

Medication Safety Alerts

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.

DOUBLE-CHECKING: DOES IT WORK?

Double-checking of medication administration by nurses in hospitals has been a topic of interest as well as controversy. Proponents have good reasons to believe that double-checking should and will catch errors, while critics have argued that it is not an effective way of preventing errors, nor an efficient way of using health care resources. Critics are also concerned that the double-check process might create a false sense of security. An Australian study examined the safety of single-person checking (by a registered nurse) of a designated group of medications. The number of medication errors reported with single-person checking was similar to the number reported in a comparable time frame in a setting where double-person checking was the standard practice.¹ The recent *Medication Safety Alert!* article reproduced below discusses the virtues of independent double-checking. It quotes Dr Anthony Grasha, professor of psychology at the University of Cincinnati, who stresses the importance of independent checking and the necessary training for proper checking.

The issue of double-checking also affects hospital pharmacists. Order entry, calculation of doses to be prepared and dispensed, and dispensing of medications are important components of the medication-use process. Will double checks on these functions, carried out by pharmacists and pharmacy technicians, help to catch medication errors before patients can be harmed? At present, hospitals vary widely in terms of double-checking practices.

When a pharmacist performs computerized medication order entry, his or her work is not usually double-checked by another pharmacist, although some

hospitals have policies whereby medication orders are subject to random checks. In contrast, orders entered by technicians are usually checked by pharmacists before they are activated. With regard to the dispensing function, medications dispensed in a hospital where unit dosing is the standard are typically filled by technicians and checked by another technician or pharmacist. The same applies to the preparation of doses for restocking of point-of-care dispensing cabinets. In some pharmacies, only medications dispensed for critical care areas are checked. In a traditional drug distribution system, medications are filled by technicians and checked by pharmacists. Doses required "stat" in both unit-dose and traditional systems are usually checked by a pharmacist or another technician before delivery or pick-up by a nurse. In some hospitals where there is only one pharmacist on duty during weekends and night shifts, medications may be dispensed without a second check.

If done properly, double-checking by pharmacists and technicians does play a role in reducing medication errors. An effective double check must be performed independently by 2 staff members and should be applied in cases involving selected high-risk patient groups (e.g., children) and high-alert medications (e.g., chemotherapy). A study on the frequency of 10-fold dosing errors, published about a year ago by researchers at the Hospital for Sick Children in Toronto, demonstrated the impact of errors in complex dosing regimens for children.² Similarly, great efforts should be exerted to safeguard complex drug regimens for cancer patients.

Hospital pharmacists should make every effort to perform independent double checks on high-alert medications such as insulin, opiates, and chemotherapeutic



agents. There have been many reports of mix-ups involving these types of drugs, as well as reports of incorrect doses calculated and prepared. Here are a few tips on preventing the dispensing of the wrong drug and incorrect dosing with these high-alert drugs:

- Use both the generic drug name and the brand name in order entry.
- Where possible, avoid using mnemonics for high-alert drugs.
- If computer mnemonics are used for these drugs, make sure that they are clearly distinguished and do not look alike or sound alike.
- Perform checks of dosing calculations “from scratch”; the person performing the check should not be aware of how the first calculation was done or its result.
- Be familiar with dosing parameters, e.g., body surface area calculations for chemotherapy, and body surface area, weight, and pharmacokinetic calculations for pediatric medications.
- Eliminate system- or task-induced errors, such as poor labelling and inconspicuous display of the decimal place.
- Double-check with another colleague and seek guidance if you are in doubt about whether a dose is correct.
- Ensure that drug protocols and practice guidelines are kept up to date.

The independence of double-checking systems is crucial. In some situations, not all double checks are truly independent, although the checks are performed independently by separate practitioners.* This problem stems from both endogenous and exogenous errors. Endogenous errors arise within the mind of an individual; thus, endogenous errors made by one person will be independent of endogenous errors made by another. Double checks therefore have their utmost effect in preventing endogenous errors. If an error is exogenous, arising from characteristics of the task or a poor display of numbers and decimal places, there is a high probability that the 2 individuals doing the checking will make the same error. In many cases, such system- or task-induced errors may also entail the psychological phenomenon called “confirmation bias”, whereby a person reading a medication label sees what he or she expects to see, rather than what is actually printed there. Dr Anthony Grasha has echoed that the most important

issue in making double-checking effective is the “elimination of task-induced factors from the work environment, e.g., computer screens that do not show decimal points well, letters and numbers that are not well defined, and poor contrast in visual displays”.†

Double-check policies are instituted at the discretion of individual hospitals and pharmacies, and none of the regulatory bodies for pharmacists have enforced double-checking criteria. However, the College of Pharmacists of British Columbia does have standards for pharmacy technicians for checking both sterile and nonsterile products. These standards hold the pharmacist accountable for ensuring that a verification process is in place.³ Similarly, the Ontario College of Pharmacists is working on a standard for certified technicians for checking compounded pharmaceutical preparations. In addition, many colleges require that pharmacists have dialogue (or counselling) with the patient for all new prescriptions. One of the benefits of such dialogue is that the patients may provide another check in the process by reviewing their own medications.

Given the ever-increasing workload of pharmacists, shrinking resources, and pharmacist shortages, performing a double check can be tall order for many pharmacies. While we are making improvements in other systems and eliminating task-induced errors, we should use our professional discretion and apply double-checking for selected high-risk patient populations and selected high-alert drugs. The Institute for Safe Medication Practices (ISMP) provides a list of high-alert drugs at its Web site (www.ismp.org).

[References are listed on page 169.]

SPECIAL FEATURE

The special feature presented below is taken directly from *ISMP Medication Safety Alert!* volume 8, issue 5, March 6, 2003.

The Virtues of Independent Double Checks — They Really Are Worth Your Time!

Has your double check system ever failed, leading to a medication error that escaped your detection and ultimately reached a patient? If you answered “yes” to this question, you’re not alone. Here’s one recent example. A pharmacist correctly calculated the dose and volume of interferon for an infant, but entered 0.68 mL

*John Senders, Professor Emeritus, University of Toronto, Toronto, Ontario. Personal communication April 1, 2003.

†Anthony Grasha, Professor of Psychology, University of Cincinnati, Cincinnati, Ohio. Personal communication April 17, 2003.



into the computer instead of the correct volume of 0.068 mL (a common mistake documented in the literature). A second pharmacist double checked the calculation. He arrived at the correct volume of 0.068, but misread the computer entry of 0.68 by the first pharmacist as 0.068 due to confirmation bias — seeing only what one expects to see and overlooking any disconfirming evidence.

As this example shows, there's no question that double checks carried out by people fail at times. But have these failures led you to doubt the overall value of double check systems? Given how busy healthcare professionals are, do you wonder if this error reduction strategy is even worth your time to carry out? We asked Dr Anthony Grasha, Professor of Psychology at the University of Cincinnati, to offer comment on this issue.

Research shows that people find about 95% of all mistakes when checking the work of others.^{4,5} Mathematically, the benefit of double checks can be demonstrated by multiplying this 5% error rate during the checking process and the rate in which errors occur with the task itself (the checking error rate \times the task error rate). For example, if a pharmacy dispensing error rate is 5% (based on research findings), and a double check occurs before medications are dispensed, then the actual chance of a dispensing error reaching the patient is 5% of 5%, or only 0.25%.

Human factors suggest that double checks are more effective if they are performed independently. For example, an error in the concentration of a drug will be detected more often if the person checking the product performs all calculations independently, without knowledge of any prior calculations. In fact, sharing prior calculations or performing a double check together with the person who originally completed the task is fraught with problems. In these instances, if a mistake is present, the person checking the work is more easily drawn into the same mistake, especially if

it appears to be correct at first glance (e.g., numbers correct but decimal point placement wrong, correct drug but wrong concentration selected during PCA [patient-controlled analgesia] pump set-up).

Dr Grasha also points out that the effectiveness of double check systems depends on training staff to carry them out properly — as an independent cognitive task, not a superficial routine task. And with workload issues looming heavily over practitioners, double checks should only be applied strategically to situations that most warrant their use — prescribing, dispensing, and administering select high alert medications. These have the greatest chance of harming patients if misused. Fewer well-placed double checks will be much more successful than an overabundance of double checks.

References

1. Jarman H, Jacobs E, Zielinski V. Medication study supports registered nurses' competence for single checking. *Int J Nurs Pract* 2002;8:330-5.
2. Kozer E, Scolnik D, Macpherson A, Keays T, Shi K, Luk T, et al. Variables associated with medication errors in pediatric emergency medicine. *Pediatrics* 2002;110:737-42.
3. *Standards for pharmacy technician verification of sterile products*. Vancouver (BC): College of Pharmacists of British Columbia; 2000 Apr.
4. Grasha AF, Reilley S, Schell KL, Trantum D, Filburn J. *Process and delayed verification errors in community pharmacy: implications for improving accuracy and patient safety*. Technical Report 112101. Cincinnati (OH): Cognitive-Systems Performance Laboratory; 2001.
5. Campbell GM, Facchinetti N. Using process control charts to monitor dispensing and checking errors. *Am J Health Syst Pharm* 2000;55:946-52.

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

e-mail: davidu@ismp-canada.org

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