

Nurse AdviseERR®

Educating the Healthcare Community About Safe Medication Practices

Reporting and second-order problem solving can turn short-term fixes into long-term remedies

Healthcare practitioners are repeatedly challenged by unexpected problems they encounter due to both large and small work system failures that hinder patient care. A medication needed for a patient is missing on a patient care unit; an order is never received in the pharmacy; access to the automated dispensing cabinet is crowded and time-consuming; the new barcode scanner has a high rate of scanning failures; a critical drug is in short supply—the list of failures is varied and quite long, often making it difficult or impossible to execute tasks as designed.¹

These system failures stem from breakdowns in the environment, staffing, technology, information management, and the supply of materials within the organization.^{1,2} A study by Tucker found that nurses encounter almost one system failure every hour (6.5 per 8 hour shift), effectively removing one in every 15 nurses from patient care duties just to deal with the failures each day.^{2,3} Edmondson found that nurses spent 15% of their time (1.2 hours per 8 hour shift) coping with a tide of system failures of varying magnitudes.¹ As a result, healthcare practitioners tend to be very skilled and proficient at working around these failures to get the job done. They bend the rules just a bit; they cut a corner when needed; they fail to engage the patient, their colleagues, or available technology when helpful. They fail to carry out the tasks as designed because some aspects of the tasks fail to meet their patients' needs. In fact, these workarounds are often considered to be signs of resourcefulness, resilience, and flexibility.¹⁻⁵

The ability to address unexpected problems is highly valued in healthcare, especially when a patient's life may be at risk. We expect practitioners to use critical thinking skills to navigate around systems or processes when they don't work well in the moment. We praise and reward practitioners so skilled in using their ingenuity to work around a deficient or faulty system and still carry out tasks. We emphasize individual vigilance and encourage healthcare professionals to take personal responsibility to solve problems as they arise—it's often considered a weakness to seek help.¹⁻³

The problem with this thinking is that workarounds merely transfer the problem to another time, person, or place. Short-term workarounds patch problems temporarily so work can be accomplished. If the problem is not fundamentally solved, it will resurface. Long-term remedies are necessary to change the underlying system and process, thus preventing recurrence.

Workarounds and nonstandard processes often take the form of at-risk behaviors by practitioners. These are behaviors where practitioners knowingly break rules but have little or no perception of the risks they are taking, or they mistakenly believe the risks are insignificant or justified. Practitioners respond to dysfunctional processes by addressing only the immediate symptoms they encounter (first-order problem solving). They feel forced to improvise with what they have at hand to create a solution to a problem, often without seeking help from other busy practitioners.² Although at-risk behaviors are the greatest source of potential patient harm in healthcare, they may

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check *it* out

To encourage organizational learning, consider implementing the following recommendations.

✓ **Make communicating/reporting risk easier.** Encouraging people to report and creating a psychologically safe environment for reporting is not sufficient. There must be convenient opportunities in the course of the day for workers to give feedback. Managers and leaders should establish frequent opportunities for communicating about problems with frontline practitioners. One way to do this is for managers and other leaders to be physically present in work areas and responsive to practitioner messages. Leaders can also hold safety huddles or debriefings, where

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SAFETY wire



A liquid dose cup you can read. Co-mar has begun distribution of mL-only liquid dose cups (**Figure 1**) with an easy-to-read, printed scale. These are being distributed by Medi-Dose (www.ismp.org/sc?id=1749) and are available in three capacities: 20, 30, and 60 mL. Previous dosage cups we have seen have had

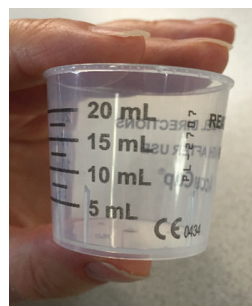


Figure 1. A mL-only dosage cup with printed scale.

embossed scales that were difficult to read or displayed both mL and teaspoonful amounts. We have always called for the elimination of teaspoons, tablespoons, and drams on devices used for measuring liquid doses of medication. We are glad to see manufacturers are finally providing mL-only devices.

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also benefit the patient whose care would have otherwise been interrupted, delayed, or omitted.¹⁴ Thus, healthcare practitioners are often satisfied, even proud, with their abilities to deliver patient care despite the obstacles, even when it means taking shortcuts, breaching procedures, or otherwise working around the system as designed.

In addition to the risks introduced from engaging in at-risk behaviors, there is another gaping flaw in first-order problem solving (addressing the immediate problem)—it works around the problem and does not truly solve it. While healthcare practitioners are often great at solving immediate problems, they rarely attempt to report them or fix their underlying causes (i.e., second-order problem solving).⁴ Or, they have reported the problem to no avail—it continues unchanged, so they continue to work around the problem. They are not necessarily trying to hide this information—they are simply pressed for time. In essence, they are often forced to quickly patch problems so they can carry out their immediate responsibilities.¹ We tend to encourage this aspect of independence, but it comes at the expense of system learning.

In 2015, Hewitt et al. describes this experience as “fixing and forgetting,” meaning that practitioners faced with a problem often fix it in the moment and forget about it, rather than fixing it and then reporting it.⁵ The research team found that “fixing and forgetting” was the predominant choice made by physicians, pharmacists, nurses, and other healthcare practitioners when faced with problems they could resolve temporarily or work around, including recurring problems that threatened safety.

Likewise, a study involving nurses by Tucker et al. found that 92% responded to obstacles in their work with first-order problem solving, failing to report the problem for system-wide learning and resolution.⁴ The nurses in the study demonstrated a dependence on, and an addiction to, these heroics of in-the-moment problem solving. After resuming care, they did not expend further effort on the problem, rarely having time to do so or a convenient method of reporting problems. Second-order problem solving (understanding why the problem exists, aiming to correct the problem) was limited to very few nurses who just communicated the problem (7%); in only one instance was the system altered to reduce problem recurrence. The research team concluded that a lack of available time and norms that valued quick, self-sufficient solutions to problems contributed to a pattern in which frontline practitioners rarely engaged in second-order problem solving. Tucker et al. also proposed that healthcare practitioners who would speak up and report system failures, no matter how small, ran the risk of being considered a “complainer.”⁴

Edmondson demonstrated similar results, with 93% of all nurses in a study taking the quick fix route for the system failures encountered, concluding that neither the hospital nor the other staff who may have contributed to the problem were able to learn from the process failures.¹ First-order problem solving served to keep communication of problems isolated so that they did not surface as collective learning opportunities. Edmondson concluded that organizational cultures lacked psychological safety for speaking up about ambiguous issues of potential concern (vs. issues of obvious concern) and exhibited work designs that emphasized production pressure and quick fixes to problems above learning from failures.

Unfortunately, the true magnitude of operational failures in the system remains hidden because practitioners fail to report them. Unlike errors, the system problems faced by healthcare practitioners receive little attention but present a valuable source of information about ways in which the system is not working. The need for a workaround is a sign that something is wrong, and when systems are wrong, the risk of errors increases.

Frontline healthcare practitioners are well positioned to help organizations learn, as they are only too aware of the problems they encounter daily which disrupt their

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staff often feel safe to verbally mention the daily barriers to care, particularly if they sense the manager’s and/or leader’s demonstrated commitment to resolving the issues. Moreover, discussions about problems encountered are often less threatening than discussions of errors.

✓ **Examine problems close in time.** By itself, reporting of system problems is not enough to ensure improvement. Managers and leaders must create capacity for second-order problem solving by examining the specific problem as close as possible to where and when it occurred.¹⁵ Important information about underlying causes of problems can be lost over time; therefore, an examination shortly after the problem occurs will likely be more productive than waiting to discuss the issue weeks or months later.

✓ **Remedy problems.** Once a problem has been identified and the underlying causes examined, attention must be paid to reducing its recurrence. An action plan should be developed by working with healthcare practitioners who have intimate knowledge of the systems’ weak points, motivation to improve its reliability, and feasible solution ideas. Staff and leadership participation in this process and problem resolution should be an explicit part of their jobs, and enough time must be allocated for improvement efforts. The action plan should be communicated to staff and then implemented expeditiously—problems that are reported but continue for weeks or months will be viewed by staff as unimportant. Monitoring to ensure the action plan is working is also crucial. Publicizing successful efforts to solve daily system problems is vital to demonstrate that reported problems are taken seriously and acted upon. This in turn will provide motivation to continue reporting problems and will encourage others to recognize the benefits of reporting.

✓ **Increase staff perception and understanding of risk.** Coach healthcare practitioners to see the risk associated with behaviors that work around the problems they encounter, and that these workarounds must be reported for analysis, learning, and system-wide improvement. continued on page 3—**check it out** >

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work. Reporting of these problems is critical to second-order problem solving and organizational learning for lasting improvements. To encourage organizational learning, consider the recommendations listed in the **Check it out!** column, starting in the right column on page 1.

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Communicate **insulin dose and concentration** on separate lines

We expect to publish the final version of *ISMP Guidelines for the Safe Electronic Communication of Medication Information* later this summer. In the draft guidelines (www.ismp.org/sc?id=1685), we included a recommendation to avoid entries on a medication administration record (MAR), home medication list, or medication reconciliation discharge report, where the name of the drug and available dosage strength are on the first line, and the patient-specific dose is on the next line. This applies to oral solids as well as liquids and injectables. This includes insulin, for which electronic orders on the MAR often list the name of the insulin product followed immediately by its concentration.

The recommendation should also apply to outpatient prescription labels. We received a report about an ambulance responding to a call for a 76-year-old man who was sweating and confused after receiving an insulin dose. Emergency service personnel initially treated the patient with IV dextrose 50% while transporting him to an emergency department (ED) where he was admitted to the hospital. When speaking to the man's son, the ED staff learned that he had given his father 100 units of **NOVOLOG** (insulin aspart) that day. The son brought the insulin vial and package to the hospital. The pharmacy label read "insulin aspart 100 units/mL." The son mistook this as the dose, which was actually much lower.

Such confusion has happened many times in the past. In our February 2016 article, "Selected medication safety risks to manage in 2016 that might otherwise fall off the radar screen—Part I," we wrote about a physician who accidentally ordered 100 units of **LANTUS** (insulin glargine) instead of 6 units every evening. The physician reviewed the list of home medications, which displayed the concentration right next to the drug name on the first line, and the patient's dose on the second line: "Insulin glargine (Lantus) 100 units/mL," followed on the next line with "6 units subcutaneous daily every evening." With all the new insulin concentrations, this situation could become even more dangerous depending on how U-200, U-300, and U-500 concentrations are understood by patients and caregivers.

In our earlier article, we noted that physicians and nurses typically anticipate seeing the drug name and patient's dose side by side, while pharmacists may be accustomed to first viewing the available concentration to determine how best to dispense the patient-specific dose. Our recommendation is to list the drug name, patient-specific dose, route, and frequency on the first line of the MAR and patient medication lists, and the available concentration and any directions on how to prepare the dose below it. Information technology vendors and drug information vendors are asked to consider this recommendation, which was also made by attendees at our November 2015 safety summit, *Optimizing Safe Subcutaneous Insulin Delivery Across the Continuum of Care*.

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✓ **Redirect autonomy.** It's an irony in healthcare that current management practices typically strive to make healthcare practitioners more autonomous in terms of problem solving so as not to over-burden managers with smaller problems.¹⁻⁵ However, in order to uncover the root causes and prevent recurrence of daily problems that can eventually lead to patient harm, healthcare practitioners need more management support, not less. Create a work environment where staff feel empowered and safe to ask for help and to report all barriers to care. This is not to say that healthcare practitioners are not capable of creating temporary solutions to their daily problems, but rather that, a failure to report these problems leads to rampant at-risk behaviors as the norm rather than seeking long-term organizational solutions to the problems. Instead of hoping that staff can handle issues on their own, managers need to actively seek out and be grateful for information about work challenges that their employees have experienced.³

✓ **Promote resiliency and reporting.** Healthcare practitioners should be encouraged to both handle the unexpected problem and then report it so steps can be taken to address its underlying causes. The challenge of workarounds is to capture their positive aspects—frontline resiliency and creativity—while simultaneously avoiding pitfalls from relying too heavily on these short-term fixes for long-standing problems.³ Thus, reporting of all workarounds and other temporary fixes to problems is crucial if we are to deliver care as efficiently and safely as possible. Furthermore, it is possible that some workarounds are superior to existing procedures, which may require changes.

✓ **Encourage the "noisy complainer."** Healthcare leaders should create an environment of psychological safety that fosters open reporting, active questioning, and frequent sharing of insights and concerns. As noted by Tucker³ and Edmondson,¹ the ideal employee, at least from an improvement standpoint, is a "noisy complainer" who remedies immediate problems but also lets managers know when the system has failed. No problem is too

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Fifty hospital employees given insulin instead of influenza vaccine

Our Brazilian sister organization, ISMP Brazil, distributed a national alert this past April after being notified of an error at a hospital where 50 employees received a dose of insulin instead of influenza vaccine (www.ismp.org/sc?id=1719). The person in charge of vaccination of hospital staff confused the multiple-dose vials, which were similar in appearance, and she took the wrong box out of a refrigerator where both insulin and influenza vaccine were stored. She administered the wrong substance to her colleagues and to herself. The administration of vaccines began at 9 a.m., and the error was discovered around 10 a.m., at which time glucose injections were administered. All of the employees who received an insulin injection were hospitalized for observation until later in the evening. Although not mentioned, the erroneous insulin dose was likely 50 units or 0.5 mL, the typical influenza vaccine dose.

The exact same error, administering insulin instead of influenza vaccine, has been reported many times around the world, including several cases in the US. Some cases have been fatal. In 1997, The World Health Organization (WHO) reported an incident in which 27 infants died after receiving insulin instead of diphtheria, pertussis, and tetanus (DPT) vaccine (www.ismp.org/sc?id=1720). Errors similar to these mix-ups have also happened with administering influenza vaccine instead of purified protein derivative (PPD) skin tests for tuberculosis, and neuromuscular blockers instead of influenza vaccines, due to non-segregated storage in emergency department refrigerators (www.ismp.org/sc?id=1715).

Keeping influenza vaccine readily available next to other medications can lead to errors. We strongly advise storing vaccines away from other drugs, in a separate refrigerator. The Centers for Disease Control and Prevention (CDC) recommends keeping vaccines in storage units dedicated only to vaccines (www.ismp.org/sc?id=1721). These incidents show how important regular, thorough drug storage checks in hospitals and ambulatory care areas are to observe and address potentially hazardous storage conditions. Errors involving look-alike vials can also be prevented by using commercially available prefilled syringes of vaccines.

Here are some other reports of insulin injections given instead of influenza vaccine:

- October 2014 in St. Louis County, Missouri, 5 teachers received insulin instead of influenza vaccine (www.ismp.org/sc?id=455).
- In January 2010 in Wellesley, Massachusetts, staff at a school received insulin instead of influenza vaccine (www.ismp.org/sc?id=1723).
- In 2007, a teacher in Attleboro, Massachusetts, received insulin instead of influenza vaccine (www.ismp.org/sc?id=1722).
- In November 2009 in Holland, 11 elderly residents in a nursing home received insulin instead of influenza vaccine (www.ismp.org/sc?id=1724). One of the residents later died (www.ismp.org/sc?id=1725).
- In 2013 in Bedford County, Virginia, 5 school employees were hospitalized after a school nurse administered insulin instead of the influenza vaccine (www.ismp.org/sc?id=1726).

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small to report. Organizations must recognize that reporting the problem is a valid step in the direction of improvement; sometimes merely raising the issue is the best the healthcare practitioner can do.⁴ However, these employees can provide an often unexplored and rich source of information about problems that, if resolved, can help reduce the incentives to practice at-risk behaviors that can cause patient harm. On the other hand, the “adaptive conformer,” who adjusts and improvises without bothering others, inhibits organizational learning.¹⁻³ Additional tips to improve reporting can be found in the July 2009 *ISMP Nurse AdviseERR*.⁶

Special Announcement

New ISMP safety video series

ISMP has just released the first in a series of “video newsletters” being produced in partnership with the Temple University School of Pharmacy. The videos are designed to provide insight on emerging medication safety issues and a quarterly summary of top content from our newsletters. The first video, found at: www.ismp.org/sc?id=1745, focuses on:

- **IV Push Medication Use:** Findings and guidelines for managing risk that were developed after a national ISMP summit.
- **Eliminating Ratio Expressions:** New United States Pharmacopeial Convention (USP) requirements to remove ratio expressions in drug labeling.
- **ISMP’s Targeted Medication Safety Best Practices:** Highlights of the 2016-2017 practices that address issues that continue to cause fatal and harmful errors.

If you would like to subscribe to this newsletter, visit: www.ismp.org/sc?id=384



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