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ISMP Institute for Safe Medication Practices
An ECRI Company

Acute Care
ISMP Medication Safety Alert!®
Educating the Healthcare Community About Safe Medication Practices

Top 10 Health Technology Hazards for 2026—include serious medication safety risks

ECRI recently released its Top 10 Health Technology Hazards for 2026. This annual report identifies the potential sources of danger involving the use of medical devices and systems that ECRI believes warrant the greatest attention for the coming year, while offering practical recommendations for reducing these risks. Since its creation in 2008, this report has supported healthcare settings and manufacturers in addressing healthcare technology risks that can impact patients and staff. The 2026 report highlights three medication safety-related topics of concern: tubing misconnections remain a threat amid slow ENFit and NRFit adoption, underutilizing medication safety technologies in perioperative settings, and technology designs or configurations that prompt unsafe clinical workflows. A short summary of each medication safety risk is provided below. If you have not yet taken action to mitigate these risks, we encourage you to consider them as you establish priorities for your medication safety improvement plan!

Tubing Misconnections Remain a Threat Amid Slow ENFit and NRFit Adoption

Problem: The inappropriate connection of a syringe, tubing, or other device to a patient line that was intended for a different use can lead to medications, solutions, nutrition, or gas being introduced into the wrong line. Such misconnections can have fatal consequences. In our October 31, 2024 article, Survey Results Reveal Tubing Misconnections Are Common and Underreported—Part I, we shared that the most commonly reported misconnections included intravenous (IV)/enteral (39%) and IV/neuraxial (22%). Specialty connectors designed to prevent misconnections during certain applications, are available and recommended for use, including ENFit connectors for enteral/oral applications and NRFit connectors for neuraxial applications (**Figure 1**).

Figure 1. The two syringes on the left use ENFit, and the two syringes on the right use NRFit connector designs. For safety reasons, these syringe tips are designed to mate only with connectors of the same type. The three syringes in the middle have traditional connector designs. Image courtesy of GEDSA.

However, the adoption of these safer connectors has been slow, particularly in the United States. The Global Engineered Device Supplier Association (GEDSA), estimates that approximately 70%

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SAFETY brief

B. Braun pump bolus rate defaulted to 1,200 mL/hour. A pharmacist who oversees an organization's smart pump drug library reported a serious safety concern with the B. Braun Infusomat Space Large Volume Pump (software version U16) after testing the dose error-reduction system (DERS) in the drug library on a test pump. The pharmacist had built a magnesium sulfate option for asthma as a continuous infusion with the capacity to provide a loading/bolus dose. For pediatric patients, the organization's protocol for severe acute asthma exacerbation is to administer a loading/bolus dose of 50 mg/kg to a maximum 2,000 mg dose over 20 minutes. The pharmacist built a soft lower rate limit of 50 mL/hour and a soft upper rate limit of 150 mL/hour, but no hard upper rate limit for the loading/bolus dose.

The pump does not allow the loading/bolus rate to be programmed over time. Instead of being able to program a bolus dose to infuse over 20 minutes to match the medication administration record (MAR), the practitioner has to calculate an mL/hour rate to approximate infusing it over 20 minutes. However, this does not work well if the dose varies by patient weight. For continuous infusions that are set up to allow for a loading/bolus dose, the pharmacist's process is to build a default infusion rate, when possible. This becomes challenging, particularly for pediatric patients who are prescribed weight-based loading/bolus doses; so the pharmacist did not build a default rate due to the variable doses.

When uploading the drug library to the test pump, the pharmacist identified that the pump had prompted a rate of 1,200 mL/hour for the loading/bolus dose without a warning alert, even though it was well above the soft upper rate limit (150 mL/hour). This could be up to twenty times faster than

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of US healthcare facilities have transitioned to ENFit products. While this represents progress, the United States still lags far behind Europe, where nearly all facilities have made the switch. The use of NRFit connectors is even less widespread in the United States, with very few healthcare facilities having converted to NRFit products, the first of which transitioned in 2024. This contrasts sharply with the United Kingdom and Japan, where GEDSA estimates that nearly all facilities have switched to NRFit.

Safe Practice Recommendations: In our November 13, 2024 article, Take Action to Prevent Tubing Misconnections—Part II, we shared that the best solution to prevent misconnections is to eliminate the potential for interconnectivity between various types of medical tubing. To reduce the risk of misconnections associated with enteral and neuraxial applications, organizational leaders should prioritize converting to ENFit (enteral/oral) and NRFit (neuraxial) devices as soon as practical. Once converted, organizations must purchase, store, and maintain an adequate supply of these devices in all patient care areas where medications may be prepared or administered via enteral and neuraxial routes. Pharmacy staff should verify that the associated product syringes are in stock and readily available during monthly unit inspections. For tools that may be useful during the conversion process, visit GEDSA's Stay Connected website.

Underutilizing Medication Safety Technologies in Perioperative Settings

Problem: Failure to implement and correctly use available medication safety technologies in perioperative settings puts patients at risk for serious medication errors. These errors can occur at several points in the medication-use process, including when ordering, selecting, preparing, and administering medications, before, during, or after the surgical procedure. The risk of errors at each point can be reduced through the use of medication safety technologies such as barcode medication administration (BCMA) systems, smart infusion pumps with dose error-reduction system (DERS) software, and automated dispensing cabinets (ADCs). Although these technologies are commonly used in other patient care areas, they remain underutilized in perioperative settings.

While medication safety is a critical concern across all care settings, it warrants particular attention in perioperative settings, including ambulatory surgery centers (ASCs), where medications are typically prescribed, selected, prepared, and administered by a single practitioner (e.g., anesthesia provider) in a high-stress, fast-paced environment. In these settings, practitioners often administer high-alert medications, such as opioids, vasopressors, and neuromuscular blocking agents. Furthermore, high-alert medications prepared by practitioners have been involved in "syringe swap" errors due in part to the nearly identical appearance of the syringes. For example, in our December 4, 2025 article, Patient Unknowingly Received a Paralytic Agent, a certified registered nurse anesthetist (CRNA) administered 50 mg of rocuronium instead of lidocaine 100 mg during a routine colonoscopy because both medications were in similar-looking 5 mL syringes. This event, similar to others, most likely would have been prevented if a barcode scanning safety system had been implemented for use with medication administration in the operating room.

Safe Practice Recommendations: Take steps to implement machine-readable coding (e.g., BCMA) in perioperative settings to verify patient identity and the patient's medication(s) before administration. When integrated with an electronic health record (EHR), this technology can enable real-time documentation of medication doses and fluid administration. Anesthesia providers should use ready-to-administer manufacturer- or pharmacy-prepared barcoded syringes along with BCMA to minimize the risk of errors. Facilitate the use of smart infusion pumps in the perioperative settings to infuse all fluids and medications and establish expectations regarding the use of DERS (i.e., 95% or higher practitioner compliance). Prioritize the use of profiled ADCs in pre- and postoperative settings, as this allows for medication selection after a pharmacist has reviewed and verified orders. Establish a policy specifying that ADC override function in pre-

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the intended rate in smaller patients. The only way that the pharmacist identified the issue was because they evaluated this on a test pump. Otherwise, if it had been uploaded to the active drug library, it could have reached a patient without even alerting the end users. This is not a drug-specific issue but a pump issue, so this can impact other medications, including other high-alert medications for adult and pediatric patients.

The reporting organization contacted B. Braun, and learned that the company is aware of this design flaw and that a future software update is planned that will address this issue. B. Braun notified the organization that if a default rate had been set for the loading/bolus dose, then the pump would not have set to a rate of 1,200 mL/hour. They were told that after the software update, if a drug does not have a default rate, the 1,200 mL/hour rate will be eliminated, and users will be required to enter the rate manually. For now, the reporting organization has removed the ability to administer a loading/bolus dose from the magnesium sulfate continuous infusion.

We have reached out to B. Braun and the US Food and Drug Administration to discuss this concern. We asked B. Braun when the software update will become available, and if customers have been notified of this issue. We are waiting for further information.

This good catch speaks to the importance of drug library oversight and critically evaluating new and modified DERS functionality using a test pump to ensure that soft and hard stops are built and working properly. Organizations that use this pump should evaluate which medication build in their drug library may be impacted by this risk and develop a mitigation plan if changes are needed. Notify end users of the risk and the actions you have taken. If a software update becomes available from B. Braun, it is crucial to develop a method to test the new software and then track the update status of each pump. Encourage practitioners to report errors and safety concerns with smart infusion pump drug libraries to the vendor and to ISMP.

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and postoperative settings should be reserved only for urgent or lifesaving situations in which a delay would harm the patient. For additional information, refer to the ISMP Guidelines for Safe Medication Use in Perioperative and Procedural Settings. Additionally, we recommend that manufacturers of machine-readable coding technologies partner with anesthesia providers to identify and incorporate perioperative and procedural workflows in the future development of integrated systems with decision-support tools.

Technology Designs or Configurations that Prompt Unsafe Clinical Workflows

Problem: The safe and effective use of medical devices and systems requires that they be designed, configured, and incorporated into patient care processes with an understanding of current clinical practice, the environment of use, and the needs of the intended patient population. Implementing healthcare technologies without fully understanding or defining the workflow of frontline users can lead to device usability problems that contribute to patient harm. These usability problems can result when manufacturers, information technology (IT) personnel, or healthcare technology management (HTM) staff implement devices without sufficient knowledge of (or attention to) these factors.

Healthcare technology requires careful selection and nuanced implementation. Patient demographics, environmental conditions, clinical workflows, and organization-specific use cases must all be considered. Inattention to these factors can compromise device effectiveness and contribute to adverse events. Scenarios that can lead to harm include the use of default settings that are inappropriate for the intended patient population, training programs that are misaligned with clinical practice, interoperability failures that prevent data exchange between systems or that create duplicate documentation burdens, and other usability barriers that prompt staff to resort to unsafe workarounds.

It is critical to understand typical workflows and use cases before new devices and systems "go live." When devices or device configurations fail to support appropriate processes, users may be forced to adapt their workflow to the technology. This can compel staff to adopt workarounds that ultimately compromise both safety and efficiency.

Safe Practice Recommendations: Organizations should establish interdisciplinary healthcare technology governance teams that engage practitioners throughout the technology lifecycle to ensure safe, efficient, and effective workflows. Before deploying new or updated technology, conduct a workflow analysis to verify that devices support and enhance existing safe practices. Provide initial and annual competency assessments to all practitioners using the technology. These assessments must extend beyond basic instruction to include alarm management, emergency response, integration with clinical processes, and recognition of device limitations. Effective governance also requires structured post-implementation surveillance. Conduct regular safety rounds, gather frontline feedback, and share close calls and errors that have occurred. Address usability issues raised by staff promptly to prevent them from needing to rely on unsafe workarounds to provide care. Leverage the resources available from ECRI and ISMP to strengthen implementation practices and close governance gaps.

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Special Announcements

Survey on new Best Practices

ISMP is conducting a brief survey to obtain a baseline measurement of the current level of implementation of the three new Best Practice statements. We would sincerely appreciate your participation in this survey, regardless of whether you have implemented the Best Practices. Please complete our survey of the new Best Practices for hospitals by **April 23, 2026**.

Apply for Fellowship Opportunities

ISMP has two one-year fellowship programs available for healthcare practitioners:

- **Ochsner Children's and ISMP Safe Medication Management Fellowship:** This opportunity is for a pharmacist to work onsite at Ochsner Health in New Orleans, LA and remotely with ISMP throughout the year.
- **ISMP Safe Medication Management Fellowship:** This opportunity is for a healthcare practitioner (e.g., pharmacist, nurse, or physician) to work remotely with ISMP.

For more information and to submit an application, click here.

Free CE from ASHP

The American Society of Health-System Pharmacists (ASHP) is offering FREE continuing education (CE) activities for pharmacists and pharmacy technicians. A webinar entitled, ***Making USP <797> as Easy as 123: Overcoming Sterile Compounding Insourcing Challenges and Adult Versus Pediatric Considerations***, will be held **Tuesday, April 14 from 1:00 - 2:30 pm ET**. Faculty experts will address ongoing challenges and strategies to bring back or increase sterile compounding in healthcare facilities. Additionally, this activity will discuss special considerations for adult versus pediatric compounded sterile products (CSPs) including compatibility and stability considerations, and appropriate opportunities to use standardized concentrations. For more information, please click here.