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ISMP
An ECRI Affiliate

Acute Care ISMP Medication Safety Alert!®

Educating the Healthcare Community About Safe Medication Practices

Start the year off right by addressing these Top 10 Medication Safety Concerns from 2021

Last year began with such hope. Thanks to the availability of coronavirus disease 2019 (COVID-19) vaccines, society began to gradually return to life as we knew it prior to the pandemic. Sadly, our emergence from the pandemic was delayed with the spread of the delta and omicron variants, shaking our confidence and overwhelming our healthcare providers once again. As we reflect on our newsletters in 2021 and the topics we wrote about last year, is it any wonder that errors with the lifesaving COVID-19 vaccines emerged at the top of the list of the **Top 10 Medication Safety Concerns** from 2021? We believe these medication safety concerns warrant continued attention and priority in 2022, especially if you have not already taken steps to mitigate them.

1 Mix-ups between the pediatric and adult formulations of the Pfizer-BioNTech COVID-19 vaccines

Late in 2021, after the US Food and Drug Administration (FDA) granted Emergency Use Authorization (EUA) of the Pfizer-BioNTech COVID-19 vaccine for children ages 5 through 11 years, we began to receive reports of mix-ups between the formulation for ages 5 through 11 years (orange cap and label border) and the formulations for individuals 12 (or 16) years or older (purple cap and label border or gray cap and label border, brand name of FDA-approved vaccine is **COMIRNATY**) (www.ismp.org/node/28303, www.ismp.org/node/28633, www.ismp.org/node/28619). The labels are not well differentiated, and once the caps are removed, the color difference is less apparent. Even the dose in mcg is not listed on the vaccine labels, which would likely help to differentiate the pediatric and adult formulations. Some of the vaccine mix-ups were due to look-alike vial or syringe mix-ups. In other cases, healthcare providers mistakenly believed it was acceptable to administer a smaller or diluted dose of the vaccine formulation intended for individuals 12 years or older to children ages 5 through 11 years. These mix-ups may have scared people, increased vaccine hesitancy, and weakened public health efforts to get children vaccinated.

To prevent mix-ups, separate the different formulations and label the storage bins. Never use vaccine vials formulated for individuals ages 12 (or 16) years or older (purple or gray cap) to prepare doses for children ages 5 through 11 years. Use barcode scanning during vaccine preparation and apply labels to vaccine syringes that differentiate between adult and pediatric doses. Only bring the intended vaccine(s) for one patient at a time into the vaccination area and include the parent/patient when verifying the prepared vaccine. Ideally, barcode scanning should be employed prior to administration. Document the lot number and expiration date prior to vaccine administration, and document administration afterwards. Report any vaccination errors to the FDA Vaccine Adverse Event Reporting System (VAERS; https://VAERS.hhs.gov/), which is mandatory for COVID-19 vaccines under an EUA, and to the ***ISMP National Vaccine Errors Reporting Program*** (ISMP VERP; www.ismp.org/VERP).

2 Mix-ups between the COVID-19 vaccines or boosters and the 2021-2022 influenza (flu) vaccines

Once the 2021-2022 flu vaccine became available in September 2021, health authorities strongly encouraged people to receive both the flu vaccine and the COVID-19 vaccine

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Worth repeating...

Preventing ILE and ViperSlide mix-ups

A June 28, 2012, *Safety Brief* advised 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**). ViperSlide is a lipid 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. ViperSlide may be combined with saline, nitroglycerin, and verapamil, or infused with those three ingredients via a Y-site, to control vasospasm (www.ismp.org/ext/839).

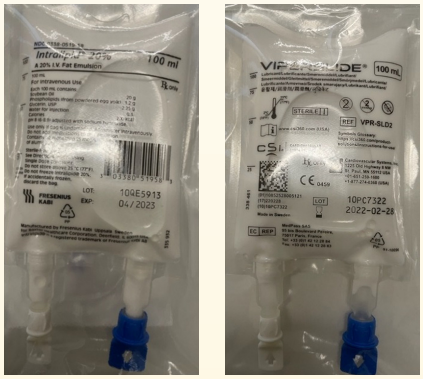

Figure 1. Look-alike bags of Intralipid 20% (left) and ViperSlide (right).

Sometimes, pharmacy has been asked to prepare ViperSlide admixtures, so the ViperSlide bags may be kept in the pharmacy.

In one reported mix-up, ViperSlide was purchased by the operating room (OR) but kept in the OR pharmacy to prepare admixtures. A bag was approaching the expiration date, so it was placed on the pharmacy counter for disposal. A technician thought

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during the same visit. Unfortunately, once the flu vaccine was available, mix-ups between the flu and COVID-19 vaccines started happening (www.ismp.org/node/27852). Many of the reported errors occurred in outpatient pharmacies, with patients who consented to a flu vaccine receiving a COVID-19 vaccine instead, or vice versa. Some of the mix-ups were associated with unlabeled syringes or labeled syringes that were next to each other in vaccination areas. Other mix-ups were linked to interruptions or distractions, or staffing shortages that led to managing dispensing and vaccination responsibilities simultaneously.

To prevent mix-ups, schedule vaccinations for a dedicated block of time each day and ensure adequate staffing. Staff should not be expected to accomplish both vaccine administration and other responsibilities simultaneously. Provide a separate area for vaccine administration, away from distractions and interruptions. Use barcode scanning during vaccine preparation and label all prepared syringes. Before vaccine administration, ask the patient which vaccine(s) they have requested, and verify the vaccine(s) with signed consent form(s). Only bring the intended vaccine(s) for one patient at a time into the vaccination area and include the parent/patient in verifying the prepared vaccine(s). Ideally, barcode scanning should occur prior to administration. Document the lot number and expiration date prior to administration, and document administration afterwards. If a mix-up occurs, apologize to the patient and provide the intended vaccine before they leave the vaccination area (or ask the patient to return to the vaccination site). Report any vaccination errors to FDA VAERS (https://VAERS.hhs.gov/) and ISMP VERP (www.ismp.org/VERP).

3 EPINEPHrine administered instead of the COVID-19 vaccine

Numerous mix-ups between **EPINEPH**rine injection and the COVID-19 vaccine have been reported. According to the Centers for Disease Control and Prevention (CDC), **EPINEPH**rine injection should be readily available to treat anaphylactic reactions to the COVID-19 vaccines. Most of the mix-ups occurred between look-alike, predrawn syringes of **EPINEPH**rine and the vaccine (www.ismp.org/node/29321). Also, **ADRENALIN** (**EPINEPH**rine) vials from Par Pharmaceutical look very similar to the Pfizer-BioNTech COVID-19 vaccine formulation for 12 years and older with the purple cap (www.ismp.org/node/29322) and could easily be confused. Both vials are about the same size and shape, with purple caps and mostly black print on white labels.

Vaccination sites should only stock **EPINEPH**rine autoinjectors, which look different than predrawn vaccine syringes. With training, the autoinjectors are easy to use in an emergency. Doses of **EPINEPH**rine and vaccine should be kept in different storage locations but close enough to vaccinators so they can be quickly retrieved when needed. Consider storing **EPINEPH**rine autoinjectors in an anaphylaxis kit with a tear-off lock. Ideally, utilize barcode scanning of vaccines and **EPINEPH**rine autoinjectors prior to administration.

4 Preparation errors with the Pfizer-BioNTech purple cap or gray cap COVID-19 vaccines

Early in 2021, we published reports of dilution errors with the Pfizer-BioNTech COVID-19 vaccine (purple cap), which resulted in administering too much or too little vaccine (www.ismp.org/node/22009, www.ismp.org/node/29339, www.ismp.org/node/24259). In many cases, practitioners used too little diluent (often 1 mL instead of 1.8 mL), too much diluent, or diluted the vaccine vial twice. In other cases, the vaccine was administered without dilution, the wrong diluent was used (often sterile water instead of 0.9% sodium chloride), or 1.8 mL of air in a syringe was used to "dilute" the vaccine.

In August 2021, a Pfizer-BioNTech COVID-19 vaccine, Comirnaty, was approved by FDA for the prevention of COVID-19 in individuals 16 years of age and older. Today, FDA-approved Comirnaty is available with either a purple or gray cap. Comirnaty in a vial with a purple cap requires dilution; Comirnaty in a vial with a gray cap MUST NOT be diluted prior to use. The Pfizer-BioNTech vaccine with a purple or gray cap is also

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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 compound Intralipid neonatal syringes. Fortunately, a pharmacist detected the error during a validation check, so the error did not reach patients.

At another hospital, one of the totes used for delivery of Intralipid bags had a ViperSlide bag mixed in. The error was not noticed, and the ViperSlide bag was stocked in the IV room along with other Intralipid bags from the tote. Thankfully, a pharmacist noticed the error before medication preparation. The following week a pharmacist found another bag of ViperSlide mixed in with the Intralipid order.

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 being stocked during the ADC refill, but the barcodes on each bag were not scanned and the 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 our prior *Safety Brief,* we 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 potential mix-ups. Avoid storing ViperSlide in the pharmacy (even in an OR pharmacy), in a perioperative medication room, or in an ADC where lipid rescue kits are stored. Place "Caution: Surgical Lubricant" auxiliary labels on ViperSlide bags to help differentiate them from Intralipid bags.

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available under an EUA, for individuals 12 through 15 years of age and for the administration of a booster dose (or a third dose for immunocompromised individuals). The purple-capped EUA vaccine requires dilution prior to use, and the gray-capped EUA vaccine MUST NOT be diluted. So both Comirnaty (purple or gray cap) and the EUA vaccines (purple or gray cap) are simultaneously available. Although we have not received any error reports yet, we worry that these vaccines will be mixed up during preparation, resulting in not diluting the purple-capped vaccine as required, or erroneously diluting the gray-capped vaccine.

To avoid mix-ups between the purple- and gray-capped vaccine vials, do not store them together in the refrigerator during or after thawing (e.g., use separate shelves). To prevent dilution errors, have the pharmacy prepare and dispense predrawn, labeled syringes of the vaccine if feasible within the timeframe for stability at room temperature. If preparing either the purple- or gray-capped vaccine outside of the pharmacy, require an independent double check of the preparation process. When preparing the vaccine syringes, remove syringes from their packaging one at a time, immediately before drawing up diluents or doses; do not open syringe packages ahead of time and/or fill the syringes with air in preparation for later dose or diluent withdrawal. Educate pharmacy and vaccination staff regarding the common types of errors that may occur, including those described above. Provide those who prepare the vaccines with an updated *Fact Sheet* for the EUA vaccines (www.ismp.org/ext/842, www.ismp.org/ext/813) or the package insert for Comirnaty (www.ismp.org/ext/843), and verify their competency regarding vaccine preparation.

5 Errors and delays with hypertonic sodium chloride

Using hypertonic sodium chloride has become the standard of care to manage elevated intracranial pressure (ICP) or to reduce cerebral edema (CE) in both adult and pediatric patients with certain neurological brain injuries. During a 2021 Medication Safety Officers Society (MSOS) *Briefing*, we learned that facilities frequently using hypertonic sodium chloride for treating elevated ICP and CE were experiencing delays in treatment while awaiting pharmacy preparation and dispensing (www.ismp.org/node/28302). For many years, ISMP has recommended NOT stocking vials/ampules of hypertonic sodium chloride in patient care units, particularly in automated dispensing cabinets (ADCs) (www.ismp.org/node/1372). However, we suggested that appropriately labeled and sequestered bags of 3% sodium chloride may be stocked in limited quantities in critical care/emergency care units. Nevertheless, since hypertonic sodium chloride, especially 23.4% sodium chloride, is used during an emergency, treatment delays can be significant.

To promote safety and allow for the rapid administration of hypertonic sodium chloride solutions in emergencies, in 2021 we recommended stocking limited quantities of 3% sodium chloride infusions in certain approved critical care/emergency care units after conducting a risk assessment. We also recommended labeling the bags with a customized high-alert medication label and bold warnings to draw attention to the hypertonic solution, storing them in a separate locked-lidded ADC compartment, and not allowing access via override. We also continued to recommend stocking 23.4% sodium chloride only in the pharmacy, defaulting all hypertonic sodium chloride orders to "stat" to speed pharmacy verification, preparing doses in the pharmacy labeled with warnings, and hand-delivering each dose to the practitioner administering the drug. However, for hospitals without 24-hour pharmacy services to accomplish timely dispensing of this emergency drug, we recommended stocking a limited quantity of 23.4% sodium chloride vials or syringes with special labeling and warnings in a single, secure critical care location that only a few trained professionals can access after pharmacy hours for emergencies. Override access for a few trained professionals to obtain 3% sodium chloride infusions from an ADC may also be necessary in facilities without 24-hour pharmacy review of orders. Other recommendations to avoid errors with hypertonic sodium chloride can be found in the November 4, 2021 article (www.ismp.org/node/28302).

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SAFETY briefs

Error involving Paxlovid packaging. On January 4, 2022, ISMP published an alert highlighting important renal dosing modifications outlined in the **PAXLOVID** (nirmatrelvir and ritonavir tablets) *Fact Sheet* (www.ismp.org/node/29046). The *Fact Sheet* instructs dispensing pharmacists to remove one of the two nirmatrelvir tablets for both the morning and evening doses from each of the blister cards before dispensing the drug to patients with moderate renal impairment. A patient who was diagnosed with coronavirus disease 2019 (COVID-19) presented at a hospital emergency department (ED) with a package of Paxlovid that she had been using at home to prevent severe disease. The patient, who had moderate renal impairment, was admitted to the hospital. The admitting physician provided orders to continue administering the Paxlovid using the blister packages brought in from home. The medication was sent to the pharmacy for identification and labeling. The pharmacist identifying the medication soon realized that the missing tablets did not match the patient's instructions to take one ritonavir and one nirmatrelvir orally, twice a day, which is the correct dose for patients with moderate renal impairment. Although labels were affixed over the removed nirmatrelvir tablets on each blister card, there were also missing ritonavir tablets that should not have been removed and some nirmatrelvir tablets that should have been removed.

Rather than asking pharmacists to modify the packaging, there should be separately available packaging for patients with moderate renal impairment, along with a set of clear instructions for patient use. Also, the reporter mentioned that if different packaging based on drug dosing is not an option, maybe the manufacturer could conduct a risk assessment to determine if it would be safe to supply one blister card with 10 ritonavir tablets and two separate blister cards with 10 nirmatrelvir tablets each, so pharmacists could dispense one ritonavir blister card and either one or two nirmatrelvir blister cards with the appropriate dose instructions. Either way, the potential for dosing errors made by patients would be reduced with more user-friendly packaging, which we have communicated to Pfizer, the manufacturer.

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6 Errors with discontinued or paused infusions

In 2021, ISMP published harmful errors involving discontinued high-alert medication infusions, including infusions of fenta**NYL** (www.ismp.org/node/25585), norepinephrine, and oxytocin (www.ismp.org/node/29324), that had not been disconnected from patients and were inadvertently restarted, often requiring medical treatment or causing death. While keeping the same medication bag may save time and resources if a discontinued or paused medication infusion is needed again later, safety comes first.

Discontinued infusions should be immediately disconnected from the patient, removed from the pump, and discarded. Stopped or paused infusions also should be immediately disconnected from the patient, removed from the pump, and discarded within a reasonable timeframe if not restarted. When starting any medication infusion, labels with the drug name and route of administration should be affixed to each access line at the distal end of the tubing closest to the patient and on the tubing above the pump or channel (or visible on the pump screen). Prior to starting or changing the rate of an infusion, the tubing should be traced from the solution container to the pump, and then to the patient for verification. Strive to implement bi-directional smart infusion pump interoperability with the electronic health record to reduce pump programming errors.

7 Infection transmission with shared glucometers, fingerstick devices, and insulin pens

With increasing regularity, unsafe practices have been associated with outbreaks caused by transmission of infectious diseases during assisted blood glucose monitoring (using a shared glucometer for multiple patients) and insulin administration (www.ismp.org/node/29323, www.ismp.org/ext/714, www.ismp.org/ext/715). These unsafe practices are associated with failures in the most basic principles of infection control:

- Using a fingerstick (lancing) device for more than one person
- Using a glucometer for multiple patients without cleaning and disinfecting it after every use
- Failing to change gloves and perform hand hygiene between fingerstick procedures
- Using an insulin pen for more than one person

Fingerstick devices should **never** be used for more than one person, even those marketed for multi-patient use. Single-use fingerstick devices are disposable and prevent reuse through an auto-disabling feature. Whenever possible, glucometers should **not** be shared. If they must be shared, each device should be cleaned and disinfected per the manufacturer's instructions after every use. The glucometer must be cleaned before it can be disinfected, which might require the repeated application of an approved cleaning agent. If the manufacturer does not specify how the device should be cleaned and disinfected, then the glucometer should not be shared. Insulin pens should **never** be used for more than one patient, even if the needle has been changed.

8 Adverse glycemic event errors

ECRI and the ISMP Patient Safety Organization (PSO) analyzed 100 harmful glycemic events that led to or occurred during a medical emergency (www.ismp.org/node/28595). Key contributing factors associated with these events included the following:

- Omissions or delays in initiating glycemic management protocols
- Mix-ups caused by look-alike insulin names or vials
- Insulin administration without consideration of dietary intake
- Omissions or delays in glucose monitoring and nutritional intake
- Communication breakdowns
- Inaccurate home medication lists and untimely medication reconciliation

To minimize adverse glycemic events, establish standardized protocols or order sets to guide the treatment and monitoring of clinically significant hypoglycemia and

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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. That concentration, known as Infants' **TYLENOL** (acetaminophen) Concentrated Drops and similar generic products, has been voluntarily phased out by manufacturers beginning in 2011, and for good reason! The formulation for infants was more concentrated than the available children's formulation (160 mg/5 mL), and some parents and healthcare professionals were confusing the two products. Using the wrong concentration and dosing the concentrated drops by volume led to multiple overdoses when the former 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 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 for the ED but for other care areas, as well. Printed materials often get copied whenever supplies run out, and eventually, the copies given to patients are copies of copies, which makes the information difficult to read.

The discharge process often does not include pharmacists, and it is possible that the above hospital's pharmacy had no idea of the existence of such a handout. Furthermore, pharmacists may not be present in the ED, and even when they are, they may not know what nurses hand out to patients. So, unless the pharmacy conducts safety rounding with nurses on each unit and discusses the potential for outdated discharge materials, problems might go unrecognized. We realize that, during the pandemic, it might not be possible to conduct safety walkarounds. However, this problem 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, including pharmacists, to ensure that the information is up-to-date and void of discontinued or

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hyperglycemia. Ensure appropriate rescue agents are readily available and establish protocols or coupled order sets that permit their emergency administration. Avoid close storage of insulin with look-alike names or labeling and use tall man letters to distinguish the unique letters of look-alike insulin brand names. Upon patient admission, capture a thorough medication history, require timely medication reconciliation, and prescribe necessary home medications. Conduct an assessment of patients receiving insulin to identify patients at high risk for developing hypoglycemia or hyperglycemia and target them for preventative interventions. Coordinate meal delivery with glucose monitoring and insulin administration, and assess the patient's nutritional intake before giving insulin. Use barcode scanning prior to drug administration. Initiate glycemic management protocols/order sets for patients who experience a blood glucose value above or below a specific target value.

9 Every organization needs a medication safety officer

Despite past achievements in medication safety, continuous changes in healthcare have introduced unintended consequences and new challenges that compromise medication safety. A medication safety officer (MSO) is a dedicated clinical medication safety advocate armed with education, authority, and leadership skills, who serves as the organization's authoritative expert in safe medication use for the purpose of reducing patient harm. However, as of 2018, only about half of US hospitals had created MSO positions to address ongoing medication safety challenges.

The MSO position is not merely a title change for an existing position, and the role cannot be covered by other practitioners simply by adding "medication safety" to their job description. Quite the opposite, healthcare executives should hire a qualified, dedicated MSO, empower them to act on medication safety concerns, and position the MSO on the organizational chart where it will best enable their ability to affect change. This helps to ensure that the organization will identify and learn from medication risks and errors (both internal and external), and implement high-leverage strategies to reduce or eliminate medication errors (www.ismp.org/node/23126). For a medication safety program to succeed, it is essential to have an innovative and highly visible MSO to set a vision and direction, identify opportunities for improvement, and coordinate the implementation of error-prevention strategies. Without MSOs, medication safety tasks are rarely prioritized, and those with high impact are infrequently addressed.

10 Increasing error reporting

Error-reporting systems are an important tool for improving patient safety and often represent the primary means of learning about hazards and errors. But encouraging staff to submit reports is not easy given the potential disincentives to reporting, including embarrassment, the perception that reporting is not worth their time, or if reporting is time consuming, confusing, or complex. Furthermore, the workforce is understandably reluctant to report errors if they are worried that the information will get them in trouble, impact their job, or lead to the perception of being careless or incompetent.

Some highly functional error-reporting systems exist today from which best practices that promote error reporting can be identified (www.ismp.org/node/27103). These best practices fall into nine categories that impact the quantity and quality of reports:

- **Trustworthiness:** Earning reporters' trust and proving the leaders' dependability
- **Open, fair, and learning culture:** Reporting without fear of being treated unfairly
- **Confidential:** Keeping the identity of reporters and involved staff confidential
- **Clear:** Defining the types of hazards and errors, including close calls, to be reported
- **Easy:** Making the reporting process exceedingly easy and readily accessible
- **Credible and useful:** Avoiding inaction and using the report to improve safety
- **Rewarding:** Recognizing reporters for playing a positive role in patient safety
- **No severity bias:** Not allowing the severity of the outcome to influence the response
- **Reinforced imperative:** Mentoring new and existing staff about reporting

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recalled products. Also, consider adding "patient drug information material" to the checklist that the pharmacy department utilizes during monthly reviews of medication storage areas in patient care units. Another option is leveraging the electronic health record to print "just-in-time" updated patient drug information at discharge.

Special Announcements

February 11 assessment deadline

Surgery sites have 2 more weeks to submit their findings from the ***ISMP Medication Safety Self Assessment® for Perioperative Settings*** to ISMP. For details, visit: www.ismp.org/node/18027. If you have questions about the data submission process, contact: selfassess@ismp.org.

Become an ISMP Fellow

ISMP is now accepting applications for three unique Fellowship programs that will begin in the summer of 2022. For descriptions of the Fellowships, candidate qualifications, brochures, program outlines, and to apply online, visit: www.ismp.org/node/871.

Virtual MSI workshops

Don't miss the opportunity to register for one of our unique 2-day, virtual ***ISMP Medication Safety Intensive (MSI)*** workshops being offered in 2022. Our next workshop is scheduled for **March 31 & April 1, 2022**. For details and more dates in 2022, visit: www.ismp.org/node/127.

To subscribe: www.ismp.org/node/10

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 ISMP, 200 Lakeside Drive, Suite 200, Horsham, PA 19044. Email: ismpinfo@ismp.org; Tel: 215-947-7797; Fax: 215-914-1492.

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 **October – December 2021** issues of the ***ISMP Medication Safety Alert! Acute Care*** 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 Microsoft Word and Excel formats (www.ismp.org/node/29286). Continuing education credit is available for nurses at: www.ismp.org/nursing-ce.

Key: ⚠ — ISMP high-alert medication

Issue No.	Problem	Recommendations	Organization Assessment	Action Required/Assignment	Date Completed
Mix-ups between adult and pediatric Pfizer-BioNTech coronavirus disease 2019 (COVID-19) vaccines					
22, 23, 25	Mix-ups between the Pfizer-BioNTech COVID-19 pediatric vaccine formulation (orange cap) for ages 5 to 11 years and the adult formulations for individuals 12 (or 16) years or older (purple or gray caps) have been reported, impacting thousands of individuals (www.ismp.org/node/28619). The labels are not distinct and fail to prominently show the intended age ranges. Also, once the caps are removed, the color difference is less apparent. Some mix-ups involve mistakenly believing it is appropriate to administer a smaller or diluted dose of the adult vaccine formulation to children.	If storing both adult and pediatric formulations, separate them and clearly label the storage bins. Do not use vaccine vials formulated for individuals 12 (or 16) years or older (purple or gray caps) to prepare doses for children ages 5 to 11 years. Use barcode scanning during preparation and administration, and label syringes to differentiate adult and pediatric doses. Only bring the intended vaccine(s) for one patient at a time into the vaccination area, and include the patient/parent in verifying the vaccine product. Report vaccination errors to the US Food and Drug Administration (FDA) Vaccine Adverse Event Reporting System (VAERS) and to ISMP.			
Mix-ups between influenza (flu) vaccines and coronavirus disease 2019 (COVID-19) vaccines					
20	Reports of mix-ups between the flu and COVID-19 vaccines have been reported ever since the 2021-2022 flu vaccine became available. Most of the reported mix-ups occurred in patients who consented to a flu vaccine but received a COVID-19 vaccine instead. Causative factors include vaccine syringes stored near each other, unlabeled syringes, distractions, and staffing shortages.	Ensure adequate and dedicated staff are present to assist in the vaccination process. Provide dedicated space for vaccination administration, away from distractions and interruptions. Bring only the prepared and labeled vaccine syringe(s) for one patient at a time to the vaccination area. Involve the patient/parent to confirm the correct vaccine(s), and scan the vaccine barcode(s) prior to administration when possible.			

Issue No.	Problem	Recommendations	Organization Assessment	Action Required/Assignment	Date Completed
Emergency use of intravenous (IV) hypertonic sodium chloride can result in errors and treatment delays					
22 ⚠	Hypertonic sodium chloride is the treatment of choice for several neurological brain injuries. However, recent reports have involved prescribing the wrong concentration due to a confusing prescribing process or unfamiliarity with the solutions; product mix-ups due to look-alike packaging and labeling during stocking and preparation; order entry dosing errors; and smart pump programming errors. Also, due to an increase in demand for these products, delays have become an issue while awaiting pharmacy preparation.	Create indication-based order sets, which link the concentration, dosing, infusion rates, and monitoring to each diagnosis. Default orders to "stat" to prioritize pharmacy preparation. Only allow pharmacy to purchase hypertonic sodium chloride from wholesalers, and sequester their storage. Provide limited quantities of 3% sodium chloride to critical/emergent care units, and keep 23.4% sodium chloride in the pharmacy (see article for exception for facilities without 24-hour pharmacy services). Require barcode scanning during preparation and administration.			
Challenges with using five characters during automated dispensing cabinet (ADC) drug searches					
21	Using only the first two to four characters of a drug name, mnemonics, or short names (e.g., "met"); skipped character abbreviations (e.g., "mtx"); or a combination of the first few letters and the strength (e.g., "meth10") has led to drug selection errors. However, requiring five characters when searching for drug names in an ADC via override has several challenges such as misspelling drug names, forgetting to enter five characters, and difficulty locating combination products or drugs known by several different names.	Using five characters is still recommended. Prior to implementation, analyze the workflow and conduct a failure mode and effects analysis to identify and manage potential challenges (see table of failure points in the full article: www.ismp.org/node/28130). If able, tailor the five-character search to problematic drugs and allow users to "opt out" for certain drugs. Create an alias/synonym for certain drugs and "pin" emergency kits and drugs to the top of the screen. Limit overrides with timely verification of drug orders by pharmacists.			
Beware of significant overfill with NUCALA (mepolizumab) vials					
20	Confusion continues when preparing doses of Nucala. The vial carton label states, "100 mg/vial," but each vial contains 144 mg to facilitate dose preparation. The mismatch between the label and the vial contents can lead to an overdose if the entire amount in the vial is used for a 100 mg dose.	Compounding instructions should state the volume to be withdrawn from the reconstituted vial; include a warning, such as, "CAUTION: Vial contains overfill. Reconstitute with 1.2 mL of sterile water for a final concentration of 100 mg/mL." As an alternative, use the 100 mg/mL autoinjector or prefilled syringe.			

Issue No.	Problem	Recommendations	Organization Assessment	Action Required/Assignment	Date Completed
Errors with injectable specialty medications such as STELARA (ustekinumab), DUPIXENT (dupilumab), and HUMIRA (adalimumab)					
24	A number of specialty medications have been associated with errors due to confusion with selecting the correct quantity or billing unit to enter for billing purposes, particularly with knowing whether the quantity should be based on "mL" or "kit" billing units (www.ismp.org/ext/817). Selecting the correct billing unit may be challenging because the pharmacy staff may not be aware of the exact contents inside a specialty medication carton, especially since these are not usually opened.	Use dispensing software notes to alert the team to the correct package size for specific products (e.g., quantity of 1 = 2 syringes). Add a default package size to the dispensing software, clarify the billing unit in the system, and set the system to print labels to match the required number of packages. Barcode scanning may be helpful to detect package size discrepancies.			
Glycemic events and emergencies analyzed by ECRI and the Institute for Safe Medication Practices (ISMP) Patient Safety Organization (PSO)					
24 ⚠	ECRI and the ISMP PSO analyzed 100 harmful adverse glycemic events that led to or occurred during emergencies. Key contributing factors included the failure to initiate or lack of glycemic management protocols, look-alike insulin names or labels, knowledge deficits, insulin administration before delayed meals, omission or delays in monitoring glycemic levels, untimely medication reconciliation, lack of patient discharge education, and drug shortages of rescue medications.	Develop protocols for hypoglycemia and hyperglycemia, ensure availability of and orders for rescue agents, implement strategies to avoid insulin mix-ups, and dispense hyperkalemia kits. Providers should perform prompt medication reconciliation, monitor glycemic levels, and initiate protocols for blood glucose levels outside of a specific range or symptoms. Insulin and meals should be coordinated, barcode scanning should be employed, and patients should receive discharge education.			
Dosing error with isavuconazonium sulfate (CRESEMBA)					
23	A physician ordered "isavuconazole 200 mg PO every 8 hours for 6 doses as a loading dose, then continue at 200 mg PO daily." Isavuconazonium sulfate 186 mg capsules were selected (since it was the closest dose to 200 mg), even though this product contains only 100 mg of isavuconazole.	Cresemba is available as a capsule and also as a lyophilized powder for reconstitution. Add a note in the electronic health record for both formulations that states, "isavuconazonium sulfate 186 mg = isavuconazole 100 mg" (capsule) or "isavuconazonium sulfate 372 mg = isavuconazole 200 mg" (injection).			

Issue No.	Problem	Recommendations	Organization Assessment	Action Required/Assignment	Date Completed
ONPATTRO (patisiran, lipid complex injection) requires a 0.45 micron filter for preparation					
25	When compounding Onpattro, a 0.45 micron filter is required but not supplied in the packaging. This filter may not be stocked by hospitals, which has resulted in not using the correct filter. In one instance, a 5 micron filter was used. In another case, it was incorrectly assumed that the 0.45 micron filter was required during administration.	Update compounding instructions to clearly indicate that filtration with a 0.45 micron filter is necessary to prepare Onpattro. Also, consider putting the filter and the drug together as a kit for use during compounding when needed.			
Photoprotection of parenteral nutrition (PN) in neonates					
23 ⚠	Some scientific literature has been published on the formation of peroxides and other degradation byproducts when PN admixtures and lipid injectable emulsions (ILEs) are exposed to light, as well as reports of adverse clinical outcomes in premature infants subjected to light-exposed PN.	Review the American Society for Parenteral and Enteral Nutrition (ASPEN) recommendations for photoprotection of PN admixtures and ILEs for premature infants (www.ismp.org/ext/809), and the safe use of ILEs in adult (www.ismp.org/ext/807) and pediatric (www.ismp.org/ext/808) patients.			
TRULICITY (dulaglutide) pen should never be primed					
20	Some nurses have been priming Trulicity pens, as they do for **VICTOZA** (liraglutide), **OZEMPIC** (semaglutide), and **BYETTA** (exenatide), which require the attachment of a disposable needle and priming. But Trulicity pens are more like autoinjectors and have an attached needle. Priming the pen empties its contents and wastes the drug.	Consider copying and including the manufacturer's information leaflet when dispensing Trulicity since nurses may not be familiar with this pen. Color copying is preferred since the instructions use color to make them easier to understand. Alerts in the medication administration record that state, "Do **NOT** Prime the Trulicity Pen," are also recommended.			
US Food and Drug Administration (FDA) warns about possible overdose with ENFit low dose tip (LDT) syringes					
21	FDA issued a warning (www.ismp.org/ext/798) about the potential for overdoses when using ENFit LDT syringes (0.5 to 0.6 mL). Liquid medications can collect in the moat area when the syringe is dipped into liquid medication without using an ENFit cap or medication straw.	Use a syringe filling adapter (straw, ENFit cap) when preparing ENFit LDT syringes. If fluid or air bubbles enter the moat area, tap or flick the syringe tip to eliminate them. ISMP and FDA continue to recommend the use of enteral devices and syringes, including ENFit LDT syringes, to reduce the risk of misconnections.			