

Medication Safety Alerts

David U and Valentina Jelincic

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.

COPING WITH THE SHORTAGE OF PHARMACISTS

Do we agree that there is a shortage of pharmacists in Canada? Do we agree that the shortage is placing pressures on both front-line and management staff? Do we agree that the situation may compromise medication safety? If you answered “Yes” to the preceding questions, perhaps we can agree on some basic strategies to deal with the problem.

The causes of pharmacist shortages in hospitals include limitations on staff numbers as a result of budget constraints, increases in the need for professionals with expertise to manage a growing number of pharmaceuticals and patient care programs, inability to attract professionals to the hospital setting, expansion of specialty services, and loss of direct patient care pharmacists to careers in other industries (e.g., consulting, the pharmaceutical industry, community practice, and academia).

Having manoeuvred through an era of hospital downsizing, consolidation, and mergers, the profession of pharmacy continues to provide essential services within health care institutions. Basic services, as well as expanded specialty programs for inpatients and outpatients, are being maintained by hospital pharmacies throughout Canada. Yet the shortage of pharmacists, coupled with shortages of doctors and nurses, increases the stress on all health care professionals and the patients under their care.

Rationalization of services and restructuring of

departments have led to numerous situations where the shortages are keenly felt. Where medication dispensing and administration used to be subject to independent double-checks by more than one professional, there may now be only one individual involved in the process. Where a pharmacist was previously responsible for the pharmaceutical care of patients on only 1 or 2 nursing units, he or she may now be covering many units, including units without a dedicated pharmacist assignment. Where transcription of orders used to be done by nurses, nonprofessional staff (e.g., ward clerks) may now be performing the task, and if there is no pharmacist to review the orders in a timely fashion, transcription errors may not be discovered until after the patient has received an incorrect medication or dosage. All of these situations create opportunities for errors and consequent harm to patients. Similarly, they all create opportunities for increases in health care costs in the form of longer patient stays and possible litigation.

These challenges are not new. Recognizing the important role of pharmacists, most hospitals have increased the numbers of pharmacists, technicians and pharmacist-managed programs over the past decade, sometimes in compensation for the loss of other professionals. Yet shortages persist. How can you, as an individual hospital pharmacist, manage your workload and maintain patient safety?

Here are some suggested strategies:

- Work collaboratively with doctors, nurses, and other pharmacists and health care professionals — communication can help to avert errors. Point-of-care teamwork is ideal: orders are reviewed even



before they are written, and all members of the team provide their expertise and input to the management of patients.

- Involve and educate patients about their health and medications. An informed patient will question inconsistencies and changes in care, providing yet another safeguard.
- Optimize the use of technology, not as a replacement for professional tasks but as an aid to professional decision-making and information-sharing (e.g., computers and personal digital assistants for quick access to drug information and clinical notes, bar coding for drug distribution and administration verification, computer-generated medication administration records to minimize transcription errors in drug orders).
- Discuss drug distribution and issues related to the medication system within the pharmacy, and elicit input from other health care professionals who may be affected. Determine whether changes are needed, what they should be, who should be involved, and how the changes can be realized.
- Standardize medications and protocols (e.g., drugs, doses, concentrations, and administration methods) to minimize chances for misinterpretation.
- Carry out independent double-checks of medication orders, drug formulations and calculations, and dispensing.
- Optimize the functions of pharmacy technicians so that pharmaceutical care activities can be performed by pharmacists. This should help in preventing order-level incidents, identifying adverse drug events, and providing a review of dispensed medications.
- Reinforce the importance of patient safety and identify any situation that may compromise it. Keep hospital administrators informed of the issues.

These are a few of the ways in which we can make the best of the staff members we have. At the same time, we need to continue looking for better and safer ways to provide pharmacy services.

Quality is never an accident; it is always the result of high intention, sincere effort, intelligent direction and skillful execution; it represents the wise choice of many alternatives.—Willa A. Foster¹

SPECIAL FEATURE

The special feature below is taken directly from *ISMP Medication Safety Alert!* volume 7, issue 19, September 18, 2002.

“Maximize” safety when titrating drug doses

Problem: Would you accept the following order: “LEVOPHED (norepinephrine) drip, start at 1 mcg/min and titrate to systolic BP greater than 90”? Do you often see similar orders for norepinephrine and other titrated medications? Do they appear on your preprinted order forms? If yes, consider the following event. An ICU [intensive care unit] nurse titrated a dose of norepinephrine up to 38 mcg/minute to maintain a systolic blood pressure greater than 90 mm Hg. This rate was maintained throughout the night, at which point the patient had so much peripheral vasoconstriction that irreversible ischemia occurred in several of his toes, leading to gangrene and eventual amputation.

Excessive vasoconstriction from pressor drugs can lead to adverse cardiac effects as well as peripheral vascular ischemia, especially if patients or families desire full heroic measures regardless of the consequences. Other factors also may contribute to the problem. For example, concomitant medications with similar modes of action, volume depletion, and preexisting compromised circulation can contribute to adverse effects when titrating pressor drugs. In fact, in the example above, the patient who lost his toes was severely dehydrated, which heightened his potential for an adverse outcome.

Accepting orders for titration of medications without dose limits is unsafe. The problem is, you may get little help from drug information resources in determining a maximum dose beyond which you'd no longer increase cardiac effects, but which would increase adverse peripheral effects. For example, after looking at several reputable references, dose ranges for norepinephrine were found as high as 210 mcg/min, with only a sentence warning about the possible adverse effects. In other references, no maximum dose is listed for the titrated medication. Similar problems may be found when seeking information on other titrated drugs, such as epinephrine or phenylephrine.

Safe Practice Recommendation: Consider bringing this issue to the Pharmacy and Therapeutics Committee, or a similar multidisciplinary committee, for discussion. Before the meeting, gather as much information as possible about safe dose ranges for medications that are titrated at your practice site. At the meeting, set a dose limit at which the physician must be called for each titrated medication. If a



titrated medication continues at or above the dose limit, it's also advisable to require the physician to acknowledge the current dose at least every 24 hours by writing specific orders with a new dose limit at which he should be called. Be sure to include dose limits on preprinted orders, written protocols for titrated medications, internal reference materials such as nursing IV [intravenous] guidelines, medication administration records, and labels of titrated solutions. "Smart pumps" that alarm when dose limits are exceeded can remind the nurse to call the physician. Nurses also should assess peripheral circulation frequently when titrating medications to detect potential problems as early as possible. Finally, it may be helpful to establish minimum doses for titrated drugs to signal possible discontinuation when they are no longer needed.

Reference

1. Foster WA. Quoted in: Quotations Web site maintained by Nicholas Russon. Available <http://members.rogers.com/nrusson/quotes/q.html#Quality>. Accessed 2002 Oct 25.

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

Valentina Jelincic, BScPhm, is a Consultant, the Institute for Safe Medication Practices Canada (ISMP Canada)

e-mail: davidu@ismp-canada.org

ISMP Canada home page: www.ismp-canada.org

continued from page 300

have the money and the time to obtain a phenotypic or genotypic profile for every patient to determine genetic susceptibilities and prescribe the drug that best fits the profile?

Here is another perspective from which to examine the issue: How badly are we doing with currently available drugs, in terms of managing disease and limiting adverse effects? If our current record isn't so good, maybe it's because we are not using the available drugs properly. Maybe we don't need a whole new generation of drugs that will also be used improperly.

The situation presented in *Gattaca*, a 1997 Sony film in which employment and mate selection in a futuristic society were based largely on nonconfidential genetic information, may simply represent a more advanced version of the scientifically engineered society described in Aldous Huxley's *Brave New World*.¹² However, I don't believe that this new world will be upon us any time soon. In the next 20 years, we pharmacists should devote our efforts to making sure the drugs we have are used properly.

References

1. Walker SE. Pharmacogenomics. *Can J Hosp Pharm* 2002;55:188.
2. Ensom MHH. 2001: a pharmacogenomics odyssey [editorial]. *Can J Hosp Pharm* 2001;54:6-7.
3. Human Genome Project information: pharmacogenomics. Oak Ridge (TN): Human Genome Project, US Department of Energy Office of Science; modified 2001 Dec 10. Available from <http://www.ornl.gov/hgmis/medicine/pharma.html> (accessed 2002 May 14).

4. Tanne JH. The new word in designer drugs. *BMJ* 1998;316:1930. Available from: <http://bmj.com/cgi/content/full/316/7149/1930> (accessed 2002 May 14).
5. Mancinelli L, Cronin M, Sadée W. Pharmacogenomics: the promise of personalized medicine. *AAPS PharmSci* 2000;2(1):article 4. Available from: <http://www.pharmsci.org/scientificjournals/pharmsci/journal/4.html> (accessed 2002 May 14).
6. Kenworthy KE, Bloomer JC, Clarke SE, Houston JB. CYP3A4 drug interactions: correlation of 10 in vitro probe substrates. *Br J Clin Pharmacol* 1999;48:716-27.
7. Bradford LD. CYP2D6 allele frequency in European Caucasians, Asians, Africans and their descendants. *Pharmacogenomics* 2002;3:229-43.
8. Bertilsson L. Geographical/interracial differences in polymorphic drug oxidation. Current state of knowledge of cytochromes P450 (CYP) 2D6 and 2C19. *Clin Pharmacokinet* 1995;29:192-209.
9. Ameyaw MM, Regateiro F, Li T, Liu X, Tariq M, Mobarek A, et al. MDR1 pharmacogenetics: frequency of the C3435T mutation in exon 26 is significantly influenced by ethnicity. *Pharmacogenetics* 2001;11:217-21.
10. Matthews HW. Racial, ethnic and gender differences in response to medicines. *Drug Metabol Drug Interact* 1995;12(2):77-91.
11. Takahashi H, Echizen H. Pharmacogenetics of warfarin elimination and its clinical implications. *Clin Pharmacokinet* 2001;40:587-603.
12. Huxley A. *Brave new world*. New York (NY): HarperCollins Publishers; 1998.

Scott E. Walker, MScPhm, FCSHP, is Editor of *CJHP*.

