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ISMP
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Nurse AdviseERR®
Educating the Healthcare Community About Safe Medication Practices

2022 ushers in the beginning of a new era at ISMP

In January 2022, an era of unwavering leadership for the Institute for Safe Medication Practices (ISMP) came to an end, as Michael R. Cohen, a persistent advocate for medication safety, stepped down as President of ISMP. Mike will continue to support ISMP's critical lifesaving work as President Emeritus, and Rita K. Jew, a respected and worthy successor, has been appointed as ISMP's President (to learn more about Rita, visit: www.ismp.org/node/22763). Mike will continue to be actively involved with ISMP part-time, working on newsletters and special projects close to his heart, continuing his quest for excellence in medication safety. He is an inspiration to us all, and we are delighted that he will continue to be available to assist ISMP. Rita will lead ISMP into a new era, as ISMP continues to provide sage guidance to influence companies, organizations, practitioners, and consumers who make, regulate, prescribe, dispense, administer, and receive medications, always focusing on the patient.

Looking Back

ISMP roots. As many know, the origin of ISMP is rooted in a monthly column, entitled Medication Errors, that began in March 1975 in *Hospital Pharmacy*. The column grew from a conversation Mike had in 1974 with Neil Davis, both of whom were working at Temple University Hospital in Philadelphia. They were discussing a serious medication error that happened at a local hospital in which a prescriber had used an abbreviation, U for "units." A nurse had misread the handwritten U as a zero and administered 40 units of regular insulin to a patient instead of 4 units. The patient developed signs of severe hypoglycemia that required immediate treatment.

Dr. Davis, who was an editor of *Hospital Pharmacy*, suggested that the incident serves as an opportunity for educating other healthcare professionals about this error-prone abbreviation. During the discussion, it became clear that much could be gained by publishing other medication errors that readers might be inclined to report in confidence to prevent patient harm and save lives. Thus, an idea was born and realized to create a national medication error reporting program that practitioners could use to confidentially report medication errors, which could then be shared anonymously with others for learning purposes.

In 1977, Mike began a similar column for nurses in *Nursing '77*, and both the *Hospital Pharmacy* and *Nursing '77* columns became leading features in the respective monthly journals. The columns prompted reports of errors from across the US, and Mike would often follow up with the practitioner to learn more about what had happened. Then Mike would share the deidentified error stories and provide error-prevention recommendations in the journal columns so others could proactively take action. Mike and Dr. Davis also began to interact with the US Food and Drug Administration (FDA), USP, The Joint Commission (TJC), and product manufacturers as important issues arose.

By 1990, Mike realized his advocacy work for safe medication practices and products was a full-time calling that should be supported by a nonprofit organization. Soon after, ISMP was founded, and by 1994, it became the nation's only 501c (3) nonprofit organization devoted entirely to preventing medication errors. Since then, ISMP has served as a vital force for progress in medication safety through its unyielding advocacy and the development of resources and learning opportunities for healthcare practitioners and consumers.

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SAFETY wires

Potential for severe cardiovascular effects when restarting cloZAPine. A 40-year-old woman with schizoaffective disorder had been taking a total daily dose of cloZAPine 500 mg for at least 10 years. However, recently she had not received the drug for nearly 2 weeks due to problems her psychiatrist was having with registering for the updated Risk Evaluation and Mitigation Strategies (REMS) certification. According to the REMS, prescribers must be certified to prescribe cloZAPine for outpatient use, patients must be enrolled in the cloZAPine REMS program by a certified physician to receive treatment, and pharmacies must be certified to receive and dispense cloZAPine. In July 2021, a new REMS platform (www.newclozapinerems.com) was initiated by the US Food and Drug Administration (FDA) to merge different registries into one, and REMS recertification of healthcare practitioners was supposed to be completed by November 15, 2021 (a temporary waiver has been

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Become an ISMP Fellow

ISMP is now accepting applications until **March 13, 2022**, for three unique Fellowship programs that will begin in the summer—the ***ISMP Safe Medication Management Fellowship***, the ***ISMP International Medication Safety Management Fellowship***, and the ***FDA (US Food and Drug Administration)/ISMP Safe Medication Management Fellowship***. An ISMP Fellowship can help you grow in your career and make major contributions to medication safety worldwide. For brief descriptions of the various Fellowships, candidate qualifications, brochures, program outlines, and directions for applying, visit: www.ismp.org/node/871.

Supported by an educational grant from Fresenius Kabi

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ISMP's impact. ISMP has had a tremendously positive impact on patient safety, medication safety, and the practices of caregivers striving to provide quality and safe patient care, both across the US as well as internationally, through ISMP sister organizations located in Brazil, Canada, and Spain, and as a founding member of the International Medication Safety Network (IMSN). Along the way, ISMP has cultivated excellent relationships with other patient safety and professional organizations, accreditors, regulators, standards-setting organizations, and the medical products industry that allow us to share our recommendations with organizations so necessary changes can be made to prevent both product- and practice-related medication errors. For example, ISMP's frequent interactions with FDA, USP, and the medical products industry have led to improvements in the safety of thousands of products and have had a significant impact on labeling, packaging, and nomenclature guidance statements and standards. Additionally, ISMP's collaboration with TJC, the Centers for Disease Control and Prevention (CDC), the Centers for Medicare & Medicaid Services (CMS), professional organizations, and patient safety organizations has resulted in collaborative projects to advance medication safety standards and our mutual goals of medication safety. Likewise, our recommendations to practitioners, healthcare providers, and organizations have also resulted in system- and practice-level changes. In fact, ISMP was among the first, if not the first, organization to recommend the following concepts to improve medication safety, many of which are widely implemented by healthcare providers and/or industry:

- Free flow protection for infusion pumps
- Removal of potassium chloride injection concentrate from patient care units
- Vin**CRIS**tine administration via a minibag instead of a syringe
- Establishing a list of high-alert medications with layered error-reduction strategies
- Use of failure mode and effects analysis (FMEA) in healthcare
- Spotlighting ***Targeted Medication Safety Best Practices for Hospitals***
- Employing a medication safety officer
- Maintaining a look-alike/sound-alike drug name list
- Maintaining a list of error-prone abbreviations that should never be used
- Use of tall man letters
- Referring to infusion pumps with a dose error-reduction system (DERS) as "smart pumps"

Throughout the years, there have been numerous times when ISMP has brought together key stakeholders, sometimes for the first time, to discuss complex medication safety issues and create consensus-based best practices and/or action plans for organizations to implement. In some cases, ISMP has been a prickly thorn in the side, provoking important questions, challenging preexisting assumptions, exposing harmful medical products, and chipping away at the resistance to much needed system changes. At other times, ISMP has been a nurturing, healing shoulder to cry on when well-meaning and competent providers have inadvertently harmed a patient—because we are all fallible human beings deeply troubled by our inability to "do no harm."

But perhaps ISMP's greatest contribution to healthcare has been giving a voice to health professionals who, in confidence, report errors to ISMP for altruistic reasons and/or share their ideas, observations, or questions with ISMP, without fear of even a disparaging thought. ISMP empowers others to give voice to their experiences because they trust ISMP and know their information will be used productively. Every idea, observation, question, or error report ISMP receives is carefully reviewed. Then ISMP healthcare professionals interact to apply their collective expertise to arrive at safety recommendations and then share compelling stories about medication errors and impactful change strategies. ISMP aims to draw national attention to medication safety problems, offer healthcare providers new ways of looking at problems, and inspire change.

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issued for pharmacies). However, practitioners ran into problems, including high call volumes and long wait times.

The patient was admitted to a hospital psychiatric unit and restarted on clo**ZAP**ine. Her physician did not want to restart her at the full dose since she had not been taking it for nearly 2 weeks. He thought a reduced daily dose of 400 mg was appropriate since the patient had been stable on a daily dose of 500 mg for an extended period of time. Unfortunately, a little more than 1 hour after receiving her first 400 mg dose, the patient was found pulseless in her room. Cardiopulmonary resuscitation was initiated with return of spontaneous circulation, but the patient suffered cerebral hypoxia and shock. Clo**ZAP**ine re-initiation as a cause of cardiac arrest is a diagnosis of exclusion, and no other etiology of the cardiac arrest was found in this case.

Many prescribers, nurses, and pharmacists are aware of the issue of clo**ZAP**ine-associated neutropenia and infection risk, in part because the REMS program is designed to manage these risks. However, it is clear that many practitioners are not aware of the potential for severe adverse cardiovascular effects, including cardiac arrest, especially when the drug is abruptly discontinued and then restarted after 2 days or more. Clo**ZAP**ine has a boxed warning that states: "Orthostatic hypotension, bradycardia, syncope, and cardiac arrest have occurred with clo**ZAP**ine treatment. The risk is highest during the initial titration period, particularly with rapid dose escalation. These reactions can occur with the first dose, with doses as low as 12.5 mg per day. Initiate treatment at 12.5 mg once or twice daily; titrate slowly; and use divided dosages."

Product labeling (not within the boxed warning) further states: "When restarting clo**ZAP**ine tablets in patients who have discontinued clo**ZAP**ine tablets (i.e., 2 days or more since the last dose), re-initiate with 12.5 mg once daily or twice daily. This is necessary to minimize the risk of hypotension, bradycardia, and syncope. If that dose is well-tolerated, the dose may be increased to the previous therapeutic

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Looking Forward

As we reflect on our history and the remarkable achievements that have been made in medication safety, we recognize that we have certainly not done it alone. Many of you have been on this journey with us, reporting hazards and errors, listening to the stories we share, implementing our recommendations, completing our surveys and self assessments, supporting our initiatives, and helping us learn more about how medications are used or misused. Although ISMP is a small organization, with your passionate support, we have had an enormous impact in the world of patient safety. Your participation in surveys and your detailed error reports are powerful drivers of change and will continue to serve as a major force in the patient safety movement and the foundation of our work at ISMP. We are humbled by the trust you place in ISMP and are truly indebted to you.

It has been an amazing journey thus far; however, there is still much more work to do. 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 more than a quarter century. We are so proud of the shared narrative around medication safety and the accomplishments we have achieved together. Improvement is only possible within a culture that ensures all changes are well understood, embraced, and sustained—nothing sums up our mission more than this. Please continue reporting medication hazards and errors (www.ismp.org/MERP), sharing your ideas, questioning complex medication safety issues that are not well understood, and responding to our efforts to improve medication safety. You can contact ISMP at any time via email at: ismpinfo@ismp.org.

Management of drug shortages with 0.9% sodium chloride, sterile water for injection, and EPINEPHrine

Problem: Ongoing drug shortages in healthcare have become commonplace, with only the severity and urgency of the issue changing with the specific drugs in short supply. According to numerous inquiries to ISMP and frequent communications with Erin Fox, PharmD, BCPS, FASHP, a recognized expert in drug shortages at the University of Utah Health, current shortages of 0.9% sodium chloride for injection vials, prefilled saline flushes, sterile water for injection vials, and **EPINEPH**rine injection emergency syringes and autoinjectors, are all creating serious safety concerns and requiring even more effort from healthcare facilities to circumnavigate. (The University of Utah provides information for the American Society of Health-System Pharmacists [ASHP] Drug Shortages Resource Center [www.ashp.org/shortages].)

0.9% Sodium Chloride Shortage

The most impactful shortage involves 0.9% sodium chloride in 10 mL, 20 mL, and 50 mL preservative-free, single-dose vials, prefilled flush syringes, and certain small volume (25 mL, 50 mL, 100 mL) bags. Shortages of the 0.9% sodium chloride vials have increased the demands for prefilled flush syringes, small volume bags, and vials of 23.4% sodium chloride, which have resulted in the current shortages of these products. Sodium chloride 0.9% is often needed to dilute or reconstitute certain medications. Also, nurses regularly use prefilled saline flush syringes, which are essential for vascular access device (VAD) maintenance and to reduce the risk of bloodstream infections.

Due to the shortage of 0.9% sodium chloride vials, we worry that the few remaining saline flush syringes are being used inappropriately and unsafely to dilute and reconstitute medications in patient care units, further depleting the supply and resulting in a serious safety issue. First, the mislabeling that occurs when medications are added to a prefilled saline flush syringe without applying a secondary label increases the risk for

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dose more quickly than recommended for initial treatment." Similar wording is also included in the *Warnings and Precautions* section of the package insert. Unfortunately, these warning statements are not being effectively communicated and/or taught to many healthcare practitioners.

Please ensure that all healthcare practitioners who prescribe, dispense, or administer clo**ZAP**ine are aware of the potential for adverse cardiovascular effects, especially considering the potential for breaks in therapy with the ongoing problems with obtaining REMS recertification. Specifically, let them know that clo**ZAP**ine treatment should be restarted at 12.5 mg once or twice daily when there has been a break in therapy for 2 days or longer. When collecting information about the patient's home medications, inquire about and document the date and amount of the last dose taken.

The hospital where this event occurred is considering an electronic requirement for the prescriber to input the patient's previous dose and when the last dose was administered when entering a new order for clo**ZAP**ine. Also, the pharmacy may be required to gather this information for all new orders for clo**ZAP**ine. The hospital is also considering an electronic inquiry regarding whether the order is new or if clo**ZAP**ine is being restarted, along with providing dosing information. FDA and product manufacturers should work together to incorporate into the boxed warning a recommendation to slowly re-initiate clo**ZAP**ine after a break in therapy for 2 days or longer.

Regular review of patient education material is essential. An emergency department (ED) nurse recently handed a baby's mother a dosage guide for infants' acetaminophen concentrated drops, 80 mg/0.8 mL. But beginning in 2011, manufacturers have voluntarily phased out that concentration for good reason! The formulation for infants, known as Infants' **TYLENOL** (acetaminophen) Concentrated Drops and similar generic products, was much more concentrated than the children's formulation (160 mg/5 mL). Some parents

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significant errors. In many cases, the manufacturer's label is permanently affixed to the syringe barrel and contains product codes and a barcode specific to the prefilled saline syringe. When a medication is added to this syringe, the syringe frequently remains labeled only as 0.9% sodium chloride, and lacks an appropriate barcode to scan because it now contains the diluted or reconstituted medication. Furthermore, most commercially available prefilled syringes of saline (and heparin) flushes are regulated by the US Food and Drug Administration (FDA) as devices, not as medications, since these products keep vascular lines open as a result of a physical effect and have no intended therapeutic effect when used as directed. While these devices (syringes) have received approval for use in flushing VADs, they have not been tested or approved for the reconstitution, dilution, or subsequent administration of medications.

Sterile Water for Injection Shortage

Most sterile water for injection vials (i.e., 5 mL, 10 mL, 20 mL, 50 mL, 100 mL) are in short supply. These vials are primarily used to reconstitute medications available as lyophilized powders. While the prescribing information for some medications suggests that an alternative sterile liquid can be used for reconstitution, many specify that sterile water for injection must be used. The consequences of using a different sterile liquid to reconstitute medications may be unknown but could include poor dissolution of the powder, precipitation, or deactivation of the active pharmaceutical ingredient before administration.

A pharmacist recently reported a dangerous workaround caused by the sterile water for *injection* shortage. Understanding the infection control risk, a nurse called a pharmacist's attention to a sterile water for *irrigation* bottle (500 mL) that had been spiked with an access port and was being used as a common-source bottle to prepare syringes of sterile water to reconstitute intravenous (IV) push antibiotics. However, the pharmacy had been preparing unit doses of sterile water for *injection* from larger bags in batches using a primary engineering control, and stocking the pharmacy-prepared unit doses of sterile water for *injection* in an automated dispensing cabinet (ADC) refrigerator for nurses to use when reconstituting lyophilized antibiotics. Not all staff knew the pharmacy had provided a supply of sterile water for *injection* in unit doses in the ADC.

It is an unsafe practice to prepare syringes used for flushing, dilution, or reconstitution for more than one patient from a common-source bottle or bag outside the pharmacy. In the pharmacy, the practice might be safe if primary engineering controls are used and strict sterile compounding regulations are followed. But outside of the pharmacy, there is a risk of contamination and disease transmission to a large group of patients, even if the solution is discarded after 24 hours. In addition, sterile water for *irrigation* is not labeled for use as an *injection* in patients. Sterile water for *injection* must pass a USP particulate-matter test that sterile water for *irrigation* does not have to pass, so they are not considered equivalent.

EPINEPHrine Shortage

Currently, there are shortages of **EPINEPH**rine injection 1 mg/10 mL syringes (0.1 mg/mL) as well as certain **EPINEPH**rine autoinjectors (0.3 mg/0.3 mL, 0.15 mg/0.15 mL, 0.15 mg/0.3 mL). Autoinjectors are used for the emergency treatment of anaphylaxis. Emergency syringes are commonly found in code carts and used for the treatment of ventricular fibrillation or pulseless ventricular tachycardia unresponsive to initial defibrillation, pulseless electrical activity, and asystole. If prefilled syringes cannot be provided, ISMP has previously recommended providing an emergency kit containing vials of **EPINEPH**rine (1 mg/mL) and 0.9% sodium chloride (10 mL) for dilution, along with directions for preparing a 0.1 mg/mL concentration for IV push administration. Primarily, 0.9% sodium chloride is needed to facilitate the dilution of **EPINEPH**rine in

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and healthcare practitioners had been confusing the two products. Using the wrong concentration and dosing the concentrated drops by volume (e.g., 5 mL) led to multiple overdoses when the 80 mg/0.8 mL product was available. Today, both Infants' Tylenol and Children's Tylenol, as well as generics, are the same concentration, 160 mg/5 mL.

For more than 10 years at this hospital, no one had removed the outdated acetaminophen dosage guide! This is not the first time we received a report about outdated materials being handed to patients. This may be a widespread problem, not only in the ED but in other care areas, as well. Also, printed materials often get copied whenever supplies run out, and eventually, the materials given to patients are copies of copies, which makes the information difficult to read.

This error report should prompt hospitals to establish a centralized electronic repository of patient education materials. At a minimum, this repository should be reviewed annually by an interdisciplinary team to ensure the information is up-to-date and void of discontinued or recalled products. Another option is leveraging the electronic health record to print "just-in-time" updated patient drug information at discharge. Remember, the discharge process often does not include pharmacists, so they may not know what nurses or other healthcare professionals are handing out to patients. However, pharmacists and nurses should work together to review patient discharge materials and remove outdated information.

Preventing ILE and ViperSlide mix-ups. In 2012, we published a short article in our acute care newsletter about the possibility of mix-ups between 100 mL bags of **INTRALIPID** (lipid injectable emulsion [ILE]) 20% and **VIPERSLIDE**, a non-drug product that acts as a lubricant to reduce friction with devices used during atherectomy procedures. The products have a similar milky white appearance, and both are packaged in flexible bags with a white and blue port (**Figure 1**, page 5). ViperSlide is a lipid

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vials and the administration of this critical emergency drug; however, 0.9% sodium chloride is also in short supply.

Safe Practice Recommendations: Sometimes drug shortages can lure practitioners and organizations to employ unsafe practices in order to provide immediate care. However, when drug shortages do occur, practitioners should collaborate and organize the response to seek safe alternatives and to comply as much as possible with medication safety best practices that embrace conservation and inventory management of the drug in short supply, as well as clinical management and error-mitigation strategies. The tiered strategies listed below should be based on your current inventory and will allow you to relax some of the conservation and inventory management strategies as your supply improves, while reserving some clinical management strategies **ONLY** after all resources have been exhausted.

General – pharmacy role

- Work with wholesalers/manufacturers to keep abreast of their inventory of products in short supply.
- Work internally with the materials management department to transfer and centralize solutions in short supply and alternatives (e.g., small volume bags) to the pharmacy.
- Work with nursing and ancillary departments to examine current usage, inventory, distribution, and waste of products in short supply and alternatives to develop conservation strategies for managing the inventory and prioritizing use.
- Use multiple pathways to communicate conservation strategies, practice changes, safe use of alternatives, and error-mitigation strategies to impacted practitioners.

General – nursing role

- **Do NOT** use IV solutions in containers (e.g., infusion bags, bottles, minibags) as common-source containers to prepare IV flush syringes or to dilute or reconstitute medications outside the pharmacy, even if labeled and only used for 24 hours.
- **Do NOT** reuse a syringe or reuse any remaining solution or medication in the syringe (single use only).
- **Do NOT** use multiple-dose vials for multiple patients in clinical areas; dedicate multiple-dose vials to a single patient.

0.9% Sodium Chloride Shortage

- Employ the following nursing conservation strategies for saline flushes:
  - ☐ Eliminate unnecessary medication dilution (www.ismp.org/node/582)
  - ☐ Reserve 10 mL (diameter) saline flushes for central lines as much as possible
  - ☐ Use large volume 0.9% sodium chloride bags for starting IV lines and administering blood products
- Reserve 10 mL vials of 0.9% sodium chloride for use in emergency code cart kits dispensed (with **EPINEPH**rine) from the pharmacy.
- **Do NOT** dilute or reconstitute medications by drawing up the contents into a commercially available, prefilled flush syringe of 0.9% sodium chloride and then administering the resultant product.
- **Do NOT** reuse the same saline syringe to flush VADs before and after medication administration.
- **Do NOT** use sterile water for injection for flushing VADs.
- Evaluate the need for continuation of VADs and remove promptly when not needed.
- Use central VADs with the least number of lumens needed (to minimize the need to flush).
- **In a complete outage:** Ask the pharmacy to prepare saline flushes (e.g., repackaged from bags and labeled appropriately) in compliance with sterile compounding regulations.

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emulsion that has similar components to Intralipid, including soybean oil, egg yolk phospholipids, glycerin, sodium hydroxide, and water. However, ViperSlide contains only 10 g of soybean oil per 100 mL (10%), compared to 20 g of soybean oil per 100 mL (20%) in Intralipid. Both products are sterile. To control vasospasm, ViperSlide may be combined with saline, nitroglycerin, and verapamil, or infused at the same time as those three ingredients via a Y-site (www.ismp.org/ext/839). ViperSlide bags are often stocked in cardiac catheterization laboratories or procedural locations. Sometimes, the bags are kept in the pharmacy because pharmacy staff prepare ViperSlide mixtures with saline, nitroglycerin, and verapamil.

In one reported mix-up, ViperSlide was purchased by the operating room (OR) but kept in the OR pharmacy to prepare mixtures. A bag was approaching the expiration date, so it was placed on the pharmacy counter for disposal. A technician thought the product was Intralipid and took it to the intravenous (IV) room for use prior to its expiration. The IV room technician also thought the product was Intralipid and used the ViperSlide to prepare Intralipid neonatal syringes. Fortunately, a pharmacist detected the error before the syringes were dispensed.

More recently, a close call was reported in which a pharmacy inadvertently stocked a bag of ViperSlide instead of Intralipid in a neonatal intensive care unit (NICU) automated dispensing cabinet (ADC). Multiple Intralipid bags were

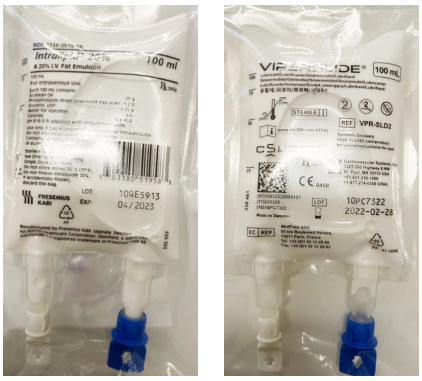

Figure 1. Look-alike bags of Intralipid 20% (left) and ViperSlide (right).

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Sterile Water for Injection Shortage

- **Do NOT** use bacteriostatic water for injection in place of sterile water for injection (unless directed in the prescribing information), especially for intrathecal or epidural injections or for neonates.
- **Do NOT** use 0.9% sodium chloride in place of sterile water for injection (unless directed in the prescribing information) to reconstitute medications, as it can result in hyperosmotic solutions at or near the saturation point and cause crystallization or infusion site reactions.
- **Do NOT** use sterile water for *irrigation* in place of sterile water for *injection*.
- **In a complete outage:** Ask the pharmacy to repackage large bags (1,000 mL or less, not pharmacy bulk packages) of sterile water for injection into empty sterile vials in compliance with sterile compounding regulations. Have the pharmacy **ONLY** repackage the sterile water for injection into syringes as a last resort if empty sterile vials are not available, as sterile water for injection prepared in syringes risks mix-ups with saline flush syringes.

EPINEPHrine Shortage

- Conserve **EPINEPH**rine emergency syringes for code carts and code situations.
- Limit the number of emergency **EPINEPH**rine syringes stocked in code carts.
- If using 1 mg/1 mL vials in lieu of emergency syringes, ask the pharmacy to package the vial, diluent (10 mL of 0.9% sodium chloride), and syringe label in a kit prominently labeled with the drug name and strength, and include instructions for preparing a dilution equivalent to a prefilled 1 mg/10 mL emergency syringe (i.e., **EPINEPH**rine 1 mg/mL: Dilute 1 mg [1 mL] in 9 mL of 0.9% sodium chloride for a final concentration of 0.1 mg/mL).
- Return expired **EPINEPH**rine products to the pharmacy so pharmacy staff can check with FDA (www.ismp.org/ext/833) about extended dating before discarding (FDA has extended the expiration date for certain lots of **EPINEPH**rine syringes).
- **Do NOT** stock the 30 mL multiple-dose **EPINEPH**rine vials in code carts, emergency boxes, or floor stock.
- **In a complete outage of EPINEPHrine syringes and 0.9% sodium chloride vials: ONLY** if all resources are exhausted and prefilled saline flush syringes are needed for dilution of **EPINEPH**rine during code situations, withdraw the **EPINEPH**rine into an empty syringe and use a Luer-lock-to-Luer-lock transfer device (e.g., www.ismp.org/ext/837; www.ismp.org/ext/840), which the pharmacy should provide with **EPINEPH**rine kits on code carts, to withdraw the 0.9% sodium chloride from the prefilled saline flush syringe into the syringe with the pre-drawn **EPINEPH**rine. Avoid diluting or reconstituting medications by drawing up the contents into a commercially available, prefilled flush syringe of 0.9% sodium chloride and then administering the resultant product. If you must do this as a last resort during code situations, the saline flush syringe **MUST** be relabeled, covering the original contents and barcode and replacing it with a new label showing that **EPINEPH**rine is in the syringe (new label should be provided in a kit). Another last-resort option is to ask the pharmacy to provide a 250 mL bag of 0.9% sodium chloride labeled as a flush solution on the code cart that can be used to dilute **EPINEPH**rine—but use this bag only during a single code. The bag should be immediately disposed of after the code. These last-resort options should **NOT** be utilized outside of emergency code situations.

Sources of recommendations

1) Drug Shortages Resource Center (www.ashp.org/shortages)
2) ASHP Connect posting from Kevin Hansen (www.ismp.org/ext/835)
3) ASHP and the University of Utah Drug Information Service Sterile Water for Injection Shortage Frequently Asked Questions (www.ismp.org/ext/829)
4) FDA Drug Shortages (www.ismp.org/ext/830)
5) Infusion Nurses Society and National Coalition for IV Push Safety Saline Flush and Vial Shortage (www.ismp.org/ext/834)
6) ISMP Safe Practice Guidelines for Adult IV Push Medications (www.ismp.org/node/97)

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being stocked during the ADC refill, but the barcodes on each bag were not scanned and the erroneous ViperSlide bag was not identified. A nurse received an error message when she scanned what she thought was Intralipid prior to administration, thus discovering the error.

In the past, we have mentioned that many procedural areas stock bags of ILE 20% as an antidote for local anesthetic and other lipophilic drug toxicities (www.lipidrescue.org). However, due to the visual similarity of these products, one can imagine a scenario where a patient in cardiac arrest due to an inadvertent overdose of local anesthesia could receive ViperSlide in error. It is unknown how this might impact treatment effectiveness given the lower lipid concentration of ViperSlide compared to ILE 20%.

Knowing the procedures where ViperSlide might be used and checking if these two look-alike products are available can help identify risks so strategies can be implemented to reduce the potential for mix-ups. Avoid storing ViperSlide in the pharmacy (even in an OR pharmacy), in an anesthesia (or other perioperative) medication room, or in an ADC where lipid rescue kits are stored. Also place "Caution: Surgical Lubricant" auxiliary labels on ViperSlide bags to help differentiate them from Intralipid bags.

To subscribe: www.ismp.org/node/138

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