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**While the risk for injury related to intravenous (IV) medication errors is well documented, the education of nursing for necessary clinical skills is limited. The Institute for Safe Medication Practices (ISMP) uncovered IV push medication preparation and administration trends that contribute to medication errors at the bedside. Examples of these trends include inappropriate dilution and violating the sterility of the ready to administer syringes. According to an article published in Nursing 2021 *Diluting IV push medications: Risky business,* “Dilution of IV push medications can lead to contamination of these sterile drugs. The manufacturing and preparation of IV push medications is highly regulated to reduce the risk of bacterial contamination. Additional manipulation of doses, such as dilution in a nonsterile environment, can introduce bacteria, increasing a patient’s risk of infection” (Sheridan & Wicker 2021). Partnering with Quality Safety Education for Nurses (QSEN), this task force assessed the learning needs of nursing program educators throughout the country. A survey of 380 nursing programs demonstrates that there is a great deal of variation in how nursing students are trained to administer IV push medication therapy. These practice variations continue once the student nurses graduate creating further confusion regarding best practice and increasing the potential for patient harm. The survey results also shed light on the lack of access to updated standards and protocols. The focus of this group is to provide safe practice standards and competency checklist for nursing faculty, nursing students, hospital nurse educators, nurse quality managers, and frontline nurses in all settings.**

**QSEN Patient Safety Committee**

**Section A**

**Key points to review prior to preparation and administration of medication.**

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| 1. Check the accuracy of the medication order (review medication administration record [MAR], orders, current condition, past medical history [PMH], as well as allergies and associated reactions). |
| 2. Assess for any patient contraindications to the medication or IV Push route of administration (e.g., hypotension, abnormal laboratory results, abnormal glucose levels, active bleeding), and evaluate patient safety, taking into consideration upcoming procedures, PMH. |
| 3. Review the type of vascular access device (VAD) and determine the appropriateness of the device based on the medication to be given and organizational policy.  |
| 4. Perform the rights of medication administration (e.g., right patient, right medication, right dose, right route, right time, right patient education, right to refuse, right assessment, and right evaluation, right documentation).  |
| 5. Prepare medication in designated clean, quiet environment. 6. Adhere to standard aseptic non touch technique (ANTT®) when preparing, administering IV push medication, flushing, and locking VAD. (ANTT is a specific and comprehensively defined type of aseptic technique with a unique theory-practice framework based on an original concept of Key-Part and Key-Site Protection; achieved by integrating Standard Precautions such as hand hygiene and personal protective equipment with appropriate aseptic field management, non-touch technique, and sterilized equipment.) (Gorski, et al., 2021; Rowley, 2001; National Institute for Health & Care Excellence, 2012)7. When a passive disinfection cap is first removed there is no need to disinfect the needleless connector. For subsequent access, the student/nurseshould disinfect the needleless connector with vigorous mechanical scrub for 5 to 15 seconds using 70% alcohol or alcohol-based chlorhexidine solution (Gorski, et al., 2021). 8. Always assess the VAD site prior, during, and after administering IV Push medication, for signs and symptoms of complications, such as pain, infiltration, phlebitis, or extravasation.9. Assess VAD site for patency using a single dose 5 to 10 mL 0.9% sodium chloride syringe. Patency is determined by evidence of brisk, bright red blood return and VAD flushes easily. *Never* forcibly flush a VAD. 10. Use commercially available or pharmacy prepared pre-filled syringes to reduce the risk of catheter associated blood stream infections (CABSI), save time during syringe preparation, and aid optimal flushing technique (Gorski, et al., 2021). 11. To the greatest extent possible, have pharmacy provide adult IV push medications in a ready to administer form to minimize the need for manipulation outside the pharmacy sterile compounding area. If using a Carpuject™ syringe, always use an appropriate cartridge holder (Institute for Safe Medication Practices, 2015). 12. 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 (Institute for Safe Medication Practices, 2015). If reconstitution or dilution of a medication is necessary, take steps to provide ready access to the proper diluent and instructions for reconstitution or dilution to support safe practice. In some facilities, this consists of “pharmacy-prepared kits,” while in other facilities, this information is available in the medication administration record (MAR) in an expanded view as part of the MAR entry (Institute for Safe Medication Practices, 2015).12. 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 (Institute for Safe Medication Practices, 2015).13. Prepare one medication syringe at a time. Labelall IV push medication syringes (include patient’s name, drug name, dose unless prepared at the bedside and immediately administered). *Never* pre-label an empty syringe in advance of use (Institute for Safe Medication Practices, 2015).14. Rate: Administer a medication at the rate recommended by the manufacturer/MAR/drug reference guide using a watch or clock with a second hand. Follow with post-flush using a single-dose 5 to 10 mL 0.9% sodium chloride syringe. Administer the flush solution at the **same rate** of administration as the medication (Institute for Safe Medication Practices, 2015). Pushing too fast can result in adverse drug effects (Gorski, et al., 2021). 15. If locking the VAD: Know the internal mechanism for fluid displacement of the needleless connector in use (e.g., negative or positive displacement, neutral, or anti-reflux) (Gorski, et al., 2021) Follow manufacturers’ directions for use for flushing, clamping, and disconnection.In the absence of manufacturer directions, consider the reported reflux volume for each type and use the following sequence:a. Negative displacement–flush, clamp, disconnect.b. Positive displacement–flush, disconnect, clamp.c. Neutral and anti-reflux–no specific sequence required. |

**Section B**

**Medication Administration preparation:**

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| 1. Obtain the medication and complete first medication check. Medication checks should be performed as a comparison against the MAR or original order.(The **first medication check** is when the medications are selected or retrieved from the automated dispensing machine or storage location. The **second medication check** occurs during the preparation of the medication for administration. The **third medication check** occurs at the patient's bedside just before medications are given.)2. If preparation is needed, prepare the medication in a designated clean, quiet environment, away from sinks. Use aseptic non touch technique (ANTT) (Gorski, et al., 2021).When necessary to prepare more than one medication in a single syringe for IV push administration, limit preparation to the pharmacy (Institute for Safe Medication Practices, 2015)3. Gather equipment (e.g., appropriately sized syringe to draw-up correct dose of medication, filter needle, if necessary, cartridge holder, 70% alcohol).To assess patency of a VAD use a 10 mL diameter-sized syringe and once patency has been confirmed, IV push administration of the medication can be administered given in a syringe appropriately sized to measure and administer the required dose. 4. If using glass ampules-clean with 70% isopropyl alcohol prior to breaking glass neck of ampule. Use a filter needle when withdrawing medication from a glass ampule, then discard filter needle and change to the appropriate needle for administration as necessary (Gorski, et al., 2021). 5. When preparing medication from a vial, use aseptic technique. Needleless caps on vials are dust covers only and not considered sterile. Scrub the diaphragm of the vial using 70% isopropyl alcohol. Inject equal amount of air into vial before removing the medication. 6. Perform an independent double check by 2 clinicians (the administering RN and 1 additional RN) for the organization-specific components of selected high-alert medications that pose the greatest risk of harm (e.g. opioids, anti-coagulants). Have two RNs/licensed clinicians witness wasting controlled substances. 7. Proceed with barcode medication administration procedures as per organization’s policy.8. Label all medication syringes prepared away from the bedside (including the patient’s name, drug name, dose) to prevent medication errors. |

**Section C: IV Push Medication Competency Checklist**

This checklist is designed to assess the competency of nursing students and practicing nurses.

**Student/Nurse: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Validator: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_**

**IV push medication\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| --- | --- | --- |
|  | **Met**  | **Not met** |
| 1. **Medication Preparation and Safety – First Check**

\* Reads medication administration record and removes the medication(s) from the storage location. Verifies that the client's name and room number match MAR.\* Compares the label of the IV Push medication against the MAR\* If the dosage does not match the MAR, determine if you need to do a math calculation\* Check the expiration date |  |  |
| 1. **Medication Preparation and Safety – Second Check**
* Assess for any patient contraindications to the medication or IV push route of administration.
* Right medication
* Right dose
* Right route
* Right time
* Right patient education
* Right documentation
* Right to refuse
* Right assessment
* Right evaluation
 |  |  |
| 1. **Prepares medication in designated clean, quiet environment**
* Gathers all equipment without prompting and performs hand hygiene.
* Assess a current drug resource guide to determine if dilution by the nurse is recommended just prior to administration
* If dilution is required, pharmacy will provide instructions on the correct diluent and volume required.
* Only dilute medications when recommended by manufacturer, supported by evidence in peer-reviewed biomedical literature, or in accordance with approved institutional guidelines. (**Never dilute IVP medications by using a pre-filled syringe of 0.9% normal saline)**
* Values own role in preventing errors: Student /Nurse verbalizes the potential risks associated with this activity and takes all necessary steps to avoid preventable harm to the patient.
* If preparing an IVP medication requiring dilution away from the patient’s bedside, labels new syringe with patient’s name, name of drug, concentration of drug and initials of nurse preparing medication.
* Adheres to standard aseptic non touch technique (ANTT) when preparing IVP medications.
* When preparing medications from a vial, uses aseptic technique and scrubs the diaphragm of the vial using 70% alcohol (vial caps are dust covers only and are not considered sterile).
* Injects equal amounts of air into vial prior to removing the medication.
* If using glass ampules—cleans top with 70% isopropyl alcohol prior to breaking glass neck of ampule. Uses a filter needle when withdrawing medication from a glass ampule, then discards filter needle and change to the appropriate needle
 |  |  |
| 1. **Knocks on patient’s door and introduces self**
* Performs hand hygiene and dons gloves
* Verifies patient’s name, date-of-birth, and allergies by comparing the patient’s identification name band to information found in the patient’s health record.
 |  |  |
| 1. **Assess VAD signs of complications such as infection, phlebitis, or extravasation/infiltration, asking if the patient has any pain during palpation of the site and surrounding area, if any of these are noted does not use**
 |  |  |
| 1. **Medication Preparation and Safety – Third Check**
* When was the medication last given
* Why is the patient receiving this medication
* Are there vital signs, labs, or clinical data to assess prior to administration?
 |  |  |
| 1. **If passive disinfection cap is removed there is no need to disinfect the needleless connector.**
* For subsequent access, the student/nurse should disinfect the needleless connector with vigorous mechanical scrub for 5-15 seconds using 70% alcohol or alcohol-based chlorhexidine solution. Allow needleless connector to dry.
 |  |  |
| 1. **Proceeds with barcode medication administration procedures as per organization’s policy.**
* Performs independent double check by 2 clinicians for the organization-specific components of selected high-alert medications that pose the greatest risk of harm. (e.g. anticoagulants).
* Have two RN’s/licensed clinicians witness wasting controlled substances.
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| 1. **Assesses VAD for patency using a single dose 10 mL diameter-sized syringe of 0.9% sodium chloride. Patency is determined by evidence of brisk, bright blood return and VAD flushes easily.**
* If assessing central line patency use a 10 mL diameter-sized syringe with 0.9% sodium chloride, once patency is confirmed, use the appropriated sized syringe to administer the medication. Never forcibly flush a VAD.
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| 1. **Educates patient about medications being administered**

To include drug name, purpose, special instructions, and potential side effects.  |  |  |
| 1. **If continuous running IV fluid is compatible with medication, pauses IV infusion device, checks patency, disinfects needleless connector proximal or closest to the patient (if passive disinfection cap present, it is not necessary to scrub the Needleless cap). Clamps tubing above the injection site closest to the patient and administers IV push medication at the correct rate using a watch or clock with second hand.**
* Appropriate rate is determined by pharmacy prepared instructions on MAR, manufacturer/organizational guidelines, or approved current drug reference guide.
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| 1. **If administering through a saline lock, removes passive disinfection cap, if no passive disinfection cap is present, disinfects the needleless connector with vigorous mechanical scrub for 5-15 seconds using 70% alcohol or alcohol-based chlorhexidine solution. Allows needleless connector to dry.**
 |  |  |
| 1. **Administers IVP medication at the correct rate using a watch or clock with second hand.**
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| 1. **Disinfects the needleless connector with vigorous mechanical scrub for 5 – 15 seconds using 70% alcohol or alcohol-bases chlorhexidine solution. Allows needleless connector to dry.**
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| 1. **Using a new prefilled syringe of 0.9% sodium chloride, flushes at the same rate recommended to administer the medication.**
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| 1. **If locking the VAD, knows the internal mechanism for fluid displacement of the needleless connector in use (e.g. negative or positive displacement, neutral, or anti-reflux).**

Follows manufacturers’ directions for use for flushing, clamping and disconnection. In the absence of manufacturers’ directions, consider the reported reflux volume for each type and use the following sequence:* Negative displacement – flush, clamp, disconnect.
* Positive displacement – flush, disconnect, clamp.
* Neutral or anti-reflux – no specific sequence required.
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| 1. **If continuous IV is present unclamp tubing and resume infusion.**
* If no continuous IV is present, apply new passive disinfection cap if available.
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| 1. **Evaluates patient for immediate response to the medication and verbalizes when to return and how to evaluate for onset and peak effect of medication. Instructs patient to call if feeling any adverse effects.**
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| 1. **Disposes of all contaminated materials in sharps container or approved receptacle. Removes gloves and preforms hand hygiene.**
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| 1. **Documents medication administration per organization’s policy.**
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| 1. **Throughout medication administration minimizes risk of harm to patients and providers through both system effectiveness and individual performance.**

**Values the contributions of standardization/reliability to safety.** |  |  |

# References

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