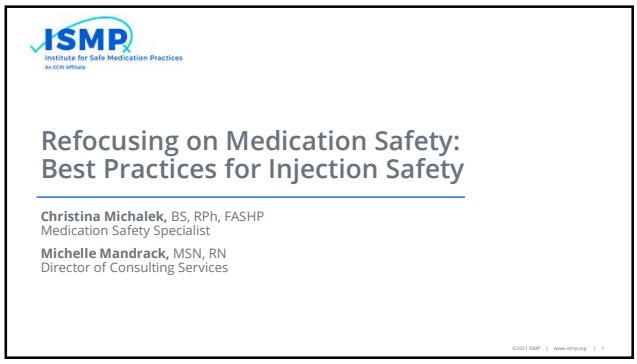
Refocusing on Medication Safety: Best Practices for Injection Safety



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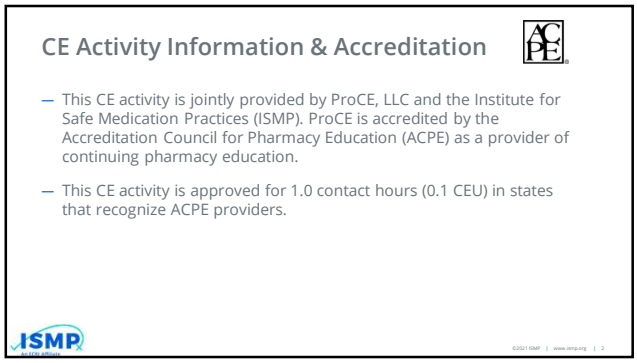

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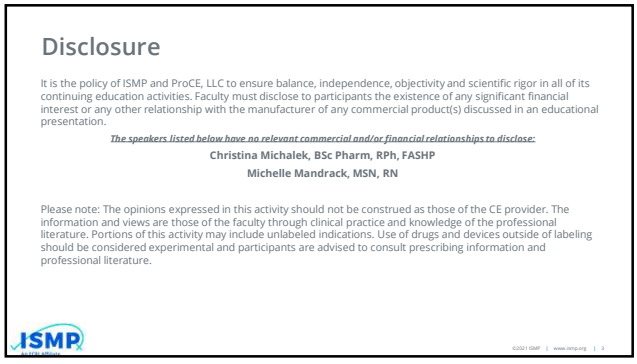

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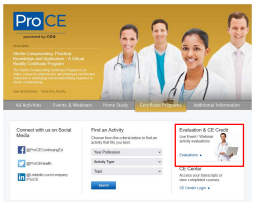
Refocusing on Medication Safety: Best Practices for Injection Safety

Online Evaluation and Statement of Completion

- www.ProCE.com
- Login with username and password
- Deadline: **January 14, 2022**



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Learning Objectives

Following completion of this activity, participants will be able to:

1. Identify how stressors, such as the COVID-19 pandemic, challenge medication safety efforts.
2. Considering pandemic-related disruptions, list strategies to prevent medication errors, including the use of ready-to-administer preparations.
3. Describe three best practices for the use of IV push medications.
4. Explain how best practices for IV push medications can provide additional workflow benefits.

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Bringing Medication Safety Back into Focus

Christina Michalek, BS, RPh, FASHP
Medication Safety Specialist
Institute for Safe Medication Practices
cmichalek@ismp.org

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Refocusing on Medication Safety: Best Practices for Injection Safety

Early Stages

- Characterized by a lot of questions and a lot of practitioner-to-practitioner sharing
- Medication workflow related issues included limiting exposure and transmission
  - Cleaning
  - Automated dispensing cabinet refilling changes
  - Medication delivery changes
  - Pause in elective care; move toward telehealth care
- Extremes in drug shortages
- Conserving resources
- Changing responsibilities

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Settling In

- Event questions and tags
  - *Is this event related to COVID-19?*
- Elimination or modification of workflow steps
  - Don and doff of personal protective equipment
- The "new normal"
  - What we stopped doing
  - What we gave up doing
  - What we continued to do
  - Where we still had risk

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Present Challenges

- Vaccination – Positivity Rates – Surges
- The burden of COVID-19 on healthcare providers
- New job responsibilities
- Supporting healthcare practitioners

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Present Challenges

- Supply chain challenges
- Drug shortages
- Pandemic job losses
  - Existing staffing shortages worsened by the pandemic
  - Recent poll indicates job changes (resigned 18%; 12-19% consider leaving)
- Prioritizing safety

Morning Consult National Tracking Poll 210915; Sept 2-8, 2021, morningconsult.com

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Pharmacy Specific Challenges

- "10 hospitals seeking pharmacy leaders" *Becker's Hospital Review*
- "More than 23,000 pharmacy jobs posted in October" *JobRx*
  - ***Health-systems (50%)***
  - ***Pharmacy technician (52%)***
- Vaccine expansion; monoclonal antibodies
- Drug shortages; shifting priorities
- Staff shortages *outside* the pharmacy department

https://www.beckershospitalreview.com/pharmacy.html

Pharmacy Jobs Report (PJR) Executive Summary: https://jobrx.com/pharmacy-jobs-report-executive-summary

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Refocusing on safety: Risks with preparation of IV push medications

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Intravenous Injections

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Compounding Outside the Pharmacy

- 444 practitioners
- 77% nurses
  - Including advanced practice nurses
- 8% anesthesia providers
  - Certified Registered Nurse Anesthetists
  - Anesthesiologists
- 15% decentralized pharmacy staff, physicians, and supervisors
- 81% acute care or specialty hospital
  - 5% ambulatory surgery center
  - 3% ambulatory infusion center
  - 3% physician practice setting or clinic
  - 1% long term care

https://www.ismp.org/acute-care/medication-safety-alert-november-5-2020

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Compounding Outside the Pharmacy

Most frequently prepared sterile injectables

- Intravenous push medications
  - Mostly medications transferred from vials to syringes (e.g., opioids, antiemetics, antibiotics, proton pump inhibitors)
- Intermittent infusions
  - Mostly using vial and bag adapter systems
- Intramuscular injections
  - Mostly vaccines, antipsychotic and, antibiotics

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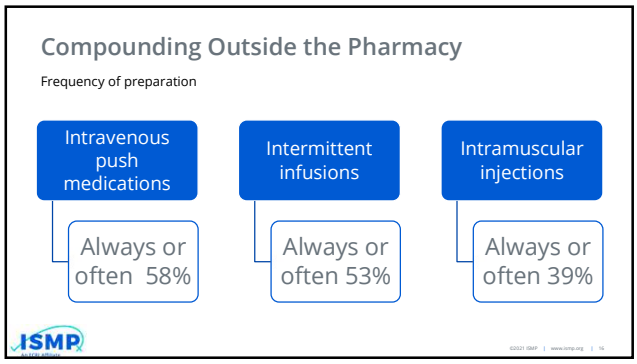

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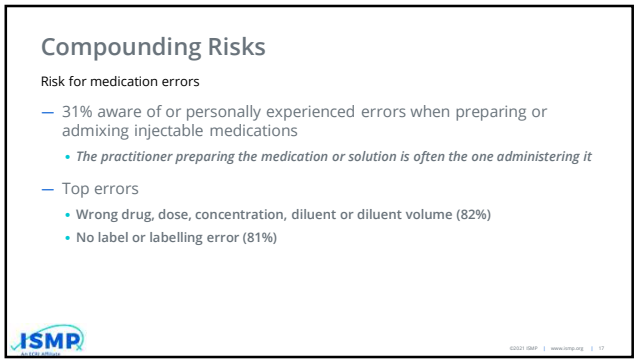

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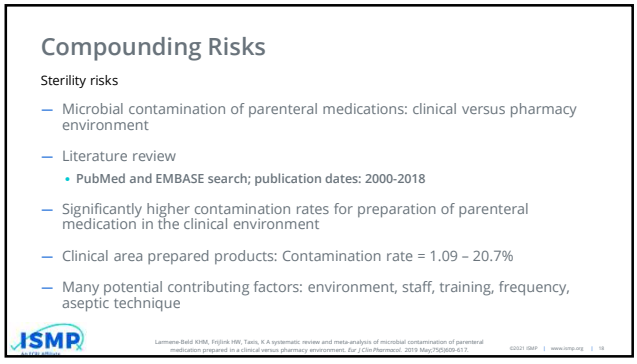

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Additional Risks

Workflow time study: Wasting IV push opioids

- Primary objective: quantify the waste associated with administering select opioids IV push
- Waste included the amount of drug wasted and the time associated with the process
- Workflow time study design, a sub-set of continuous direct observation time motion studies was employed in inpatient care areas at two sites
- 669 distinct waste observations; combined loss of $1605.39; workforce time waste $489.51
  - **Secondary measures: 86 observations included interruptions; average time removal to disposal 2 hours**

Hertig J, et al. A continuous observation workflow time study to assess intravenous push waste. *Hosp Pharm* 2020;56(5):584-591.

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Pharmacy's Role

How can pharmacy minimize these risks?

- Work towards eliminating compounding outside the pharmacy
  - ***How?***
  - **Need to understand the what and why**

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Pharmacy's Role

Pharmacy compounding can also be associated with risk

- 634 pharmacy practitioners
  - **80% pharmacists**
  - **18% technicians**
  - **2% student, resident, safety officer**
- 87% hospital pharmacy environment
- 57% using some form of technology

https://www.ismp.org/acute-care/medication-safety-alert-october-22-2020

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Compounding Risks

- Observational studies of manual compounding processes identified a mean daily error rate of 9%
- Automation identified 7.1% error rate
- When compared to manual processes, technology-assisted compounding provided a safety benefit detecting 14 times more errors

Flynn BA, Pearson RE, Barker KN. Observational study of accuracy in compounding i.v. admixtures at five hospitals. Am J Health Syst Pharm 1997;54:904-12
Reece KM, Lozano MA, Roux R, Spivey SM. Implementation and evaluation of a gravimetric i.v., workflow system in an oncology ambulatory care pharmacy. Am J Health-Syst Pharm. 2016;73(3):165-73
Eckel SF, Higgins JP, Hess E. Multicenter study to evaluate the benefits of technology-assisted workflow on iv., room efficiency, costs, and safety. Am J Health-Syst Pharm. 2019. 76(12):895-001

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Compounding Risks

- 74% of all respondents were aware of at least one pharmacy compounding error in the past 12 months
  - This included those caught and corrected in the pharmacy as well as those discovered after dispensing
  - A higher percentage of pharmacists were aware of the errors (79%) compared to technicians (67%)

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Pharmacy Challenges

- Verification process
- Training/Competency
- Insufficient Technology
- Staffing
- Space
- Workload

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Additional Risks

Potential for diversion in all settings

- Many of these medications are controlled substances
- 1 in 10 health professionals struggle with addiction or abusing drugs not prescribed
  - 10% - 15% will inappropriately use substances over their career
- Healthcare workers pattern of drug abuse and dependency is unique to the general population
  - Tends to follow drug availability
  - Job related stressors
  - See the positive effects drugs have on patients
  - Comfort level with use; I'm in control
- Risk exposure: routinely supplying more than needed; allowing manipulation or products, especially when not supported, workflow required to close the loop

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Bringing safety into focus.

What can we do <u>now</u> to support safety injection practices?

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Bringing Medication Safety into Focus

- Stressors
- Disruptions
- Intravenous push preparation risks
  - Infection control breeches
  - Medication Errors
  - Diversion risks
  - Gaps in training
  - Gaps in high-leverage strategies

- *What actions or decisions can eliminate risks and improve medications safety?*
- *What can you stop or start doing to improve safety?*

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Refocusing on Medication Safety: Best Practices for Injection Safety

Bringing Medication Safety into Focus

- Eliminate the need for compounding and potential risk of hospital-acquired infections by capitalizing on the purchase of commercially-manufactured products
- Remove the need for compounding outside the pharmacy environment by dispensing intravenous push medications in ready-to-administer dosage forms
- Reduce the steps required for wasting controlled substances by providing patient-specific doses of intravenous push controlled substances in ready-to-administer dosage forms

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Best Practices for Injection Safety

Michelle Mandrack, MSN, RN
Director of Consulting Services
Institute for Safe Medication Practices
mmandrack@ismp.org

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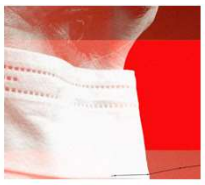
COVID's Toll on Clinicians



HEALTH

WHY HEALTH-CARE WORKERS ARE QUITTING IN DROVES

- Staffing shortages
- Crisis care
- Moral distress
- *The Great Resignation*

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Refocusing on Medication Safety: Best Practices for Injection Safety

Significant potential for error

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Consider Impact on Medication Administration

- Nurses spend 26.9% of their time on the critical task of medication administration
  - **"Most significant amount of time spent on obtaining and verifying medications"**
- Approximately ⅔ of medication administration time related to drug delivery to the patient
- Other ⅓ spent preparing drugs for administration

Keohane, CA, Bane, AD, Featherstone, E, Hayes, J, Woolf, S, Hurley, A, et al. Quantifying Nursing Workflow in Medication Administration. JINA. 2008;38 (1). pp 19-26.
Hendrich, A, Chow, M, Skierczynski, BA, Lu, Z. A 36-Hospital time and motion study: how do medical-surgical nurses spend their time? The Permanente Journal. 2008;12(3). pp 25-34.

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IV Push Medication Use

- Essential component of care
- Clinically advantageous
- Many high-alert medications are administered IV
- Errors in use have potential for serious harm

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Refocusing on Medication Safety: Best Practices for Injection Safety

Factors that Increase the Risk of Errors with IV Push Medications

- Using part of a vial or ampule, or more than one vial or ampule for a single dose
- Manipulations needed to prepare medications (e.g., vial-to-syringe, syringe-to-syringe transfer, dilution)
- Reconstitution of powders with specific diluents
- Dilution of some concentrated injectable drugs

ISMP. Errors with injectable medications: unlabeled syringes are surprisingly common! *ISMP Medication Safety Alert!* 2007;12(20):1-2.

34

Unnecessary or Improper Dilution

- ISMP survey on dilution practices (adults) N =1,773
  - 83% further dilute IV push medications

Single-dose vials and ampules	**77%** (14% always)
Multiple-dose vials	**49%** (11%)
Manufacturer's prefilled syringes	**43%** (10%)
Pharmacy-dispensed syringes	**20%** (5%)

  - Common medications

Opioids	**67%** (27% always)
Antianxiety/antipsychotic	**65%** (24%)

ISMP. Part I: Survey results show unsafe practices persist with IV push medications. *ISMP Medication Safety Alert!* 2018;23(22):1-5.

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Unnecessary or Improper Dilution

Reasons for further dilution	
Reason	**Percent of Participants (%)**
Desire to administer the drug slowly	94
Avoid patient discomfort	70
Reduce the risk of extravasation	33
Measure small volume doses accurately	25
Other (e.g., drug-specific requirements, facility policies, drug reference recommendations, prior education)	13

ISMP. Part I: Survey results show unsafe practices persist with IV push medications. *ISMP Medication Safety Alert!* 2018;23(22):1-5.

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Unnecessary or Improper Dilution

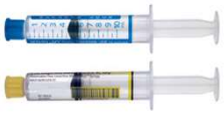
- Volume of diluent and method to determine the volume of diluent is variable
  - **Most had personal formulas**
    - 1 mL per minute of time needed to slowly administer drug
    - Different if peripheral or central line
  - **No respondents described a dilution process that would result in a specific concentration**
  - **43% reported policies or guidelines on dilution**

ISMP. Some IV medications are diluted unnecessarily in patient care areas, creating undue risk. *ISMP Medication Safety Alert!* 2014;19(21):1-5.

37

Use of Pre-Filled Flush Syringes for Dilution

- 81% use flush syringes for drug dilution
  - **56% reported this practice 50% of the time**
  - **19% reported always**
- Most often, the syringe is not relabeled or labeled



ISMP. Part I: Survey results show unsafe practices persist with IV push medications. *ISMP Medication Safety Alert!* 2018;23(22):1-5.

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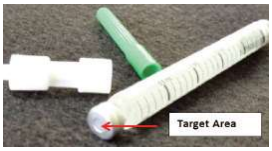
Misuse of Vials, Syringes, and Needles

- Survey on Carpuject™ prefilled syringes (N=540)
  - **Looking at issue of overfill and whether nurses were aware**
  - **Many nurses not concerned about overfill because they withdrew doses from the cartridges using a syringe**
  - **Using cartridges as single-/multiple-dose vials**



ISMP. ISMP survey reveals user issues with Carpuject prefilled syringes. *Nurse Advise-ERR.* 2012;17(16):1-3.

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Prefilled Syringe Cartridges as Single- and Multiple-Dose Vials

- Risk of:
  - Contamination
  - Unlabeled/mislabeled syringes
  - Dosing or measurement errors
  - Loss of barcode for scanning on prefilled cartridge
  - Risk of conditions that may facilitate drug diversion of products documented as "wasted"
- Contributing factors:
  - Desire or need to dilute medication before injection
  - Unavailability of syringe holders
  - "This is how I was taught"

ISMP. ISMP survey reveals user issues with Carpuject prefilled syringes. *Nurse Advise-ED.* 2012;17(16):1-3.

40

IV Administration Errors

- American Nurses Association (ANA) Medication Errors and Syringe Safety Are Top Concerns for Nurses
  - 99% believed risk to patients is serious
  - Errors most likely to happen during the preparation and administration of IV medications
- Giving IV push medications too fast is most common type of IV drug errors
  - 43% to 69% (majority clinically significant)
  - Wide variability in rates of administration
  - Drug characteristics and fast rates associated with pain, phlebitis, other complications

FAST

Medication Errors and Syringe Safety Are Top Concerns for Nurses According to New National Study [press release]. http://www.nursingworld.org/FunctionalMenuCategories/MediaResources/PressReleases/2007/SyringeSafetyStudy.aspx. Silver Spring, MD: American Nurses Association; June 18, 2007. Fahrmi F, Amapanah P, Faizi M, et al. Errors in the preparation and administration of intravenous medications in the intensive care unit of a teaching hospital: an observational study. Aust Crit Care. 2008;21(2):110-6.
Taxis K, Barber N. Incidence and severity of intravenous drug errors in a German hospital. Eur J Clin Pharmacol. 2004;59(11):815-7.
ISMP. ISMP. How fast is too fast for i.v. push medications? *ISMP Medication Safety Alert!* 2003;8(1):1.
Pinkney S, Fan M, Chan K, et al. Multiple intravenous infusions. Phase 2b: laboratory study. *Ont Health Technol Assess Ser.* 2014;14(5):1-163.
Vijayakumar A, Sharon EV, Teena S, Nobil S, Nazeer I. A clinical study on drug-related problems associated with intravenous drug administration. *J Basic Clin Pharm.* 2014; 5(2):49–53.

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Wrong Rate Event

- Physician prescribed 20 mg labetalol IV bolus for ED patient with hypertensive crisis
- Nurse retrieved medication quickly but patient being moved to radiology
- Enroute, nurse administered the drug in seconds
- Patient immediately arrested

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Rates of IV Push Medication Administration

- 2-5 minutes is a LONG time when administering medication
- Clocks showing elapsed time improve practice

McDowell SE, Mt-Isa S, Ashby D, Ferner RE. Where errors occur in the preparation and administration of intravenous medicine: a systematic review and Bayesian analysis. *Qual Saf Health Care*. 2010;19(4):341-5.
Vijayakumar A, Sharon EV, Teena S, Nobil S, Naseer I. A clinical study on drug-related problems associated with intravenous drug administration. *J Basic Clin Pharm*. 2014; 5(2):45-53.

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Limited or Absent Labeling

- Labels on clinician-prepared syringes more likely to be limited or absent
  - 28% reported **less than 10% of the time**
  - Only **50% reported always**
  - **Significant amount of "labeling" appears to be taping vial to syringe**

Medication Errors and Syringe Safety Are Top Concerns for Nurses According to New National Study [press release]. http://www.nursingworld.org/FunctionalMenu/Categories/MediaResources/PressReleases/2007/SyringeSafetyStudy.aspx. Silver Spring, MD: American Nurses Association; June 18, 2007.
ISMP. Part I: Survey results show unsafe practices persist with IV push medications. *ISMP Medication Safety Alert!* 2018;23(22):1-5.

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Absent Labeling Event

- A syringe containing vecuronium was prepared for a trauma patient
- Medication not used, and syringe set down near saline flushes
- Vecuronium later used to flush the IV line of an alert 3-year-old girl
- Child became flaccid and respiratory efforts ceased
- Quickly intubated and ventilated, so permanent harm averted

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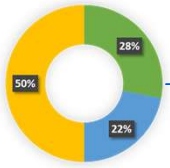
Labeling of Self-Prepared Syringes



Reasons syringes are not labeled when prepared away from the bedside	
Not necessary if only 1 medication is prepared	51%
Not necessary if only 1 syringe is prepared	45%
In an emergency	39%
Too time-consuming	20%
No labels are available	20%
Not an expectation	12%
Able to distinguish between multiple unlabeled syringes by visual appearance or location	7%

■ Never (0%) or Rarely (1-10%) ■ Sometimes (11-50%) or Often (51-95%) ■ Always (>95%)

ISMP. Part I: Survey results show unsafe practices persist with IV push medications. *ISMP Medication Safety Alert!* 2018;23(22):1-5. ©2021 ISMP | www.ismp.org | 46

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Clinician-Prepared Medications

- Clinician-prepared syringes are common
  - **ANA survey: 44% of nurses administer IV push medications more than 5 times each shift**[7]
- ISMP survey, 75% reported less than half of the time IV push medications provided in pharmacy-prepared or commercially available ready-to-administer syringes

Medication Errors and Syringe Safety Are Top Concerns for Nurses According to New National Study (press release). http://www.nursingworld.org/functionalMenuCategories/MediaResources/PressReleases/2007/SyringeSafetyStudy.aspx. Silver Spring, MD: American Nurses Association; June 18, 2007.

ISMP. Part I: Survey results show unsafe practices persist with IV push medications. *ISMP Medication Safety Alert!* 2018;23(22):1-5. ©2021 ISMP | www.ismp.org | 47

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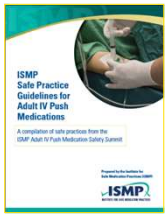
Safe Practice Guidelines for Adult IV Push Medications

1. Acquisition and Distribution of Adult IV Push Medications
2. Aseptic Technique
3. Clinician Preparation
4. Labeling
5. Clinician Administration
6. Drug Information Resources
7. Competency Assessment
8. Error Reporting



https://www.ismp.org/guidelines/iv-push ©2021 ISMP | www.ismp.org | 48

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Safety Hierarchy

High Level
- Failure-mode proposed strategies
- Use commercially-available, or pharmacy-prepared patient-specific doses
- Use automation and technology to assist human decision making

Mid-Level
- Limit complexity and access
- Provide decision support or reminders at the point of order entry, verification, and administration
- Consider the use of redundancies e.g., independent checks
- Provide ready to apply barcoded labels

Low Level
- Create policies and expectations for practice
- Educate providers about added risk
- Validate compounding competencies

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Key Risk Reduction Strategies for Safety and Efficiency

High Leverage

- Provide IV push medications in ready-to-administer form
  - **Minimize the need for manipulation outside of the pharmacy sterile compounding area**

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Ready-to-Administer Guidance

- ISMP Safe Practice Guidelines for Adult IV Push Medications
- Infusion Nurses Society: Infusion Therapy Standards of Practice
- ASHP-PPAG Guidelines for Providing Pediatric Pharmacy Services in Hospitals
- The Joint Commission Medication Management Standards

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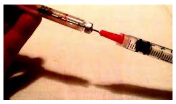
Key Risk Reduction Strategies for Safety and Efficiency

Medium Leverage



- Provide the rate of IV push administration on the MAR
- Provide clinical units with blank or printed, ready-to-apply labels, including sterilized labels where needed, to support safe labeling practices
- Appropriately label all clinician-prepared syringes of IV push medications or solutions, unless the medication or solution is prepared at the patient's bedside and is immediately administered to the patient without any break in the process
- Do NOT withdraw IV push medications from commercially-available, cartridge-type syringes into another syringe for administration
- Do NOT dilute or reconstitute IV push medications by drawing up the contents into a commercially available, prefilled flush syringe of 0.9% sodium chloride

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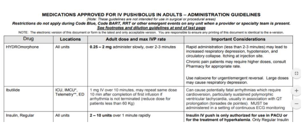
Key Risk Reduction Strategies for Safety and Efficiency

Lower Leverage



MEDICATIONS APPROVED FOR IV PUSH/BOLUS IN ADULTS – ADMINISTRATION GUIDELINES

(Note: These guidelines are not intended for use in surgical or procedural areas)

Restrictions do not apply during Code Blue, Code BART, RRT or other emergent events on any unit when a provider or specialty team is present.

See footnotes and dilution guidelines at end of last page

NOTE: The electronic version of this document or form is the latest and only acceptable version. You are responsible to ensure any printing of this document is identical to the e-version.

Drug	Locations	Adult dose and max IVP rate	Important Considerations
HYDROmorphone	All units	**0.25 – 2 mg** administer slowly, over 2-3 minutes	Rapid administration (less than 2-3 minutes) may lead to increased respiratory depression, hypotension, and circulatory collapse. Itching at injection site. Chronic pain patients may require higher doses, consult Pharmacy for appropriate rate. Use naloxone for urgent/emergent reversal. Large doses may cause respiratory depression.
Ibutilide	ICU, IMCU*, Telemetry**, ED	1 mg IV over 10 minutes, may repeat same dose 10 min after completion of first infusion if arrhythmia is not terminated (reduce dose for patients less than 60 Kg)	Can cause potentially fatal arrhythmias which require cardioversion, particularly sustained polymorphic ventricular tachycardia, usually in association with QT prolongation (torsades de pointes). MUST be administered in a setting of continuous ECG monitoring
Insulin, Regular	All units	**2 – 10 units** over 1 minute rapidly	**Insulin IV push is only authorized for use in PACU or for the treatment of hyperkalemia**. Only Regular Insulin

- Provide instructions and access to the proper diluent when reconstitution or dilution is necessary outside of the pharmacy sterile compounding area
- Provide standardized, facility-approved IV push medication resources at the point of care to guide the safe practice of IV push medication administration
- Only dilute IV push medications when recommended by the manufacturer, supported by evidence in peer-reviewed biomedical literature, or in accordance with approved institutional guidelines

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Questions?

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