November 15, 2018 ■ Volume 23 Issue 23

ISMP

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

Part II: Survey results suggest action is needed to improve safety with adult IV push medications

Problem: In our November 1, 2018 newsletter (www.ismp.org/node/1208), we shared the findings from a recent 2018 ISMP survey of 977 practitioners (mostly nurses) on adult intravenous (IV) push medication practices and compared these results to related ISMP surveys conducted between 2010 and 2014. The 2018 survey revealed five unsafe practices associated with IV push medications that have persisted or worsened in the past decade:

1. Using prefilled syringes or cartridges as vials (withdrawing some or all medication from the prefilled syringe or cartridge into another syringe for administration)
2. Diluting adult IV push medications unnecessarily despite their availability in a ready-to-administer form (e.g., manufacturer or pharmacy-prepared syringes, single-dose vials)
3. Diluting or reconstituting an IV push medication in a prefilled 0.9% sodium chloride (saline) flush syringe that is rarely relabeled (see "**Is it really saline?**" to the right)
4. Failing to properly label syringes of IV push medications prepared away from the patient's bedside
5. Clinicians preparing or manipulating IV push medications on patient care units instead of pharmacy dispensing ready-to-administer syringes of medications

The survey also identified conditions that foster and perpetuate these five unsafe practices, including:

- Ongoing drug shortages, which have led to:
  - A declining number of adult IV push medications dispensed in ready-to-administer syringes
  - An increase in IV push medications being dispensed in unfamiliar formulations (concentrations and packages) and volumes greater than needed
  - Administering medications by the IV push route that were previously administered by infusion (which may continue after resolution of the drug shortage)
  - Unsafe drug conservation practices (e.g., using partial doses from prefilled syringes, cartridges, or single-dose vials and saving the remainder for future use)
- Mistaken beliefs associated with IV push drug administration:
  - A 10 mL syringe must be used to administer IV push medications via an implanted port or peripherally inserted central catheter (PICC)
  - Syringe labeling is not necessary if only one drug or one syringe is prepared, or if syringes can otherwise be distinguished by visual appearance or location
- System vulnerabilities:
  - Lack of syringe (cartridge) holders to administer IV push medications in manufacturers' prefilled syringes/cartridges
  - Use of prefilled syringes without a needleless connector or removable needle to attach to an IV access port
  - Variability in procedures used to administer IV push medications to ensure slow administration, avoidance of patient discomfort, and a reduction in the risk of extravasation

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Is it really saline?

Eighty-one percent of respondents (mostly nurses) to our 2018 survey reported that they have used a prefilled 0.9% sodium chloride (saline) flush syringe to reconstitute or dilute an IV push medication, particularly the 5 mL or 10 mL flush syringes. This unsafe practice has increased since our 2014 survey, at which time 54% of practitioners said they had diluted medications using a saline flush syringe. When participants in our 2018 survey were asked to describe the process, three methods were reported, resulting most often in a saline flush syringe that also contains a medication (**Table 1**). Most respondents who described the process did not mention relabeling the flush syringe. Herein lies the problem: the syringe is labeled "0.9% saline flush" but contains an additional medication.

If the syringe leaves the preparer's hands before being administered, it might be used by another practitioner as a saline flush. The result could be lethal if the syringe contains a high-alert medication such as an opioid, which about three-quarters of respondents admitted to diluting even when the medication was provided in manufacturer or pharmacy-prepared syringes.

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Table 1. Diluting medications using a saline flush syringe (descending order of frequency)

Description of Process
Waste an appropriate amount of saline from the prefilled saline syringe, draw the proper amount of medication from a syringe (cartridge) or vial directly into the prefilled saline syringe, mix, and administer
Draw the dose of medication into a syringe, waste an appropriate amount of saline from the prefilled saline syringe, add the medication to the saline syringe, mix, and administer (mostly used for low volume doses to aid in measurement)
Draw the appropriate dose of medication into a syringe, add to that syringe the appropriate amount of saline diluent from the prefilled saline syringe, mix, and administer

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- ☐ Recommendations for unnecessary dilution in drug references
- ☐ Lack of available labels for self-prepared syringes
- ☐ Organizational policies that do not require labeling of self-prepared syringes
- ☐ Perpetuation of unsafe IV push medication practices during professional education, orientation, and on-the-job training (e.g., unnecessary dilution)

In **Part II**, we offer recommendations for the safe preparation and administration of adult IV push medications based on the survey results. We are also providing practitioners with access to a new gap analysis tool that can be used to evaluate an organization's adherence to the ISMP ***Guidelines for Safe Practice of Adult IV Push Medications***[1] (see boxed information below).

SAFE PRACTICE RECOMMENDATIONS: ISMP recommends the following actions to reduce the risk of medication errors or other adverse patient outcomes associated with adult IV push medication administration.

Assessing Unsafe Practices

Conduct a gap analysis. ISMP strongly encourages all organizations to conduct an assessment of adult IV push medication practices using our recently launched ***ISMP Gap Analysis Tool (GAT) for Safe IV Push Medication Practices*** (see boxed information below). The GAT will help facilities identify and address the five unsafe behaviors identified in the recent ISMP survey as well as conduct a broader analysis of compliance with all the evidence- and expert consensus-based best practices found in the ISMP ***Guidelines for Safe Practice of Adult IV Push Medications***.[1] The GAT will also help facilities identify opportunities for improvement and track their progress over time. The tool is available for **FREE** thanks to support from the Baxter Healthcare Corporation.

Dispensing Ready-to-Administer Prefilled Syringes

Dispense prefilled syringes. When possible, dispense IV push medications in ready-to-administer prefilled syringes in the correct concentration and volumes needed for common or patient-specific doses. If prefilled syringes are not available commercially, pharmacy should prepare and dispense syringes of medications in patient-specific doses. If stability conditions do not allow for such preparation, commercially available single-dose vials should be dispensed. All prefilled parenteral syringes should allow administration via a needleless system (e.g., have a luer connector or removable needle). To facilitate use of manufacturer's prefilled cartridge syringes, be sure designated syringe (cartridge) holders are readily available and practitioners know how to access and use them.

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Find and minimize your IV push safety gaps with NEW ISMP tool

ISMP has launched a new tool to help healthcare facilities identify and manage targeted risks associated with the use of IV push medications in adults. The ***ISMP Gap Analysis Tool (GAT) for Safe IV Push Medication Practices*** is designed to assist practitioners in evaluating their practices, pinpointing specific challenges and potential areas for improvement, and tracking progress over time. The GAT is based on ISMP's IV push medication guidelines and consists of 50 items. The tool is being made available at no charge, thanks to support from Baxter Healthcare Corporation. Healthcare facilities that submit their findings to ISMP anonymously via a secure internet portal by **March 31, 2019**, will receive a gap analysis score and will have access to aggregate data after the submission period. The aggregate data can be used to compare a facility's experiences to that of demographically similar healthcare facilities. Participation can also help facilities assess their compliance with local policies and procedures for management of IV push medications, as well as requirements from regulatory or accrediting agencies such as the Centers for Medicare & Medicaid Services (CMS). For more information, or to access the GAT, visit: www.ismp.org/node/1188.

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Some saline flush manufacturers have widened the gradations on flush syringes to a full mL to discourage dilution since more precise gradations are needed to measure medications accurately. Others have added "For Flush Only" to the label to remind practitioners of their intended use. However, this unsafe behavior has persisted.

Please educate staff about the serious risks associated with this practice and that dilution of medications provided in a ready-to-administer form is unnecessary.

SAFETY briefs

HIGH-ALERT

Opioid legislation has new packaging provisions. Under provisions of the opioid legislation signed last month by President Trump (www.ismp.org/ext/128) as part of a risk evaluation and mitigation strategy (REMS), the US Food and Drug Administration (FDA) will be able to require manufacturers to package oral opioids for certain patients in unit-dose or blister packaging. This will facilitate opioid prescriptions for shorter durations and in smaller quantities.

An article in our April 7, 2016, newsletter (www.ismp.org/node/1183), reviewed how blister packages (referred to as patient packs) may also deter opioid diversion. Consumers often report to ISMP that pharmacies dispensed fewer opioid tablets or capsules than prescribed (e.g., oxy**CODONE**, **HYDRO**codone and acetaminophen). But it's impossible to know if the shortage originated after it left the pharmacy, or in the pharmacy—and if it occurred in the pharmacy, whether it was accidental. If patient packs were used, the number of tablets supplied would be fixed, the count disputes would be eliminated, and the opioids may be harder to divert. Pharmacists could dispense a sealed carton from the manufacturer containing the blister pack, and both patients and pharmacists would be able to readily identify the quantity of pills being dispensed by opening the carton at the point-of-sale. The patient could even be asked to sign for, and agree to, the quantity at the point-of-sale. Such packaging would also help consumers in detecting diversion in the home because the blisters could be numbered and the quantity remaining would be readily identifiable.

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Establishing Practices Around Dilution

Seek alternatives when possible. For medications where dilution may be needed for patient comfort or to reduce the risk of extravasation or injury during IV push administration, have the pharmacy determine if alternatives exist that do not need to be diluted, or if the medication can be administered via a syringe pump or small volume IV infusion.

Be clear about dilution. Establish a facility-specific policy regarding which, if any, adult IV push medications should be diluted prior to administration, where the medication should be diluted (pharmacy, if possible), and guidelines for how the medication should be diluted and administered. Communicate the policy and guidelines to appropriate practitioners.

Pharmacy dilution. When possible, require pharmacy to prepare all IV push medications that must be diluted according to the manufacturer's guidelines or facility's policy. The syringe of diluted medication should be labeled for each patient with the patient's name, drug name, strength, dose, directions for administration (e.g., slow IV push over 3 to 5 minutes), and the beyond-use date/time.

Nurse/frontline practitioner dilution. If stability requires a medication to be diluted immediately prior to IV push administration, provide the medication in a single-dose vial (not a prefilled syringe) along with specific directions for dilution via written or electronic guidelines or checklists that provide the appropriate diluent, standard diluent volumes, and resulting concentrations (e.g., mg/total volume). Also provide dilution instructions on the medication administration record (MAR) or another document that is readily accessible prior to drug administration. Be sure directions for withdrawing the patient's dose are included, as well as proper labeling of the drug's concentration after dilution. Encourage nurses/frontline practitioners to always reference the facility's policy and guidelines when diluting medications, and to call the pharmacy with questions (as commercial drug references may provide less specific or different recommendations compared to the facility's policy and guidelines).

Do not dilute in flush syringes. Eliminate the use of saline flush syringes for diluting and administering medications. These syringes are considered medical devices, not medications, and have not been evaluated or approved for the dilution and administration of IV push medications (see "**Is it really saline?**" on page 1, right column).

Coaching and Educating Practitioners

Dispel myths. Conduct educational programs to dispel myths that lead to unsafe practices associated with IV push medication administration. For example, an update may be in order based on the Infusion Nurses Society (INS) guidelines that note it is safe to use a syringe that is *appropriately sized* (e.g., 3 mL) for the administration of IV push medications via an implanted port or PICC once patency has been confirmed using a 10 mL (or 10 mL diameter-sized) syringe to flush the line.[2] Also, dispel any misunderstandings regarding the benefits and risks of diluting all adult IV push medications prior to administration in the absence of manufacturers' recommendations (which may differ from some drug reference recommendations).

Coach practitioners to see the risk. Hold discussions with practitioners and present educational programs to help them clearly see the risks associated with these five unsafe practices. In particular, emphasize the unacceptable risks associated with: withdrawing a medication from a prefilled syringe and transferring it into another syringe; diluting medications dispensed in a ready-to-administer form, particularly opioids, anxiolytics/antipsychotics, and antiemetics; using a prefilled saline flush syringe to dilute or reconstitute a medication (see "**Is it really saline?**" on page 1, right column); and failing to label a syringe prepared away from the patient's bedside, even

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One packaging company has already introduced a blister pack that pharmaceutical manufacturers could use (www.ismp.org/ext/108) for this purpose. The packaging is said to be child-resistant and has a senior-friendly locking mechanism. It also provides numerical identification of each blister. Such packaging can also help people spot a dispensing error, as each blister pack or the individual unit-dose pack would have the drug name and strength printed on it. The new packaging is an important measure in combating the opioid crisis, and we hope that other companies will follow with offering this type of packaging.

HIGH-ALERT

Filtering EPINEPHrine withdrawn from glass ampuls? The ISMP *Guidelines for Safe Practice of Adult IV Push Medications* recommend using a filter needle when drawing medications from glass ampuls. While some glass fragments may enter the solution when the ampul neck is snapped, there is little evidence of patient harm from glass ampul particles (www.ismp.org/ext/129). Nevertheless, the use of a filter needle was supported by a consensus of summit participants during development of the ISMP Guidelines (www.ismp.org/ext/130) after consideration of its potential impact on safety and its ability to be implemented in most organizations.

At least one manufacturer, Belcher, sells **EPINEPH**rine in a glass ampul. But are filters needed when **EPINEPH**rine doses for a severe allergic reaction or anaphylaxis are withdrawn from ampuls and administered subcutaneously or intramuscularly (IM)? We were asked this recently and decided NOT to recommend using a filter needle for subcutaneous or IM **EPINEPH**rine injections. Our reasoning is that it adds another step in the dose preparation process during an emergency, even if anaphylaxis kits are supplied with a filter needle. Requiring the use of a filter needle will incorporate a multistep process of possibly removing a needle from a syringe, replacing it with a filter needle, preparing the dose, then removing the filter needle and reattaching a needle for injection. Without a kit, staff may have trouble locating a filter needle (or straw), and most clinics, doctor's offices, and community pharmacies (where vaccines are administered) may not have filter needles on hand, even if they stock **EPINEPH**rine in glass ampuls.

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if only one syringe or medication has been prepared, or if practitioners believe they can distinguish multiple syringes by visual appearance or location alone. When appropriate, recognize the role that drug shortages may play in these unsafe practices, and let practitioners know how the organization will manage the shortages in a way that reduces the need to engage in these practices.

Assess orientation content. Review orientation program content to ensure that new practitioners are not being taught unsafe adult IV push administration practices, such as unnecessary dilution or dilution using a flush syringe, and to ensure they are being taught the best practices found in the ISMP ***Guidelines for Safe Practice of Adult IV Push Medications***.[1] Consider creating an orientation checklist of competencies associated with IV push medication administration based on the ISMP Guidelines.

Safe Labeling of Self-Prepared Syringes

Make labeling an expectation. Establish policies and procedures that require practitioners to label all IV push medications prepared away from the bedside (or not administered immediately if prepared at the bedside), even if only one syringe or medication has been prepared. Provide practitioners with the required content for all medication labels and be sure this expectation is communicated to all practitioners.

Provide patient care units with labels. To facilitate proper labeling of self-prepared syringes, provide patient care units with blank, preprinted, peel-off, and/or automated labels (e.g., labels for patient-specific or unit-dose medications that are created or printed from automated devices such as an automated dispensing cabinet). Avoid using tape to create a label or taping a medication vial to the syringe as a method of labeling. Handwriting on the tape may not be legible, may smear, or the tape may fall off; and the syringe and vial may come apart during transport. Pursue more accurate and safe ways to label self-prepared syringes.

Other Recommendations

Reduce variability with IV push administration. Establish a clear procedure for administering IV push medications to ensure slow administration, avoidance of patient discomfort, and a reduction in the risk of extravasation. Be sure practitioners do not mistakenly believe that further dilution of ready-to-administer medications is the only way to achieve these goals.

List the rate of administration. For quick reference, include the rate of administering all IV push medications on the MAR.

References

1) ISMP. Guidelines for safe practice of adult IV push medications. 2015. www.ismp.org/node/97
2) Infusion Nurses Society. Infusion therapy standards of practice (standard 40, flushing and locking, practice criteria D3). *J Infus Nurs.* 2016;39(1S):S1-S159.

ISMP Medication *Safety Alert!* Acute Care (ISSN 1550-6312)

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Keep in mind, most doses of **EPINEPH**rine for treating anaphylaxis will be given subcutaneously, or preferably IM, with a subcutaneous or IM needle, not intravenously (IV), where glass particles are more likely to reach the systemic circulation. The risk of harm from injecting glass particles into subcutaneous tissue or muscle is less than the risk of delaying a life-saving dose. Another factor is that small bore 25- or 27-gauge needles are typically used to administer **EPINEPH**rine, which would likely prevent glass from being drawn into the syringe. A study showed that larger bore, unfiltered needles increase the risk of aspirating glass and other particles than smaller bore unfiltered or filtered needles (www.ismp.org/ext/131).

We recommend using **EPINEPH**rine autoinjectors to treat an allergic reaction or anaphylaxis (www.ismp.org/node/245) since it avoids the issue altogether. Another reason that we favor autoinjectors is that we have received occasional reports of **EPINEPH**rine overdoses in which clinicians have administered, sometimes by the IV route, the full 1 mg amount in an ampul rather than a 0.15 to 0.5 mg dose. There are now generic autoinjectors available, so the cost has decreased compared to previously.

Special Announcements

ISMP symposia at ASHP

Register (www.ismp.org/ashp-activities) and join us for the following ISMP symposia presented during the **2018 ASHP Midyear Meeting** in the Anaheim Convention Center (ACC North):

- **December 2** (9:00 a.m. – 10:00 a.m.): *Balancing Unpredictable Intravenous Medication Supply with the Demand for Safe Injection Practices*
- **December 3** (11:30 a.m. – 1:00 p.m.): *Hidden Perioperative Medication Safety Risks: A Time for Pharmacy Involvement*
- **December 4** (11:30 a.m. – 1:00 p.m.): *Transforming Smart Infusion Pump Safety: Are You Ready?*
- **December 5** (11:30 a.m. – 1:00 p.m.): *Addressing Risks Associated with IV Push Medication Use in Adults*

Six NEW High-Alert Medication Learning Guides for Consumers

Just a handful of drugs are considered high-alert medications. These medications have been proven to be safe and effective, but serious harm can occur if they are not taken exactly as directed. This means that it is vitally important for patients to understand how errors happen with these medications, and the steps that are necessary to keep them safe while taking these medications.

For some commonly prescribed and/or error-prone high-alert medications, ISMP has created **Consumer Medication Learning Guides**, including six NEW Learning Guides for:

- Eliquis (apixaban)
- Xarelto (rivaroxaban)
- Pradaxa (dabigatran)
- Oral methadone
- Oral methotrexate (to treat conditions other than cancer)
- Humulin R U-500 (concentrated regular insulin)

Each Learning Guide has been created at an appropriate health literacy and reading level for most consumers. The 2-page Learning Guides include ***10 Safety Tips*** specific to each medication, along with a table of ***Fast Facts*** about the medication. The Learning Guides are FREE and available for download. Practitioners can freely reproduce the Learning Guides, use them for reference during patient education, and distribute them directly to patients who are taking these medications.

The six NEW Consumer Learning Guides join existing Consumer Learning Guides* for:

- Warfarin
- Lovenox (enoxaparin)
- Fentanyl Patches
- Hydrocodone with acetaminophen
- Oxycodone with acetaminophen
- Humalog (insulin lispro)
- NovoLog (insulin aspart)
- Lantus (insulin glargine)
- Apidra (insulin glulisine)
- Levemir (insulin detemir)

**These Learning Guides are also available in Spanish.*

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To download the FREE **High-Alert Medication Learning Guides for Consumers**, visit our professional (www.ismp.org/node/1055) and consumer (www.ismp.org/ext/127) websites.