

Acute Care

ISMP Medication Safety Alert!®

Educating the Healthcare Community About Safe Medication Practices

ISMP celebrates your contribution to our success during our 25th anniversary

25
YEARS

Since 1994, when ISMP first became the nation's only nonprofit organization devoted entirely to preventing medication errors, we have served as a vital force for progress in medication safety through our unyielding advocacy and the development of resources and learning opportunities for healthcare providers and consumers. As we reflect on our 25 years of existence (1994-2019) and the remarkable achievements that have been made in medication safety along the way, we recognize that we have certainly not done it alone. Only with your help has ISMP been able to pursue its unique mission to advance patient safety worldwide by empowering the healthcare community, including consumers, to prevent medication errors.

In some cases, we have been a prickly thorn in the side, provoking important questions, challenging preexisting assumptions, and steadily chipping away at the resistance to much needed system change born out of the hazards and errors reported by you. At other times, we have been a nurturing, healing shoulder to cry on when well-meaning and competent providers have inadvertently harmed a patient because we are fallible human beings deeply troubled by our inability to "do no harm." While conducting national summits and self assessments, we have brought key stakeholders together at the table, sometimes for the first time, to discuss complex medication safety issues and create consensus best practices and/or action plans to implement them.

We have also empowered others to give voice to their experiences through surveys and by creating confidential, national medication error-reporting programs for both healthcare providers and consumers (www.ismp.org/node/296). We review every survey response and error report we receive. We then use this information to share compelling stories about medication errors and impactful change strategies to draw national attention to medication safety problems, offer healthcare providers new ways of thinking, and inspire change. Your participation in surveys and your reports of hazards, close calls, and errors are powerful drivers of change, both in the US and abroad, and they will continue to be a major force in the patient safety movement and the foundation of our work at ISMP.

Many of you have been on this incredible journey with us throughout our 25 years, reporting hazards and errors, listening to the stories we share, implementing our recommendations in practice, participating in surveys and self assessments, supporting our work, and helping us learn more about how medications are used or misused. Although ISMP is a relatively small organization, with your support we have had an enormous impact in the world of patient safety. In honor of our 25-year anniversary, we would like to share some of the progress we have made together and what ISMP has to offer the healthcare community today to promote safer medication use.

Medication Safety Progress

ISMP's advocacy work (www.ismp.org/node/299) has resulted in needed changes in clinical practice and public policy to prevent harmful and fatal errors, along with thousands of medication labeling and packaging changes, working cooperatively with the US Food
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SAFETY briefs



Risk of IV bupivacaine administration.

Vials of bupivacaine and pantoprazole from AuroMedics look alike, increasing the risk of a mix-up that could lead to inadvertent administration of intravenous (IV) bupivacaine. The vials have different geometric shapes on the primary display panels, but both labels use a light blue color, and both clear glass vials are the same size with aluminum ferrules, contributing to their similar appearance (Figure 1). Thus, the risk of a mix-up is increased if these vials are stored near one another, such as in an emergency department or perioperative area.

We have contacted the company to recommend changes to the labels. However, to be safe, please consider purchasing these products from different manufacturers. Barcode scanning should be employed prior to drug preparation and administration to



Figure 1. Look-alike vials of bupivacaine and pantoprazole.

detect any mix-ups between these products. Due to the cardiotoxic effect of bupivacaine (asystole) when the drug inadvertently reaches systemic circulation, lipid emulsion should be readily available where bupivacaine is stocked or used for reversal if needed.



Morphine vial tampering.

A hospital reported suspected vial tampering after morphine injection vials were returned from
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Sidebar: ISMP Impact on the Healthcare Community

Firsts

ISMP helped introduce the following concepts in healthcare (created or were first to publish):

- High-alert medications (for acute care, long-term care, community/ambulatory setting)
- Tall man lettering for look-alike drug name pairs
- Error-prone abbreviations and dose expressions to avoid
- Action Agendas (actionable summaries of medication safety problems)
- QuarterWatch (quarterly analysis of FDA MedWatch reports)
- Use of failure mode and effects analysis (FMEA) in medication safety
- Need for free-flow protection with infusion pumps
- Use of an independent double check when a single pathway can result in a harmful error

Landmark Nomenclature, Labeling, and Packaging Changes

Some important changes that have happened because of ISMP involvement:

- Vin**CRIS**tine 5 mg multi-dose vials taken off the market to avoid confusion with vin**BLAS**tine 5 mg vials
- Cardiac lidocaine in 1 and 2 g concentrate prefilled syringes taken off the market to avoid direct IV administration
- Neuromuscular blocker warning statements about the need for ventilation included on labeling and packaging
- Dosing volume by “mL” rather than household measures more widely adopted
- Movement from apothecary to metric measurements on labels and dosing devices
- Elimination of ratio expressions on single entity drug labels
- Vaccine labeling changes initiated to prevent errors
- Elimination of the “Rule of Six”
- Guidance from FDA regarding safe labeling practices
- Promoted pre-market trademark safety testing of new brand names to avoid name confusion prior to approval

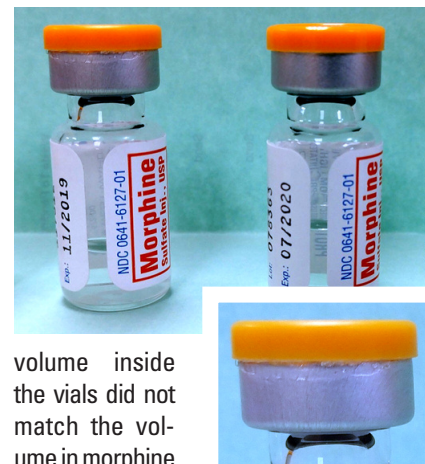
Safety Foundations

ISMP has created essential medication safety programs and tools, including:

- The only national voluntary medication errors reporting program for healthcare providers and consumers
- Newsletters with trusted, real-time safety information distributed to nearly every US hospital and many other settings
- National Alert Network (NAN Alerts), in cooperation with the National Coordinating Council for Medication Error Reporting and Prevention and ASHP
- Groundbreaking Medication Safety Self Assessments® for healthcare organizations
- Free medication safety resources, including lists of high-alert medications, often-confused drug names, and error-prone abbreviations and symbols
- Guidelines with consensus-based best practices to address safety issues with technology (e.g., smart infusion pumps, automated dispensing cabinets, electronic communication of medication information), high-alert medications, and error-prone processes (e.g., adult IV push medications, compounded sterile preparations, timely administration of drugs)
- Hosting the Medication Safety Officers Society (MSOS), with nearly 2,000 members, to facilitate information sharing and collaboration

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controlled-drug storage by emergency medical services (EMS). After further inspection, it was discovered that the vial caps had been glued back onto the vials prior to return. In **Figure 1**, the glue residue is visible just below the vial cap. Despite being glued, some of the vial caps would still spin, though not freely due to friction from the glue residue. In addition, it was noted that the



volume inside the vials did not match the volume in morphine vials without tampering. The authorities were alerted, and a suggestion was made for ISMP to share the information with other healthcare practitioners so they will know to observe all returns for evidence of tampering.

Figure 1. Glue appears on vial ferrule on the left (magnified in the picture below) along with a noticeable decrease in fluid volume compared to the vial without tampering (right).

ISMP is aware of other situations where morphine or another opioid has been partially or fully replaced with water or saline, including vials stored in automated dispensing cabinets (ADCs). In some cases, a needle hole in the stopper is visible when viewing the stopper from the base of the vial. Tampering with medication vials is a clear sign of drug diversion and something to be on guard for, unfortunately.



NCCN and The Joint Commission back ISMP vinca alkaloids “Call to Action.”

Both the National Comprehensive Cancer Network (NCCN) (www.nccn.org/) and The Joint Commission (www.jointcommission.org/) have recently sent letters to the US Food and Drug Administration to convey their strong support for the request made by ISMP to require the removal of administration by syringe from the prescribing

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and Drug Administration (FDA) Division of Medication Error Prevention and Analysis (DMEPA). Medication safety will always be an ongoing issue given the influx of new drugs, frequent changes in system design and technology, and human fallibility. However, many of the serious medication errors that ISMP has drawn attention to have been corrected or prevented with high-leverage strategies, and our patients are safer for it.

One of our earliest successes was with potassium chloride (KCl) for injection concentrate. Multiple patients had died after receiving undiluted concentrated KCl instead of intravenous (IV) furosemide, or when it was used instead of 0.9% sodium chloride to dilute other medications or flush IV lines. We worked tirelessly with other organizations to remove concentrated potassium vials from nursing units, replacing them with diluted, premixed KCl large- and small-volume solutions. Thanks to those efforts, we have seen a significant reduction in deaths related to concentrated KCl vials and are aware of only one tragic fatality in the last 20 years in the US.

One of our most recent examples involves IV vinca alkaloids. For years, ISMP has called upon organizations to prevent fatal errors with these medications by preparing and administering them in minibags instead of syringes, to avoid inadvertent intrathecal administration. Today, most US hospitals and cancer centers comply with this practice, and many professional groups, including the National Comprehensive Cancer Network (NCCN), the Oncology Nursing Society (ONS), the American Society of Clinical Oncology (ASCO), and the World Health Organization (WHO), endorse the practice. Based on error reports and at least 135 worldwide cases of intrathecal administration of vinca alkaloids in which none were prepared in minibags, the US prescribing information now includes directions to dilute these drugs in a flexible plastic container to reduce the risk of wrong route errors; however, the labeling also provides explicit directions for preparation and administration of vinca alkaloids via a syringe. ISMP is now calling upon FDA to require the removal of administration by syringe from the prescribing information for all vinca alkaloids (see the **SAFETY** brief starting on the bottom of page 2 about additional support for this important action).

These are just two examples from among many serious medication errors that have been addressed since ISMP featured them in our newsletters and advocated for needed changes on behalf of healthcare practitioners who reported them. For additional examples, see the **Sidebar** (on page 2), and visit the list of ISMP achievements and historical timeline on our website (www.ismp.org/node/1242). Many of the changes have been accomplished through collaborative efforts with professional, accrediting, and regulatory agencies; corporate funders; and within individual organizations or larger health systems to increase the power and reach of our efforts.

ISMP Resources

In addition to direct advocacy work, ISMP has provided healthcare practitioners with practical guidelines, tools, and resources to improve medication safety and encouraged the widespread use of best practices such as barcode scanning and use of premixed IV solutions. Many have been developed with input from voluntary, expert advisory groups and, thus, represent consensus best practices. In the past year alone, ISMP has provided healthcare practitioners with the following new guidelines, resources, and tools (www.ismp.org):

- Created an ISMP **Gap Analysis Tool (GAT) for Safe IV Push Medication Practices** to help practitioners prevent harm when preparing, dispensing, and administering IV push medications for adults
- Published a white paper emphasizing the need for medication safety officers and the value of creating a dedicated position
- Issued the 2018-2019 **Targeted Medication Safety Best Practices for Hospitals**

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information for all vinca alkaloids, including vinCRISTine. NCCN is a not-for-profit alliance of 28 leading cancer centers devoted to patient care, research, and education. The Joint Commission is a not-for-profit organization that accredits nearly 21,000 healthcare organizations and programs in the US. An ISMP “Call To Action” to require the removal of administration by syringe—an unsafe technique that has led to inadvertent intrathecal administration—was published in the March 14, 2019, issue of the *ISMP Medication Safety Alert!* (www.ismp.org/node/1492). We greatly appreciate the support of NCCN and The Joint Commission for this effort. Like ISMP, NCCN and The Joint Commission recommend that all hospitals and cancer centers require vinCRISTine and other vinca alkaloids to always be prepared and administered in an intravenous (IV) infusion bag and never in a syringe.



Sound-alike antidote error prevention.

A patient with insecticide poisoning presented to the emergency department (ED). The product ingested contained acephate, an organophosphate, and the patient appeared to be suffering from organophosphate poisoning. The ED physician contacted a poison control center, which recommended giving an intravenous (IV) pralidoxime 30 mg/kg loading dose followed by an 8 mg/kg/hour infusion for 6 hours. However, the ED physician heard “pyridoxine.” To be sure, the physician repeated “pyridoxine” back to the poison control staff member several times, but the poison control staff member did not hear that the physician was saying the incorrect medication name.

Pyridoxine, also known as vitamin B6, was then ordered by the ED physician. The verifying pharmacist reviewed the prescribing information for pyridoxine in a drug database and felt comfortable approving the order since it was within the dose range that the ED physician had mentioned (although it was intended as the pralidoxime dose). Pyridoxine is listed among other antidotes and is used for isoniazid overdose toxicity (www.ismp.org/ext/154).

The pharmacist had enough pyridoxine vials on hand for the 2,200 mg bolus dose that was calculated for the patient. But he had continued on page 4—**SAFETY** briefs >

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- Released revised **Guidelines for the Safe Use of Automated Dispensing Cabinets**
- Published revised **Guidelines for Safe Electronic Communication of Medication Information**
- Conducted the second national summit on smart infusion pumps focused on optimizing the use of the technology, preparing for interoperability with the electronic health record, and library analytics, which resulted in a draft set of updated guidelines currently posted on the ISMP website for public comment
- Conducted the **ISMP Medication Safety Self Assessment[®] for High-Alert Medications** and created 6 consumer learning guides to help educate patients
- Provided more than 100 educational programs via webinars, online learning, and face-to-face presentations or multi-day workshops about medication error prevention and Just Culture
- Launched an updated website with enhanced navigation capabilities and features making it easier for practitioners to stay up-to-date

ISMP has made many other free resources available to practitioners as well (see the **Sidebar** on page 2 for examples).

And did you know that ISMP publishes more than just this acute care newsletter? We offer four additional digital newsletter publications (www.ismp.org/node/1003)—for acute care nurses (**Nurse AdviseERR**, published monthly), community pharmacy/ambulatory care providers (**ISMP Medication Safety Alert! Community/Ambulatory Care**, published monthly), long-term care providers (**Long-Term Care AdviseERR**, published every other month), and consumers (**Safe Medicine**, published every other month). Healthcare organizations can provide **Safe Medicine** to their patients via the Intranet, hard copy, or republished content; or consumers can purchase the newsletter separately.

If a healthcare organization wants more hands-on assistance in reducing and preventing medication errors, ISMP consulting services (www.ismp.org/node/26) can provide an unbiased analysis of practice, technology, and system vulnerabilities associated with all aspects of the medication use process in a wide range of practice settings. ISMP can also offer a unique perspective when assisting with medication-related sentinel event investigation, root cause analysis, and development of an action plan; evaluating health information technology to facilitate safe implementation; and assessing specialty services or areas (e.g., pediatrics, oncology, ambulatory surgery, compounding pharmacies).

ISMP also offers individually tailored mentorship programs for practitioners with oversight of medication safety lasting 1 to 2 weeks, and year-long fellowships for practitioners to learn directly from ISMP experts onsite in our Horsham, PA, office, preparing them for leadership roles in medication safety (www.ismp.org/node/31). For at-home learners, ISMP also provides an online medication safety certificate course in partnership with the American Society of Health System Pharmacists (ASHP) (www.ismp.org/node/770).

We hope that you will take advantage of the information, educational opportunities, and recommendations ISMP has to offer by visiting www.ismp.org. You can receive alerts about upcoming programs, opportunities to provide input, and new web features by joining our email contact list (www.ismp.org/node/928)—just choose the “Join Mailing List” option under *Make a Selection*.

International Error Prevention Efforts

In addition to extensive advocacy work in the US, ISMP has played a key role in international efforts to improve safe medication use, and has established affiliate organizations in Canada, Spain, and Brazil. ISMP is also one of the founding organizations of the International Medication Safety Network (IMSN) (www.intmedsafe.net/) and provides

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to borrow more vials from another hospital to compound the follow-up maintenance infusions. The patient received the bolus dose and a partial infusion of pyridoxine before the error was recognized by an intensive care unit (ICU) physician. Fortunately, the patient did not experience any side effects and no longer needed treatment with pralidoxime as the symptoms of organophosphate poisoning had already subsided. When contacted, the poison control center stated there was no formal communication process (e.g., email, fax) to send recommendations or case discussions to healthcare providers in follow-up. In hindsight, spelling the drug name instead of just repeating it back could have prevented the error. Poison control center staff should consider sending a confirmation email or fax of their recommendations immediately back to healthcare providers so that any mistakes related to mishearing or misinterpreting the recommendations could more easily be recognized. We will also consider adding the name pair to the **ISMP List of Confused Drug Names**.



Overdoses related to “pill dumping” into a spare medication vial.

Pharmacists from the Maryland Poison Center recently published several cases of what they refer to as “pill dumping” where patients use a spare medication vial to hold multiple medications taken from different labeled prescription vials (Leonard JB, Klein-Schwartz W. Using a spare medication vial to store multiple medications: a potentially fatal in-home medication error. *Am J Health Syst Pharm*. 2019;76[5]:264-5). For example, “pill dumpers” may store all their morning or evening medications in a spare medication vial to make it easier to take all their medications at once. However, sometimes they mistake a look-alike prescription vial for the “pill dumping” vial and swallow any remaining contents in the prescription vial.

Looking at the data, the Maryland team identified 88 patients who were “pill dumpers.” Although all exposures happened in the home, these patients were already in or had been referred to a healthcare facility at the time of the call. Most wound up in the emergency department or critical care unit. One patient died when he accidentally swallowed pills remaining in a

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consultation and assistance on medication safety issues to healthcare professionals all over the world, including Europe, Australia, New Zealand, the Middle East, and Asia. Some examples of recent global efforts include working with IMSN and FDA to hold a global summit on drug packaging and labeling, and drafting the first set of Global Targeted Medication Safety Best Practices. Additionally, ISMP offers international fellowships to practitioners desiring an opportunity to be involved in global medication safety efforts.

How You Can Help Us Continue Our Efforts

It has been an amazing journey so far; however, there is still much more work to do—both in the US and globally. The role of ISMP moving forward is clear. For our entire staff, medication safety is not just a mission, it is a passion and a life's work. We feel incredibly grateful to have been working with you to advance medication safety for a quarter century, and we are so proud of the shared narrative around medication safety and the accomplishments we have achieved together. We are humbled by your passionate response to our advocacy work, educational programs, recommendations, and requests for information to enhance learning. Improvement is only possible within a culture that ensures any changes are well understood, embraced, and sustained—nothing sums up our mission more than this. Please continue reporting hazards and errors (www.ismp.org/node/296), questioning complex medication safety issues that are not well understood (ismpinfo@ismp.org), and responding to our efforts to improve medication safety. You can also help ensure a safer future for patients by donating to ISMP to honor this year's milestone anniversary. For more information or to make a charitable contribution, visit our 25th anniversary webpage (www.ismp.org/node/1242).

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prescription vial containing oral colchicine. We have also observed patients who use a spare vial to hold multiple different medications instead of taking all the individual prescription vials with them when traveling. We can think of scenarios where this could also be a set-up for an error.

Patients should be discouraged from reusing old medication vials to prepare their daily medications or to contain anything different than what the vial label indicates. Also, according to the authors, pill boxes or pill organizers might reduce the occurrence of "pill dumping."

➔ **Special Announcements**

Please comment on updated guidelines
A draft set of revised and expanded guidelines to optimize the safe use of smart pump technology is available for public comment at www.ismp.org/node/1497. Please submit your comments and suggested edits by **April 26** to: bfofi@ismp.org.

Deadline extended for gap analysis
The submission deadline for the ISMP *Gap Analysis Tool (GAT) for Safe IV Push Medication Practices* has been extended to **April 30**. Participants who submit their findings anonymously to ISMP will receive a gap analysis score and have access to aggregate data. For details, visit: www.ismp.org/node/1188.

Get intensive about medication safety
Don't miss a unique opportunity to maximize your error prevention efforts and learn to look at your organization through the eyes of leading safety experts at the next ISMP **Medication Safety Intensive on April 25-26** in **Houston, TX**. For details, visit: www.ismp.org/node/127.

Free FDA webinar series
On **April 23**, the US Food and Drug Administration's (FDA) Division of Drug Information is presenting a **FREE** webinar, *FDA Drug Topics: Across the Regulatory, Research, and Clinical Care Environments: Sex and Gender Influences*. For details, visit: www.ismp.org/ext/30, and to register, visit: www.ismp.org/ext/31.

Worth repeating... 
PCA pump keys available online

You may have been surprised to know that it is possible to purchase keys online that unlock the contents of patient-controlled analgesia (PCA) pumps, as we discussed in our January 29, 2015 newsletter. After two recent complaints about the availability of these keys, we conducted an online search and found we could still purchase the keys for CADD-Solis pumps and CareFusion Alaris Medley PCA syringe pumps from eBay and Walmart. The keys may also be available on other websites. Additionally, hazard alerts have been previously issued for various PCA infusion pumps (e.g., BD Alaris, Hospira Sapphire, CADD-Solis) to warn that the lockboxes can be accessed with items commonly available in a care unit. Thus, the security of medications, typically opioids, available in PCA pumps may still be in jeopardy, despite locking the door of the housing that holds the medication in the pump.

As a precaution, follow the manufacturer's directions and utilize other security features sometimes available with PCA pumps. For example, some pumps may have a software code to activate the locking mechanism as opposed to just a manual key lock. If the volume in an opioid infusion bag on a PCA pump begins to dwindle unexpectedly, without any other explanation, your PCA pump locking mechanism may have been compromised.

If you would like to subscribe to this newsletter, visit: www.ismp.org/node/10




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ISMP Medication Safety Alert!® ActionAgenda

 One of the most important ways to prevent medication errors is to learn about problems that have occurred in other organizations and to use that information to prevent similar problems at your practice site. To promote such a process, the following selected items from the January-March 2019 issues of the *ISMP Medication Safety Alert!* have been prepared for leadership to use with an interdisciplinary committee or with frontline staff to stimulate discussion and action to reduce the risk of medication errors. Each item includes a brief description of the medication safety problem, a few recommendations to reduce the risk of errors, and the issue number to locate additional information. Look for our high-alert medication icon under the issue number if the agenda item involves one or more medications on the *ISMP List of High-Alert Medications* (www.ismp.org/node/103). The Action Agenda is also available for download in a Microsoft Word format (www.ismp.org/node/1509) that allows expansion of the columns in the table designated for organizational documentation of an assessment, actions required, and assignments for each agenda item. Continuing education credit is available for nurses at: www.ismp.org/nursing-ce.

Key:  — ISMP high-alert medication

Issue No.	Problem	Recommendation	Organization Assessment	Action Required/Assignment	Date Completed
Safety enhancements every hospital must consider after another tragic neuromuscular blocker event					
(1, 3) 	National news exposed the details of yet another fatal medication error in which a neuromuscular blocker was inadvertently administered to an unventilated patient. Intending to administer intravenous (IV) VERSED (midazolam) to a patient in radiology with claustrophobia, a nurse mistakenly selected vecuronium from an automated dispensing cabinet (ADC) screen using the override function after typing in the first two letters of the drug name, "VE," for Versed. The patient was not monitored and was found in full arrest 30 minutes later. She died the next day.	Establish a standard process for patients who require sedation in radiology. Sequester neuromuscular blockers and affix a clear warning (Warning: Causes Respiratory Arrest—Patient Must Be Ventilated) on storage locations and ADC screens. Build an interactive warning on the ADC screen that requires verification of ventilation. Clarify ADC override policies and monitor regularly (see updated ADC guidelines at: www.ismp.org/node/1372). ISMP has asked ADC vendors to make design changes (e.g., drug name searches requiring at least 5 letters) and manufacturers to clarify the warning on vials. Do not allow the severity of the outcome of an error drive the response.			
Unsafe storage of vecuronium and vancomycin					
(5) 	When checking a prepared intravenous (IV) admixture, a pharmacist noticed that vecuronium had been used instead of vancomycin. Investigation found that vecuronium was stocked next to vancomycin in the IV area in an unlidded bin (the lid had broken off). Also, the label that warned about respiratory paralysis and arrest on the vecuronium bin was curled and could not be fully read.	Segregate and sequester neuromuscular blocking agents from other medications (e.g., place in a lidded bin or rapid sequence intubation [RSI] kit). Scan barcodes for IV admixtures using IV workflow technology. If warning labels are used, inspect them regularly and replace them as soon as signs of wear are recognized.			


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Issue No.	Problem	Recommendation	Organization Assessment	Action Required/Assignment	Date Completed
Enoxaparin (LOVENOX, generics) syringe failures					
(4) 	Forty-two reports of enoxaparin prefilled syringe failures and inadvertent activation of the needle safety mechanism have been received involving brand and generic products. Most reports indicated that the syringes broke apart when engaging the safety mechanism, that the safety mechanism did not or was difficult to engage, or that the mechanism engaged too soon. This resulted in needlesticks, underdoses, missed doses, and embedded needles.	The US Food and Drug Administration (FDA) and Sanofi are looking into these complaints. In the meantime, advise practitioners handling these syringes to always point the needle end away from themselves and others, including the patient, until the moment of injection and after injection when activating the safety mechanism. If these syringes are dispensed for use in the home, patients should also be educated about proper use.			
“Fuzzy matching” during electronic searches can lead to errors					
(2, 3)	An Epic upgrade incorporates “fuzzy matching,” which creates a list of “near hits” based on what the system “thinks” you are searching for with patient names, medications, and other orders. However, the “near hits” may lead to selection of the wrong drug if the drug names look alike, particularly if the drug name is misspelled (e.g., cyclo SERINE misspelled as “cyclosorine” creates a list containing cyclo SPORINE).	The use of fuzzy matching is a risk not worth taking and is currently unsafe for medication ordering. Fuzzy matching can be disabled for all search options, but not for medications alone. Update: Although Epic recently revised the algorithms, which eliminated some of the problems, similar-looking drug names are still presented to users during searches, so the functionality should still be disabled.			
Bupivacaine 0.25% mistaken as bupivacaine with EPINEPHrine after misreading package insert on top of packaging box					
(5) 	A pharmacy technician nearly placed a package of bupivacaine vials into a bin containing bupivacaine with EPINEPHrine vials, but the error was caught during barcode scanning of the product. The package insert that was displayed on the packing carton listed both plain bupivacaine and bupivacaine with EPINEPHrine (the US Food and Drug Administration [FDA] allows a single package insert for both products).	Warn pharmacy staff about the risk of a mix-up and remind them to look at the side panels of the packing carton for the official product label, not the package insert visible on the top. Require barcode scanning of these products during storage and administration. We have also contacted the company to suggest flipping the package insert text-side down to avoid confusion.			

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Issue No.	Problem	Recommendation	Organization Assessment	Action Required/Assignment	Date Completed
Subcutaneous-only RITUXAN HYCELA (riTUXimab and hyaluronidase) confused with intravenous (IV)-only RITUXAN (riTUXimab)					
(1)	Rituxan Hycela has been administered IV instead of subcutaneously. Practitioners have mistakenly believed the drug should be administered IV because the volume of the dose, either 11.7 mL or 13.4 mL, is larger than a typical subcutaneous dose. Name similarities can also contribute to mix-ups and confusion.	Educate oncologists and nurses about the risk of wrong route errors. Store Rituxan Hycela and Rituxan in a way that indicates that they are different formulations. Employ barcode scanning to verify storage and administration. Include an auxiliary warning on Rituxan Hycela syringes, "Administer subcutaneously in the abdomen."			
Subcutaneous-only HERCEPTIN HYLECTA (trastuzumab and hyaluronidase-oysk) may accidentally be administered intravenously (IV)					
(6)	Herceptin Hylecta is administered subcutaneously, whereas HERCEPTIN (trastuzumab) is administered as an IV infusion. While the volume of a typical subcutaneous injection is 2 mL or less, the Herceptin Hylecta dose is 5 mL, which may lead practitioners to believe it should be administered IV.	Use barcode technology to avoid mix-ups between the IV and subcutaneous versions. Also affix a prominent auxiliary label that states, "Administer subcutaneously in the thigh," on syringes of Herceptin Hylecta or utilize the peel-off sticker provided on the vial to label the syringe.			
Include 4-letter suffixes when expressing biosimilar drugs, as required by the US Food and Drug Administration (FDA)					
(6)	FDA requires the use of a random 4-letter suffix attached by a hyphen to the end of the generic name of biosimilar drugs (unless approved before the new naming convention). Versions of the same biological drug may not be an exact copy of the same molecule. The suffix will identify the specific product if it is associated with an adverse event.	When a biological nonproprietary drug name is used, include the full name along with the suffix, on all labels, in electronic health records (EHRs), and in adverse event reporting systems. ISMP also encourages using the brand and nonproprietary names together to provide redundancy and avoid name confusion.			
Finalized guidelines for electronic communication of medication information					
(1)	Electronic forms of communication are now widely used in healthcare. If the conventions used to communicate medication information electronically are not carefully considered, these technologies may contribute to medication errors rather than mitigate risks.	Healthcare organizations and vendors of electronic health information technology should apply the principles in ISMP's updated <i>Guidelines for Safe Electronic Communication of Medication Information</i> (www.ismp.org/node/1322) when information about medications is communicated in electronic formats.			

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Issue No.	Problem	Recommendation	Organization Assessment	Action Required/Assignment	Date Completed
Designing effective warnings					
(4)	Warnings are generally less reliable than design strategies that eliminate hazards altogether, prevent hazards from touching targets, or detect errors before they reach patients. But warnings can reduce the risk of errors when they are well designed. If warnings do not reach the target audience, capture attention, and cause the recipient to understand the warning and the required response, they will not be effective.	Print visual warnings in big, bold font using mixed case letters, and make sure they are clinically important. Use correct signal words (<i>caution</i> or <i>warning</i> for injuries that <i>might</i> occur; <i>danger</i> for serious hazards that <i>will</i> occur) and color to draw attention to the warnings. Use affirmative wording when possible (e.g., avoid “Not for IV use;” state “For oral use only”), and embed pictorials. The most effective warning requires the recipient to interact with it to continue.			
Medical residents’ electronic medication prescribing errors					
(2)	A large study (www.ismp.org/ext/153) that analyzed medical residents’ medication e-prescribing found that pharmacists identified an error in 4% of the medication orders, particularly with antimicrobials and anticoagulants. Errors were most frequent in August and September, and among first- and third-year residents. The errors were most often associated with a failure to adjust dosing for renal impairment (40%), unclear or incomplete orders (27%), and duplicate therapy (25%).	Increase resident supervision for the first three months of training, not just July. Educate residents about the specific kinds of errors that are common when ordering antimicrobials and anticoagulants. Ensure third-year residents consult with other healthcare professionals when caring for complex patients or ordering medications prescribed infrequently. Establish a reliable plan for renal dose adjustments.			
Mix-ups between dexAMETHasone and dexMEDEtomidine (PRECEDEX)					
(4) 	Mix-ups between dexmedetomidine and dexamethasone injection have been reported. Pharmacy staff have selected the wrong drug when preparing an intravenous (IV) admixture or when restocking an automated dispensing cabinet (ADC). Nurses have also removed the wrong drug from ADCs via override or programmed dexmedetomidine infusions in smart infusion pumps as dexamethasone.	When available, use premixed dexmedetomidine. Employ barcode scanning prior to IV admixture or when selecting and stocking vials in ADCs. Do not store these drugs near each other in the pharmacy. We also suggest the use of tall man letters (dexMEDEtomidine, dexAMETHasone) if you carry both products (will be added to ISMP’s list of drug name pairs with tall man letters during the next update).			

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