It would be a near-impossible task to list all the risks associated with medication use that could lead to harmful medication errors. This unfortunate reality is often at the heart of wondering where to start to improve medication safety, and why people frequently resort to playing “whack-a-mole,” addressing risks only when they pop up and become visible after an adverse event.

Thus, it might be useful to review some selected medication safety risks that can fall off the radar screen unless an adverse event happens to draw attention to them. This 3-part series highlights some problem areas by examining one risk from each of the Institute for Safe Medication Practices’ (ISMP’s) 10 Key Elements of the Medication Use System™.

Part 1, in this issue of P&T, addresses system vulnerabilities involving 3 key elements: how patient information and drug information are managed, how information is communicated to staff, and how information is presented on drug labels and packages.

1. **Key Element: Patient Information**

**Potential Problem: Placing Orders on the Wrong Patient’s EHR**

Now that most hospitals and doctors’ offices have implemented electronic health records (EHRs), a potential vulnerability that can lead to serious errors is placing orders on the wrong EHR. Even if you are aware of this vulnerability, you may not realize how often errors occur. Using a unique retract-and-reorder tool, which identifies orders placed on a patient’s electronic record that are then retracted and reordered on a different patient’s electronic record, Adelman et al. were able to identify and quantify close calls that would have resulted in wrong-patient errors, but may never have been reported as such.¹ According to this study, about 14 wrong-patient electronic orders are placed every day in a large hospital system with approximately 1,500 beds, or about 68 wrong-patient errors per 100,000 medication orders.¹ By this measure, 1 in 37 hospitalized patients will have an order placed for them that was intended for another patient.¹

These errors—made by prescribers, pharmacists, and nurses who enter orders—are usually caused by interruptions and having more than one patient’s EHR open. Nurses have a lower rate of this type of error, while radiology and outpatient providers have higher error rates than their comparison groups.¹

Multiple studies have demonstrated ways to reduce such events. Requiring verification of the patient’s identity has reduced errors by 16%² to 30%,² and requiring reentry of the patient’s ID has reduced errors by 41%.³ Prompting clinicians for an indication when certain medications are ordered without an indication on the patient’s problem list has intercepted errors at a rate of 0.25 per 1,000 alerts.³ In one study, most emergency department (ED) staff (81%) felt that a room number watermark on the patient’s EHR would eliminate most wrong-patient orders in the ED.⁴

In another study, clinicians felt that the following interventions would significantly reduce wrong-patient entries:

- including a patient’s photo on order entry screens;
- showing the patient’s location based on a unit floor plan;
- providing alerts about similar names;
- using radio-frequency identification (RFID) technology;
- always showing the patient’s full name on screens;
- requiring reentry of the patient’s ID; and
- including the identity of the patient with the order submit button.⁵

Limiting the number of patient EHRs that can be opened at one time is also recommended; the ability to reduce errors by adopting this practice is under study.

2. **Key Element: Drug Information**

**Potential Problem: Nursing References That Promote Unnecessary Dilution of IV Push Medications**

According to a 2014 ISMP survey on medication dilution practices, 83% of nurses reported that they sometimes further dilute adult intravenous (IV) push medications prior to administration.⁶ The medications most often diluted by nurses participating in the survey included opioids, antiemetics/antipsychotic medications, anti-infectives, anti-inflammatories, cardiovascicular medications, reversal agents, insulin, and heparin.

A decision to dilute adult IV push medications is often made to avoid patient discomfort or extravasation of vesicants, and/or to help administer the drug slowly. While dilution for these reasons may seem understandable (although often unnecessary), researchers were “alarmed” to hear that 43% of nurses further dilute the medications dispensed in manufacturers’ prefilled syringes, which are largely intended for direct IV push administration. Furthermore, 20% of the responding nurses said they also dilute medications dispensed in syringes prepared by pharmacy in patient-specific doses. These dilution practices may cause unnecessary risks, exposing the patient to potential errors, contamination, and infection.

According to ISMP, some of the drug references that nurses rely on suggest dilution may be warranted to ensure slow IV push rates of administration. ISMP recommends several ways of counteracting this practice. First, check the references the nurses are using, and conduct a nursing survey to learn the extent and variability of dilution practices within the organization. Second, take action to reduce unnecessary dilution. Third, provide the products in different forms/continued on page 567.

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strengths so nurses don’t feel they must dilute them. And, fourth, remind nurses that some drug references will suggest dilution as long as the official prescribing information does not specifically say to avoid it.

3. Key Element: Communication About Drug Therapy
Potential Problem: Confusing the Available Concentration as the Patient’s Dose on Electronic Records
A longstanding risk that ISMP has warned about deals with how home medications appear on computer screens and how medication orders appear on electronic medication administration records (eMARs). If the available concentration of an oral or parenteral liquid medication precedes the patient’s specific dose, the concentration is sometimes mistaken as the patient’s dose. For example, a physician recently accidentally ordered 100 units of LANTUS (insulin glargine) instead of the correct dose of 6 units every evening because the list of home medications displayed the concentration next to the drug name on the first line (Insulin glargine [Lantus] 100 units/mL), and the patient’s dose below it on the second line (6 units subcutaneous daily every evening).

This is particularly concerning in view of the fact that insulin is now available in 100 units/mL, 200 units/mL, 300 units/mL, and 500 units/mL concentrations. Pharmacists may be accustomed to first viewing the available concentration to determine how best to dispense the patient-specific dose, but physicians and nurses typically anticipate seeing the drug name and patient’s dose immediately beside it. ISMP’s recommendation is to list the drug name, patient-specific dose, and directions for use on the first line of the eMAR and patient medication lists, and the available concentration and any directions on how to measure the patient’s dose below it.

Next month, in Part 2, we’ll cover more Key Elements and more system vulnerabilities that can lead to dangerous medication errors.

REFERENCES

The reports described here were received through ISMP’s Medication Errors Reporting Program (MERP). Errors, close calls, or hazardous conditions may be reported on www.ismp.org or relayed directly to ISMP by calling 1-800-FAILSAFE or via email at ismpinfo@ismp.org.