IV Push Medication Matters: New Survey Points to Slow Adoption of Best Practices

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CE Earn Up to 8.0 Hours. See page 225.

If it seems as though you are being asked to prepare and administer more IV push medications in your practice than in the past, you are probably correct in your observation. After an unrelenting stretch of natural disasters that affected drug manufacturing and major supply chains, most hospital pharmacies experienced daily drug shortages pertaining to even the most commonly used medications and fluid supplies. Although drug shortages technically have been occurring for the past decade, it is hard to find any practitioner in the United States this past year who has not directly felt the challenge of drug shortages on medication use routines.[1] Daily shortages involving large-volume IV infusion bags, premixed antibiotics for secondary administration, and even limited supplies of sterile water and 0.9% sodium chloride vials have resulted in at-risk behaviors and routine work-arounds, making IV push medication administration difficult and at times even error prone. Roughly one third of practitioners responding to a 2018 survey by the Institute for Safe Medication Practices (ISMP; $n = 977$) indicated that currently they are "administering more medications via the IV push route that were previously given as infusions, particularly antibiotics, antiemetics, and proton pump inhibitors."[2] In addition, 34% of respondents suggested that they are required to "prepare more medications at the bedside" and that "IV push drugs are being provided in unfamiliar formulations (concentrations and packages) or volumes greater than needed for an individual dose."[2] About one third of these practitioners also indicated that they no longer get prefilled syringes of common medications in needed concentrations or volumes.[2]

A recent informal poll of pharmacists in June 2018 at a Baxter promotional theatre at the American Society of Health-System Pharmacists' meeting revealed that at least 83% of organizations have responded to the drug shortage by moving away from dispensing ready-to-administer medications in commercially available or pharmacy-prepared piggybacks or minibags to supplying vials or ampules of the drug for bedside preparation, dilution, and administration by the IV push method. Sixty-four percent of the organizations who reported moving to an IV push method of drug administration also reported continuing this new practice, even after immediate drug shortages had resolved. This change is more than an added burden on the frontline practitioner. From a safety standpoint, any added manipulation of medications at the bedside, even by experienced practitioners, creates complexity, extra steps, and undue risk, which has been proven to contribute to preventable errors.[3,4]

From 2010 through 2014, ISMP conducted several surveys to better understand variations observed in IV push practices seen during onsite hospital visits and in the ISMP Medication Errors Reporting Program. These surveys revealed a number of clinical practice irregularities previously reported in *Journal of Emergency Nursing*,[5] including an increase in nurse preparation of parenteral medications on the clinical unit, practitioners using a medication cartridge as a vial to withdraw the medication into another syringe prior to administration, unnecessary dilution associated with medications that were dispensed in ready-to-administer forms, and the inappropriate use of prefilled 0.9% sodium chloride flush syringes to dilute IV push medications, resulting in mislabeled syringes.[6-8] To address these and other related safety concerns, and to set expectations for improved practice, ISMP held a national summit in 2014, which resulted in the 2015 publication

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*ISMP is the only 501c(3) nonprofit organization devoted entirely to preventing medication errors. ISMP is the premier international resource on safe medication practices in health care institutions, working closely with health care practitioners, consumers, regulatory agencies, and professional organizations in all aspects of medication error prevention. If you would like to report a medication error to ISMP's National Medication Error Reporting Program to help others, go to www.ismp.org/report-medication-error or call (800)FAIL-SAF(e). ISMP is a federally-recognized Patient Safety Organization.

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TABLE 1
Reasons why nurses withdraw medications from prefilled, ready-to-use cartridges or syringes

1. Desire or need to dilute medication before injection
2. Unavailable syringe/cartridge holders
3. "This is how I was taught"
4. Too hard to read the dose increments on cartridge syringe
5. To prevent infection transmission with reuse of unclean syringe holders
6. Cartridge sometimes slips, making administration difficult
7. Rubber plunger pulls out of the cartridge too easily
8. Incompatibility of holder with some needleless IV connectors
9. Risk of breaking the glass cartridges

Data from reference 8.

of the *ISMP Safe Practice Guidelines for Adult IV Push Medications* (https://www.ismp.org/guidelines/iv-push).[9]

Now, 3 years later, a repeat survey about IV push medication use has been performed with responses from 977 nurses (97%) and anesthesia providers (3%).[2] A large majority of survey respondents work in inpatient areas (94%), with 12% of respondents reporting that they work in emergency departments. Although the 2018 survey demonstrates small reductions in the frequency of some of the earlier unsafe practices, an unexpected number of practitioners still report using prefilled syringes or cartridges as vials, diluting IV push medications despite their availability in a ready-to-administer form, unsafe labeling practices, and preparing IV push medications at the bedside instead of having them prepared by the pharmacy. Some of these risky practices appear to be associated with ongoing drug shortages but also can be attributed to latent system vulnerabilities that have not been fully addressed, limited expectation development and implementation, and orientation/teaching strategies that perpetuate these practices.[2] ED leaders concerned with patient safety and infection control issues should take note of these disturbing survey results.

In opposition to ISMP's IV push medication use best practice No. 3.5 (available at www.ismp.org/sites/default/files/attachments/2017-11/ISMP97-Guidelines-071415-3.%20FINAL.pdf) and standards of the Infusion Nurses Society, Association of Professionals in Infection Control, and other professional organizations,[10,11] two thirds (66%) of respondents in the current survey reported withdrawing medications from a ready-to-use, prefilled syringe (or cartridge) and transferring the contents into another syringe to administer an IV push medication dose. Up to 16% of providers in the survey reported performing this drug transfer more than half of the time when using a prefilled syringe.[2] Table 1 lists the most common reasons given for withdrawing medication from a prefilled syringe, with dilution being the most prevelant.[7] Based on current survey comments, reasons given for withdrawing medications from prefilled syringes include the administration of partial doses from a single dose syringe or cartridge to promote drug conservation or the erroneous belief that a 10-mL–sized syringe must be used to *administer* medications via an implanted port or peripherally inserted central catheter. (According to the Infusion Nurses Society, clinicians should use an appropriately sized syringe for medication administration once patency has been confirmed using a syringe that is 10 mL in diameter.[10])

Overall, 84% of participants in the 2018 ISMP survey reported that they further dilute certain adult IV push medications prior to administration.[2] These findings are similar to ISMP's 2014 survey in which 83% of respondents further diluted certain IV push medications (see Table 2). Although in opposition to ISMP's IV push best practice guidelines, 81% of participants reported using a commercially available 0.9% sodium chloride syringe to dilute medications. Approximately 56% use a flush syringe to dilute medications at least half of the time, and 19% said they *always* do. While certainly convenient, practitioners may not be aware that commercially available prefilled 0.9% sodium chloride flush syringes are approved as *devices* by the Food and Drug Administration and are not approved for the preparation (reconstitution or dilution) or administration of medications.[9] The contents of the syringe are only sterile when used as designed, with a forward fluid path. The frequency of this unsafe practice has increased since the 2014 survey, at which time 54% of practitioners said they had diluted medications using a saline flush syringe.[7]

Practitioners reported that the decision to further dilute adult IV push medications was most often associated with the desire to administer the drug slowly (94%), avoid patient discomfort (70%), reduce extravasation (33%), and measure small-volume doses accurately (25%). Other reasons stated for dilution included drug-specific requirements (eg, the need to dilute LORazepam), facility policies, recommendations found in drug references, and prior education from a preceptor or peer.[2,8] It is important to note that most participants in the recent survey reported they do not receive IV push medications in ready-to-administer syringes and must prepare these medications prior to administration, which has only become more common during the ongoing drug shortage crisis. Although drug shortages have challenged the ability to obtain ready-to-use medications, it

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TABLE 2
Reasons given for further dilution of ready-to-use medications

Reason	% of participants
Desire to administer the drug slowly	94
To avoid patient discomfort	70
To reduce the risk of extravasation	33
Need to measure small-volume doses accurately	25
Other (drug-specific requirements, facility policies, prior education)	13

Data from reference 2.

is concerning that some pharmacy departments have responded by shifting nonemergent IV push medication preparation to the nurse, outside of proper engineering controls. Also of concern with this clinical practice is that many participants from the survey do not relabel the 0.9% sodium chloride flush syringe when using it to dilute medications, making it indistinguishable from a flush syringe of pure saline solution.

One of the most concerning findings in this survey is that *only* 50% of participants reported that they *always* label IV push medications that are self-prepared away from the patient's bedside. More than a quarter (28%) of participants said they *rarely* or *never* label practitioner-prepared syringes. Participants who said they did not *always* label syringes prepared away from the patient's bedside believe that labeling is not necessary if they prepare just one medication (51%) or one syringe (45%) at a time.[2] Surprisingly, and in opposition to national standards and other professional practice guidance for safe practice, respondents also said they did not need to label syringes because they could "distinguish between multiple syringes without a label" by visualizing the different volume in each syringe (76%); noting the size of the syringes (40%), differences in needles, caps, or medication colors (36%), or how they were transported, such as their orientation on a tray or sterile field (16%); or by carrying syringes in different hands (12%) or pockets (12%).[2] In this author's view, these findings are concerning given the national attention to proper syringe labeling during the past decade. Poor labeling practices are visible if observation methods are used by nurse leaders. Now is the time to address at-risk behaviors and coach practitioners who may not appreciate the risk, and not after a serious syringe swap event occurs as a result of poor labeling habits.

Although research on IV push practices is relatively limited, some studies suggest that the most common medication error with IV push use is administration of the drug too quickly.[12,13] In the 2018 ISMP survey, 63% of participants indicated that the rate of administration of an IV push medication is provided on the patient's medication administration record or electronic health record. Many participants indicated that they need to look up the rate of administration in drug references (41%) or in facility-specific guidelines (40%) or remember the rate from previous administrations (41%). Surprisingly, 18% of participants reported that they administer all IV push medications the same way over 2 to 5 minutes (regardless of dose or volume), so they "do not need to investigate or know" the specific rate of administration for each drug.[2]

These survey findings offer only a small glimpse into current IV push medication practices but clearly indicate that there are challenges ahead for the full adoption of safer IV push medication practices. Although the IV push guidelines and other professional and accreditation standards are freely available, some organizations are not aware or have yet to appreciate the risks associated with variable medication administration behaviors. Subtle variations in individual practices often are not recognized until after an event occurs. Many organizations have not developed standard expectations or competency assessments for IV push medication management, which are a necessary baseline in any emergency department given the frequency of IV push medication use.[14]

Because assessment is the first step in understanding and creating a baseline of expectations for improving any practice issue, organizations (and emergency departments) interested in learning about current IV push practices in their own facilities are invited to use a free gap analysis tool available on ISMP's Web site: https://www.ismp.org/resources/gap-analysis-tool-safe-iv-push-medication-practices. This new 50-item tool is based on the current ISMP IV push guidelines. Participation is designed to:

- Heighten health care practitioners' awareness of safe medication systems and practices associated with IV push medication use in adult patients
- Assist health care practitioners with identifying and prioritizing opportunities for reducing patient harm when preparing, dispensing, and administering IV push medications in adults
- Create a baseline of national efforts to enhance safety when acquiring, preparing, dispensing, and administering IV push medications in adults

Organizations interested in obtaining a score for their responses can do so by submitting their findings to a

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secure ISMP site before March 31, 2019. After completion of the data collection period and time for data analysis, an aggregate national description of current practices will be made available to participating facilities to make comparisons of results to like facilities. The gap analysis tool is designed to be completed by an interdisciplinary team of professionals representing all of those involved in some aspect of IV push medication use. ED practitioners, based on their extensive experience with IV push medication use in adults, should be key participants in this assessment.

It is unlikely that drug shortages will be resolving any time soon. Strained drug distribution and product availability has had a direct impact on decisions made by hospital pharmacies and frontline providers when preparing and administering IV push medications. Many of these decisions, however, have been left to individual providers, are risk prone, and are not based on best practice guidance. Do not assume that these survey results, surprising as they are, are not reflective of practices occurring in your own organization. Gather a team, participate in this national practice assessment, and find out what is really occurring with IV push drug use. Together we can begin to meet the challenges of Safe Practice, Safe Care.

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