Selected Medication Safety Risks That Can Easily Fall Off the Radar Screen—Part 3

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Some medication safety risks are painfully apparent in an organization, while others lie dormant in the system until an error or adverse event draws attention to them. ISMP has found selected medication safety risks for organizations that might otherwise fall off the radar screen. In Parts 1 and 2, published in the last two columns, we described one risk for six of ISMP’s Key Elements of the Medication Use System. These risks were related to:

1) **Patient information:** Placing orders on the wrong patient’s electronic health record (EHR);
2) **Drug information:** Nursing references that promote unnecessary dilution of IV push medications;
3) **Communication about drug therapy:** In electronic records, confusing the available concentration with the patient’s dose;
4a) **Manufacturer drug labeling, packaging, nomenclature:** Per-liter electrolyte content on the labels of various sizes of manufacturers’ IV bags;
4b) **Practitioner drug labeling, packaging, nomenclature:** Drawing more than one dose into a syringe;
5) **Patient education:** Discharging patients who do not understand their discharge medications; and
6) **Drug storage, standardization, and distribution:** Improper and unsafe vaccine storage.

Part 3 in this month’s column covers one risk in the last four remaining Key Elements associated with environment, medication devices, staff competency and education, and culture.

7. **Key Element: Environmental Factors, Workflow, and Staffing Patterns: Poor Quality Lighting**

Lighting is a crucial aspect of the physical environment that has been linked to medication safety. Poor quality lighting has often impared the highly visual tasks associated with medication use, thus leading to medication errors. Examples include tubing misconnections due to low lighting in a patient’s room, infusion pumps that have been misprogrammed due to dim backlighting on the screens, and product selection errors in the pharmacy and patient care units caused by low lighting under a pharmacy hood or shadows around an automated dispensing cabinet (ADC).

Despite existing guidelines for lighting in health care, it has been a challenge to implement optimal lighting conditions for prescribing, dispensing, and administering medications. Recent literature reviews found that little system-wide action has been taken to increase staff awareness of the problem or to improve the lighting. This is largely because the tasks associated with medication use are varied, carried out under diverse physical conditions and in differing locations, and because there are differences in individuals’ light requirements based on their visual acuity and age. Due to an ever-increasing population of older health-care providers, eye fatigue from computer work and task complexity, small font sizes on medication labels, poor background contrast, and glare or shadows have taken their toll on visual accuracy.

Proper illumination improves both the accuracy and efficiency of medication-related tasks. Fluorescent cool-white lamps or compact fluorescent lamps should be used in areas where critical tasks are performed, including on mobile medication carts, near ADCs, and in patients’ rooms for nighttime administration of medications. The administration of medications at night under low lighting to avoid disturbing the patient is an unsafe practice and should be avoided.

Adjustable 50-watt, high-intensity or task lights are recommended when difficult-to-read prescriptions and product labels are encountered. Illumination levels for computer order-entry areas should be at least 75 foot-candles (fc), while 100–150 fc are required when interpreting handwritten orders. Medication preparation areas, medication verification areas, and patient counseling areas should have illumination levels between 90 and 150 fc. Medication rooms should provide illumination at 100 fc. Lighting levels should be increased if the workforce has an average age above 45 years. A combination of a magnifying glass and task light can also significantly improve accuracy and should be used on mobile medication carts (including those used with barcode medication verification systems) and near ADCs.

8. **Key Element: Medication Device Acquisition, Use, and Monitoring: Failure to Disinfect Ports and to Use Sterile Caps**

Two seemingly harmless practices that breach aseptic technique might lead to contamination of sterile injection equipment and increase the risk of a health-care-associated infection (HAI) of the bloodstream or tissues: 1) failing to place a sterile cap on the end of a reusable intravenous (IV) administration set that has been removed from a primary administration set, saline lock, or catheter hub, and left hanging between each use; and 2) failing to properly disinfect the port when accessing needleless valves on an IV set. In the first instance, the tip of the IV administration set is exposed to potential contaminants, which could lead to infection if the contaminated IV set is reconnected to the patient’s IV access. In the second instance, the port is exposed to potential contaminants that can be pushed into the patient’s IV line once the port has been accessed by tubing or a syringe.

These risks may be unintended consequences of needleless IV-system implementation. Before needleless systems,
practitioners typically replaced the needle used to connect the infusion to the IV tubing with a new sterile, capped needle to prevent contamination when the line was hanging between uses. Now it appears that practitioners are not considering the risk of contamination and are not placing a sterile cap on the exposed tubing. Some have speculated that the lack of a needle or cannula on a syringe, or at the end of the tubing, may suggest that protection and disinfection are not required.

It is imperative that facilities develop procedures that incorporate manufacturer-recommended disinfection protocols for their needleless connectors, and place a sterile cap on the end of the IV tubing between intermittent infusions.9 This disinfection process should specify the disinfecting agent, the method for disinfection (e.g., scrub the access surface), and the duration. “Looping”—attaching the exposed end of IV tubing to a port on the same tubing—is not recommended. Both processes (disinfection and capping) should be observed during competency assessments related to medication administration for new and existing practitioners. At-risk behaviors that breach aseptic techniques require coaching and education, as well as continued monitoring by organizational leadership.

9. Key Element: Staff Competency And Education: IV Practices Based on Inherited Knowledge Handed Down From One Practitioner to Another

Parenteral drug administration often poses risks because of its complexity and the multiple steps required to prepare, measure, and administer medications. A systematic review determined an overall probability of 73% for a practitioner to make at least one clinical error during IV preparation and administration.7 While the causes of these errors are diverse, one contributing factor is that pharmacists and nurses are ill-prepared to take on these tasks upon graduation from schools of pharmacy and nursing.

In recent years, pharmacy practice has moved into a more clinical realm. Partly as a result, core practices such as sterile compounding and IV admixture do not receive as much attention as that given to clinical pharmacy roles during training.8,9 Schools of pharmacy often do not adequately teach students sterile compounding, nor do they prepare them to verify compounded sterile preparations and oversee processes they have never carried out themselves. Instead, sterile compounding procedures are typically handed down from one pharmacist to another, often with little scientific merit. New pharmacists learn via inherited knowledge passed down by practicing pharmacists, who may or may not carry out the procedures safely, depending on how they were taught.

For graduate nurses, it is much the same situation, although for different reasons. Oftentimes, student nurses are not permitted to administer IV infusions or IV push medications during rotations in clinical areas. If they are allowed, the experiences are few and far between. New graduate nurses need to quickly get up to speed and learn these skills. But again, the procedures are handed down from one nurse to another.10,11 Most training is prefaced with, “Here’s how I do it,” resulting in a wide variability due to individual preferences. Furthermore, nurses receive little feedback on performance in this area due to a lack of defined policies and procedures that outline expectations.

Training of all pharmacists and nurses who are new to the organization should follow a documented standard process that outlines the steps associated with sterile compounding (including IV admixture) and IV drug administration according to well-designed, evidence-based protocols. Variability in practice and individual preferences should be discouraged. Specific training modules should be developed and standardized, and competency evaluation via observation should occur at least annually. All practitioners should be carrying out all processes in the same way—the safest way—every time.


As health care organizations move toward a “just culture,” one of the areas that could be overlooked is an organization’s human resource-related policies and procedures. Because these policies and procedures typically describe staff expectations, individual accountability, and disciplinary processes, they must be reviewed and often revised to ensure alignment with the tenets of a just culture. Otherwise, the journey will be long and unsuccessful if the policies are in conflict with a just culture.

In a just culture, human resource-related policies and procedures regarding safety should hold all individuals equally accountable for the quality of their behavioral choices and should not focus on errors (which are not a behavioral choice) except for the expectation to report them. The policies and procedures should reflect a tone that is proactive toward risk identification rather than reactive to errors and adverse outcomes. They should define human error as inadvertent, and respond by counseling individuals and conducting an investigation to determine how to redesign systems to prevent the errors or detect them before they reach the patient. Policies and procedures should describe how to investigate a procedural violation to determine its causes and scope, and how to coach staff who have engaged in at-risk behaviors under the mistaken, but good faith, belief that the risks were insignificant or justified. For outcome-based duties related to a business code of conduct, such as arriving to work on time and wearing identification badges, policies should be clear about expectations and the actions that will be taken when they are not met. When describing reckless behavior (actions involving a conscious disregard of what an individual knows is a substantial and unjustifiable risk), remove any reference to “negligent” or “criminal” conduct as the basis for disciplinary action. Regrettably, mere human error can result in legal action (criminal negligence), but human error is never reckless behavior. Further, ensure that event reporting and investigation policies and procedures support the tenets of a just culture.

While human resource-related policies and procedures cannot guarantee that the desired actions will be realized in practice, they are a critical step for building an organizational foundation for success. Old punitive policies entail the risk of slipping back into an unjust culture. As organizations align actual practice with a just culture, they also need to align supporting policies and procedures.

REFERENCES
1. Graves K, Symes L, Cesario SK. Light for continued on page 666
3. Graves K. Nurses’ decision-making processes about lighting during medication administration. A dissertation submitted to Texas Woman’s University College of Nursing. May 2014.

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.