

This series brings you up-to-date information about medication safety issues and strategies to prevent medication errors. It draws on Australian incidents and US experience, including (with permission) material from ISMP Medication Safety Alert! a bulletin published by the US Institute for Safe Medication Practices <www.ismp.org>. This series is coordinated via the Committee of Specialty Practice in Medication Safety (Chair, Rosemary Burke, Director of Pharmacy, Concord Hospital, NSW). Australian incidents are collated and editorial recommendations made by Penny Thornton (Principal Advisor, Medication Safety, NSW Health; <medsafety@shpa.org.au>).

AUSTRALIAN INCIDENTS

More oral syringe news!

Epistatus (Phebra), buccal midazolam 10 mg/mL (4 mL solution) is available under the Special Access Scheme. Epistatus contains midazolam maleate equivalent to midazolam base 40 mg in 4 mL. Epistatus comes in a 30 mL screw top bottle with a rubber top designed to fit the provided purple oral dispensers. Unfortunately, we have discovered that the purple oral dispensers provided **can** be connected to a luer lock female port. We are concerned that:



1. The **colour** purple in Australia signifies cytotoxic. Our advice from Phebra via their supplier is that they are purple because that is the European (UK) standard.

2. **Connectivity** of what is purported to be an oral syringe. Phebra has written to the supplier of the syringes listing their (and our) concerns over connectivity and they are also contacting their regulatory affairs manager, as Australian registration is proposed.

3. This buccal solution is twice the **strength** of the midazolam that everyone is used to using the buccal route – particularly in kids. Parent education will need to be prioritised if changing products held to treat their epileptic children at home.

Now, we welcome Phebra bringing this badly needed paediatric product to Australia. Injectable midazolam 5 mg/mL in polyolefin ampoules are now used for buccal administration because of the lack of an alternative of the correct strength. However, by replacing this product, we must not introduce further potential errors. Phebra's rapid attention to the safety issues we have highlighted are appreciated. We hope that the change in the colour and design of the oral syringe will occur prior to their application for product registration.

[*Australian Alert 103, December 2009*]

Which lumen?

A night nurse had labelled the patient's IV pump with drug name stickers and labelled each line for the multi-lumen catheter. A separate pump was apparently being used to run a noradrenaline admixture line (blue lumen line). Morphine and midazolam were being run together into the brown lumen line. An anaesthetist arrived and gave the morphine/midazolam as a bolus. The patient's systolic blood pressure went up to 320 mmHg. It was noted that morphine and noradrenaline were running together into the brown multi-lumen port despite the sticker indicating it was morphine/midazolam. The previous nurse appeared to have spiked the noradrenaline line into the midazolam bag and vice versa.

Recommendation: For patients receiving multiple drugs by infusion, check each drug line from the point of the patient's cannula connection to the IV infusion bag. Label each line close to the point of administration with the drug being infused to prevent similar errors. Ensure that all infusion bags with drugs added are clearly labelled with, e.g. the added drug name, amount.

[*Australian Incident 104, February 2010*]

US SAFETY BRIEFS

Safer connectors in the UK

The National Patient Safety Agency, a patient safety oversight government agency that is part of the National Health Service in the UK, has published an alert to ensure that as of 1 April 2011, all spinal (intrathecal) bolus doses and lumbar puncture samples will be performed using syringes, needles, and other devices that will not connect with intravenous Luer connectors. Further, as of 1 April 2013, all epidural, spinal, and regional infusions and boluses must be delivered with devices that will not connect with intravenous Luer connectors or intravenous infusion spikes. Currently, standard medical connectors (Luer connectors) are used in a wide variety of systems including the administration of intravenous, spinal, and other injections. Their wide use has exposed patients to the risk of accidentally delivering spinal and epidural medications intravenous, and *vice versa*, with fatal results. A range of devices with safer connectors are not currently available. However, some new products are commercially available <www.neurax.co.uk>, and representative industry groups and other key stakeholders support this initiative. It is believed that this move will stimulate additional manufacturers to develop safer connectors that will not allow a Luer connection. Copies of the Patient Safety Alert (being issued in two parts because there are two implementation dates), together with supporting information, are on the National Reporting and Learning Service web site <www.nrls.npsa.nhs.uk/resources/type/alerts/?entryid45=65259>.

[*ISMP Medication Safety Alert! 3 December 2009*]

Lithium safety alert

In recognition of patient harm that sometimes occurs in patients taking lithium, the National Patient Safety Agency in England and Wales has released an alert on safe lithium therapy. The alert, sent to all healthcare organisations where lithium therapy is initiated, prescribed, dispensed, and monitored, requests compliance with safe treatment practices established by the National Health Service. These include informing patients of the known side effects or symptoms of lithium toxicity and scheduling regular blood tests, which are important as a basis for dose adjustments when appropriate. Clinically significant alterations in lithium blood levels may occur with

commonly prescribed and over-the-counter medicines. The blood level of lithium is dependent on kidney function, and lithium has the potential to interfere with kidney and thyroid functions. The National Patient Safety Agency has developed supportive material for health professionals as well as a patient information booklet, lithium alert card, and a record book for tracking blood tests. The complete alert and links to the associated materials can be found at <www.nrls.npsa.nhs.uk/resources/type/alerts/?entryid=45=65426>.

[ISMP Medication Safety Alert! 17 December 2009]

For those who just can't wait until the next issue for alerts!

ISMP and Doctor's Digest launch



new iPhone application.

In cooperation with the publication *Doctor's Digest*, ISMP has launched **PracticeRx**, a

free safety alert system and error-reporting tool for the iPhone. If you have an iPhone you can download the free application now using iTunes or your iPhone. Go to:

<http://itunes.apple.com/us/app/practicerx-by-doctors-digest/id345767265?mt=8>. Users can

report medication errors to ISMP via email on their phone, dial our toll-free number (800-FAIL-SAFE), or send a voicemail created by the application. ISMP is posting safety alerts and error-prevention tips as well as patient safety news and information about our organization. A special area has also been devoted to preventing errors with high-alert medications.

Be sure to download the application today!

[ISMP Medication Safety Alert! 14 January 2010]

Order by metric weight, not volume

A pharmacist who manages an electronic database for a health system that he frequently receives requests to use mL as the ordering unit with oral liquids (versus metric weight, e.g. mg, g). The pharmacist wanted to know if we had a position that agreed with his, which is to prescribe oral liquid medications using metric weight. In the ISMP book, *Medication Errors*, we noted that, in most cases, it is unacceptable to express doses or quantities in terms of dosage form or volume alone. Volume may be used along with a strength or concentration, for example, it is acceptable to prescribe 5 mL of a solution of 100 mg/5 mL (unnecessary if the dose in mg is prescribed). It is also acceptable to prescribe by

volume when: there is no strength due to a combination of many ingredients, or no active ingredient (e.g. cola syrup); when the active ingredient is available only as a liquid in a single strength; and when prescribing certain external-use items such as creams, lotions, and drops (e.g. 'add 10 drops to vaporiser water'). Usually, however, prescribing by volume alone presents a hazard. For example, Fer-In-Sol (ferrous sulfate) contains 15 mg of iron per mL while generics contain 15 mg of iron per 0.6 mL (25 mg/mL). The brand product contains 40% less elemental iron per mL than generics. If Fer-In-Sol is prescribed in terms of mL and generic substitution is allowed, the patient would receive nearly twice as much iron as intended. Healthcare providers should specify the dose in mg and alert parents when multiple concentrations are available.

[ISMP Medication Safety Alert! 14 January 2010]

Catching deadly drug mistakes

That was the title of a 18 January 2010, *Wall Street Journal* article <online.wsj.com/article/SB10001424052748703626604575010932945077528.html> about new efforts under way to quickly spread the word about medication errors and offer guidance on how to prevent similar mistakes. The article touched on the new national alert system that the American Society of Health-System Pharmacists is coordinating with ISMP in order to gain more widespread notification about very serious medication errors. Alerts will continue to be provided to readers of our publications, as before, but the American Society of Health-System Pharmacists will now send alerts about very serious errors to their 35 000 members. Other healthcare organisations are expected to join the national alert system. We estimate that alerts will be sent about six to ten times a year. Included in the *Wall Street Journal* article were descriptions of ISMP's efforts to address medication errors and a new effort by the American Association of Eye and Ear Centers of Excellence to improve labelling of ophthalmic and otic solutions <www.nyee.edu/lasa-e-petition.html>. This effort, supported by ISMP, addresses issues that, according to the online petition, 'threaten patient safety... for many ophthalmic patients'. Below the petition, the American Association of Eye and Ear Centers of Excellence provides pictures of look-alike ophthalmic medications representing how the containers appear to someone with normal vision and someone with impaired vision (a condition that exists in many who use these products).

[ISMP Medication Safety Alert! 28 January 2010]

Different type of allergy problem

No one knows how it happened, but during a hospitalisation, 'vitamin D' was entered into the allergy field of a renal transplant patient's medical record. The patient never reported adverse effects from the vitamin and, in fact, needed vitamin D and calcium to prevent bone loss that can lead to osteoporosis. During an emergency department visit a few years ago, she asked staff to remove the erroneous information; she repeated the request during another visit when, again, someone mentioned the allergy to her. Last week, despite promises to correct the problem, vitamin D was still listed as an allergy when she visited a new primary care physician in a hospital-owned practice. It turns out, medical personnel in clinical areas could not correct the prior electronic

medical records. However, the patient's new physician said he would contact a programmer in the information technology department who could make the correction. It is important for clinicians to understand procedures for correcting electronic information and streamline the steps as much as possible without jeopardising the integrity and security of electronic information.

[ISMP Medication Safety Alert! 28 January 2010]

Australian comment: This is a key medication safety strategy for us to note as we install electronic medications management systems. We must be sure there is wide knowledge and appropriately authorised capacity to correct inadvertent data entry errors.

Increase in fentaNYL patch serious adverse events

Fatal and serious adverse drug events reported to the US Food and Drug Administration increased by 25% in 2008 compared to 2007, caused in large part by large-scale generic drug recalls. Among all drugs causing fatal and serious adverse drug events, fentaNYL, specifically fentaNYL patches, ranked first. FentaNYL accounted for twice as many reports of injuries or deaths due to errors than the second ranked drug, acetaminophen, or the third ranked drug, insulin. New prescriptions for fentaNYL should not be dispensed without patient education by a doctor or pharmacist who has received special training in the safe use of this drug. Take measures such as creating guidelines, determining the indication, and limiting prescribing privileges to ensure only appropriate patients receive this drug. For further recommendations, visit www.ismp.org/Newsletters/acutecare/articles/20070628.asp.

[ISMP Medication Safety Alert! 28 January 2010]

Order scanning systems may pull multiple pages through the scanner at a time

Order management scanning systems offer numerous advantages, but if the pharmacy never receives the orders—a situation that exists when multiple pages of orders are pulled through the scanner at the same time, thus scanning only the top page—these benefits can be compromised.

[ISMP Medication Safety Alert! 28 January 2010]

Value of independent double-checks has yet again been called into question

Some believe the independent double-check process is not justified and could lead to more mistakes, while others feel that it does not work. When performed correctly, however, double-checks can identify a relatively high rate of errors, as confirmation bias can often block a person's ability to see his own mistakes. For double-checks to be effective, they must be accomplished independently; provide education to staff regarding the appropriate method. Double-checks should also be limited to certain high-alert medications, very complex processes, and high-risk patient populations. Staff should document mistakes caught during the checking process, and they should analyse and act on these reports.

[ISMP Medication Safety Alert! 28 January 2010]

Seasonal influenza vaccines falsely believed to provide protection against H1N1

Some healthcare practitioners believed the 2009-2010 seasonal influenza vaccine provided protection against the H1N1 2009 virus because the label notes that the seasonal influenza vaccine includes the A/Brisbane/59/2007 (H1N1) strain. This virus strain, however, was not responsible for the H1N1 2009 pandemic. The strain used for the H1N1 2009 vaccine is A/California/7/2009 (H1N1).

[ISMP Medication Safety Alert! 28 January 2010]

Australian comment: As we move into the southern hemisphere winter we must take note of this alert as it will be our responsibility as pharmacists to be sure clinicians are fully aware of the protection range provided by our influenza vaccines.

Mix-ups between dosage strengths that differ by a factor of 10

A common form of dosing errors involve mix-ups between drug dosage strengths that differ by a factor of 10. Examples include mix-ups with Abilify (aripiprazole) 20 mg and 2 mg, Compazine (prochlorperazine) suppositories 25 mg and 2.5 mg, and predniSONE 50 mg and 5 mg. The use of trailing zeros (i.e. 5.0 mg) and naked decimal points (i.e. .5 mg) increases the risk that a 10-fold dosing error will occur. Avoid using naked decimals (e.g. write 0.5 mg instead of .5 mg) and trailing zeros (e.g. write 2 mg instead of 2.0 mg) on all prescriptions (written and electronic), computerised medication selection screens and pre-printed order forms. Ultimately, we hope that the US Food and Drug Administration and manufacturers will market strengths that are above or below the exact 10-fold difference.

[ISMP Medication Safety Alert! 28 January 2010]

Wrong insulin concentration

A new nurse working in the emergency department of a community hospital offered to help a colleague who had received an order for an insulin infusion. The pharmacy was closed, so the infusion had to be prepared in the emergency department. The nurse used information contained in a monograph for insulin that appeared in a published drug reference chained to the automated dispensing cabinet. As per the monograph, she prepared the infusion by placing 500 units of regular insulin in a 100 mL bag of normal saline. Unfortunately, being new, the nurse was unaware that the standard concentration for insulin infusions at the hospital was actually 100 units of insulin in 100 mL of normal saline. This information was buried in an old and outdated insulin policy on a shelf outside the medication room, thus not readily accessible to the new nurse. Although the infusion bag was properly labelled, the concentration was never discussed during the handover to the receiving nurse. The standard concentration for insulin infusions (1 unit/1 mL) was well known to the more experienced nurse, who administered a separately prepared bolus dose of 10 units of regular insulin as ordered and then started the insulin infusion at 2 mL/hour on the infusion pump (which she believed was 2 units/hour but was actually 10 units/hour). After the patient became symptomatic, staff recognised the error. Ideally, pharmacies should prepare infusions that are not commercially available; but in the absence of pharmacy services, prepared infusions, especially with high-alert drugs, should be independently

checked by another individual after preparation and during patient handovers. When 24-hour pharmacy coverage is not an option, or under conditions that warrant immediate use, hospital approved drug guidelines for IV admixtures prepared by nurses outside the pharmacy should be readily available for reference, and nurses should be educated about the procedures during orientation and when new admixtures are added to the guidelines. Unfortunately, even use of a 'smart' infusion pump may not prevent an error like this unless the nurse hanging the infusion reads the label and recognises the erroneous concentration.

[ISMP Medication Safety Alert! 11 February 2010]

Drug name mix-up

Two patients received levetiracetam (Keppra) instead of levocarnitine (Carnitor). The first patient was a 6-year-old child with an underlying metabolic disorder (assumed to be a carnitine deficiency) and history of seizures. Levetiracetam was dispensed instead of levocarnitine in a community pharmacy. The child's mother did not recognise the error. She had read 'L-E-V' and thought it was the right medication because 'it has such a long name'. The community pharmacist stated that the error was made when the patient ran out of refills and a technician had to re-enter a new prescription. During the process, the technician chose levetiracetam from a pick list instead of levocarnitine. Serendipitously, the patient did well during the two months she took levetiracetam in error. She experienced no seizure activity and was more alert and active. Her doctor decided to continue the levetiracetam but taper the dose. The second patient was a 4-month-old child with a metabolic disorder. Again, the patient was dispensed levetiracetam instead of levocarnitine and took the drug for 11 days. Fortunately, there were no apparent adverse effects. The doctor decided to taper the patient off of levetiracetam over a one-week period. Both levetiracetam and levocarnitine have the same elixir strength of 100 mg/mL. The typical dose of levocarnitine in paediatrics ranges from 50 to 100 mg/kg/day to a maximum of 3 g/day and is similar to levetiracetam dosing of 20 to 60 mg/kg/day, although doses as high as 100 mg/kg/day have been used. One strategy to prevent this error is to use both brand and generic names when prescribing them, or the brand name primarily. Another strategy is to change the name of levocarnitine to L-carnitine. Luckily for these two patients, no apparent harm occurred, but a patient who is seizure free on daily doses of levetiracetam could have a seizure if given levocarnitine in error.

[ISMP Medication Safety Alert! 11 February 2010]

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