective 24-hour nursing chart check may have alerted nurses to the overlooked order sooner. Finally, when medication doses are prescribed for administration in other than a daily dose (alternating doses, weekly or monthly doses, 72-hour patches, etc.), prescribers should include clear directions for when each dose should be started.



## References

1. Volling JC, Hyland S, U D. Medication safety alerts: antibiotic and anticoagulant first-dose delays. *CJHP* 2003;56:49-51.
2. High alert medications. [Huntingdon Valley (PA)]: Institute for Safe Medication Practices (ISMP); 2002 Sep. Available at: <http://www.ismp.org/msaarticles/highalertmedications.htm>. Accessed 2003 July 24.

**Jason C. Volling**, BScPhm, is Emergency Department Pharmacist and Medication Safety Specialist, Toronto Western Hospital, University Health Network, Toronto, Ontario.

**Sylvia Hyland**, BScPhm, is Pharmacy Site Operations Manager, Toronto Western Hospital, University Health Network, and a founding member of ISMP Canada.

**David U**, MScPhm, is President and CEO, Institute for Safe Medication Practices Canada (ISMP Canada).

**e-mail:** [davidu@ismp-canada.org](mailto:davidu@ismp-canada.org)

**ISMP Canada home page:** [www.ismp-canada.org](http://www.ismp-canada.org)

---

## BOOKS RECEIVED

*AHFS Drug Handbook*, 2nd edition. DiPiro JT. American Society of Health-System Pharmacists, Bethesda, Maryland, 2002. ISBN 1-585255-202-9. Softcover, US\$45.00.

*A to Z Drug Facts*, 4th edition. Tatro DS. Facts and Comparisons, St Louis, Missouri, 2003. ISBN 1-57439-132-1. Softcover, US\$49.95.

*Drug Facts and Comparisons 2003*, 57th edition. Tatro DS. Facts and Comparisons, St Louis, Missouri, 2003. ISBN 1-57439-135-6. Hardcover, US\$194.95.

*Drug Interactions Facts*, 2003 Edition. Tatro DS. Facts and Comparisons, St Louis, Missouri, 2003. ISBN 1-57439-137-2. Softcover, US\$131.95.

*Handbook on Injectable Drugs*, 12th edition. Trissel LA, Hawkins B. American Society of Health-System Pharmacists, Bethesda, Maryland, 2002. ISBN 1-58528-041-0. Hardcover, US\$194.00.

*Pocket Guide to Injectable Drugs*, 12th edition. Trissel LA. American Society of Health-System Pharmacists, Bethesda, Maryland, 2003. ISBN 1-58528-043-7. Softcover, US\$44.00.

