Preparing IV Medications Outside the Pharmacy

The Institute for Safe Medication Practices (ISMP) recently conducted a survey to assess the frequency of preparing and mixing medications and/or infusions outside the pharmacy; implementation of safe preparation and admixing practices; training on these practices; and the safety and errors associated with these practices. The majority of respondents were nurses (77%) working in acute care or specialty hospitals (81%).

The types of sterile injectables that were most frequently prepared outside the pharmacy included:

- Intravenous (IV) push medications, typically those that require transfer from vial to syringe (i.e. opioids, antiemetics, antibiotics, proton pump inhibitors)
- IV intermittent infusions such as mini-bag diluent containers with integral vial adaptors
- Intramuscular (IM) injections such as vaccines, antipsychotics and antibiotics

Here is a summary of the best practice and training survey findings.

Best Practice	Survey Result
Practitioners prepare or admix one sterile, injectable medication and/or infusion at a time.	84% Agree or strongly agree
My facility has a standard process for labeling sterile, injectable medications and/or infusions prepared or admixed outside the pharmacy.	78% Agree or strongly agree
The labeling process is followed.	66% Agree or strongly agree 27% Neither agree nor disagree
My facility has standard procedures for preparation and admixture of sterile, injectable medications and/or infusions prepared outside the pharmacy.	65% Agree or strongly agree 18% Neither agree nor disagree
The admixing procedures are followed.	71% Agree or strongly agree 27% Neither Agree nor Disagree
I have been formally trained to prepare and admix sterile, injectable medications and/or infusions outside the pharmacy, and my competency is assessed/verified annually.	34% Agree or strongly agree 17% Neither agree nor disagree 49% Disagree or strongly disagree
My facility requires practitioners who prepare and admix sterile, injectable medications and/or infusions outside the pharmacy to undergo formal training and an annual competency assessment and verification.	30% Agree or strongly agree 17% Neither agree nor disagree 53% Disagree or strongly disagree

Additional results:

- Most respondents reported preparing medications in a dedicated location such as a medication room (71%), separate area designated for mixing sterile ingredients (25%), anesthesia workstation (18%), or laminar airflow hood outside the pharmacy (4%).
    - Other locations where medications are prepared include at the bedside (37%), on a counter or desk in the nursing station (28%), and on a computer workstation (16%).
    - Eight percent of respondents reported preparing medications in the operating/procedure room, patient's home, ambulance or other.

Reference

1. Institute for Safe Medication Practices. (2020). *Nurse Advise-ERR.* Retrieved from Institute for Safe Medication Practices: https://www.ismp.org/nursing/medication-safety-alert-november-2020

- 35% of respondents are required to have another clinician perform an independent double check
    - Of these, 30% reported that all high-alert mediations require an independent double check
    - 44% indicated that only certain high-alert medications (i.e. vasoactive drugs, oxytocin, insulin, opioids, thrombolytics) require an independent double check

Preparation Errors
About 30% of respondents personally experienced errors when preparing or admixing sterile, injectable medications and/or infusions. These errors include:

- Use of an expired drug (or not administering the medication/infusion immediately after preparation (90%)
- Use of the wrong drug, dose, concentration, diluent, or diluent volume (82%)
- No label or labeling error (81%)
- Wrong preparation technique (i.e. wrong use of multiple-dose vials, not using a filter needle) (80%)

There were many challenges related to the preparation and admixture of sterile injectable mediations including:

- Rushing, particularly during emergencies
- Interruptions and distractions
- Lack of accuracy – incorrect drug, concentration, dose, diluent or diluent volume, incompatibilities
- Lack of sterility of the preparation area, preparation process, end product
- Unsafe practice habits – not following procedures, using normal saline flush syringes to dilute/reconstitute IV push medications
- Lack of training and experience, no formal competency verification, unfamiliar with standard processes
- Lack of proper and complete labeling; no access to labels
- Lack of standard preparation/admixture processes
- Independent double check failures due to low staffing, emergencies, lack of procedures
- Lack of space, poor lighting, noisy environment
- Lack of pharmacy staffing
- Lack of needed medications, diluents, needles, filter needles, transfer devices

It is important for healthcare leaders to be aware of the challenges that surround medication preparation outside of the pharmacy setting. They should work to address these issues, particularly training and annual competency verification.

Reference

1. Institute for Safe Medication Practices. (2020). *Nurse Advise-ERR.* Retrieved from Institute for Safe Medication Practices: https://www.ismp.org/nursing/medication-safety-alert-november-2020