Medication Safety Pearls

A presentation for HealthTrust Members
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HCA Healthcare℠

Disclosures

- The presenters have no financial relationships with any commercial interests pertinent to this presentation.

- This program may contain the mention of drugs or brands presented in a case study or comparative format using evidence-based research. Such examples are intended for educational and informational purposes and should not be perceived as an endorsement of any particular supplier, brand or drug.

Learning Objectives for Pharmacists

- Evaluate the current functionality in their electronic health records and automated dispensing cabinets to identify opportunities for improvements surrounding the safe administration of promethazine
- Identify necessary steps to ensure medication safety while implementing standardized programmable infusion pump guardrail libraries
- Locate opportunities within their electronic health record for documentation surrounding intravenous anticoagulant medication administration documents and opportunities to improve this medication safety practice

Learning Objectives for Nurses

- Evaluate the current functionality in their electronic health records and automated dispensing cabinets to identify opportunities for improvements surrounding the safe administration of promethazine
- Identify necessary steps to ensure medication safety while implementing standardized programmable infusion pump guardrail libraries
- Locate opportunities within their electronic health record for documentation surrounding intravenous anticoagulant medication administration documents and opportunities to improve this medication safety practice

Learning Objectives for Pharmacy Technicians

- Evaluate functionality in their automated dispensing cabinets to identify opportunities for improvements surrounding safe administration of promethazine
- Describe strategies for technicians to assist pharmacists in mitigating risk surrounding IV anticoagulant administration

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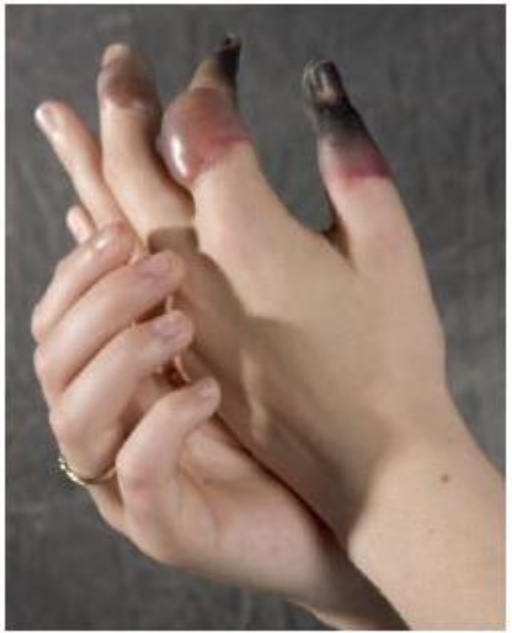
Promethazine safety in automated dispensing cabinets and electronic health records

Promethazine: High Alert Medication

Institute for Safe Medication Practices (ISMP) defines promethazine as a high alert medication.

- A high alert medication carry a risk of causing serious injury to patients if they are misused
- Errors with these products are not necessarily more common, but the consequences of an error with these medications are often harmful



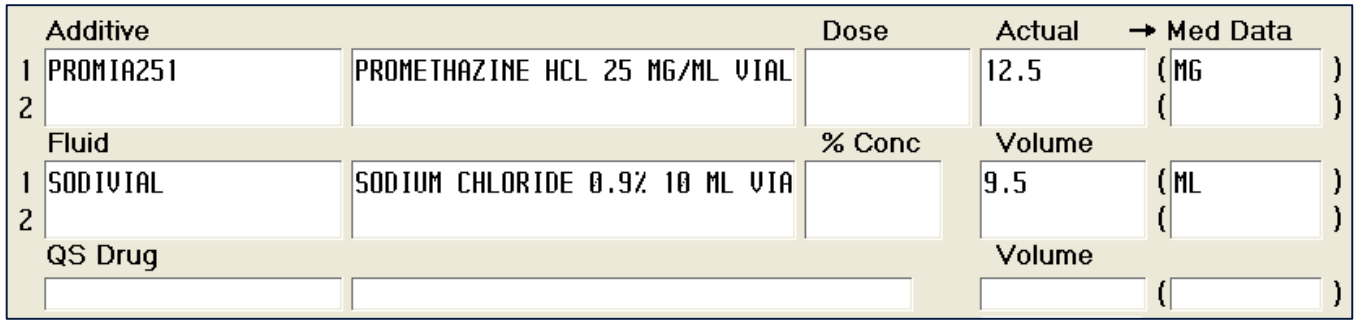
Phenergan extravasation caused gangrene in a young woman's fingers.
(Courtesy of The Daily World, Aberdeen, WA)

Source: High-Alert Medication Survey Results Lead to Several Changes for 2018. August 23, 2018. Retrieved August 26, 2019 from https://www.ismp.org/resources/high-alert-medication-survey-results-lead-several-changes-2018

Promethazine: Safety for your Institution

ISMP recommends promethazine IV to be diluted in 10–20 mL:

- Order entry with medication + diluent ensures both are prompted to be pulled at the automated dispensing cabinet



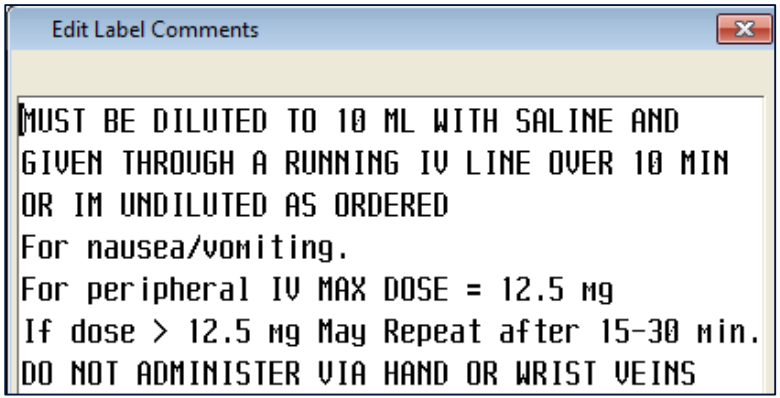
	Additive		Dose	Actual	→ Med Data
1	PROMIA251	PROMETHAZINE HCL 25 MG/ML VIAL		12.5	(MG)
2					( )
	Fluid		**% Conc**	**Volume**	
1	SODIVIAL	SODIUM CHLORIDE 0.9% 10 ML VIA		9.5	(ML)
2					( )
	QS Drug			**Volume**	
					( )

Source: Action Needed to Prevent Serious Tissue Injury with IV Promethazine. August 10, 2006. Retrieved from https://www.ismp.org/resources/action-needed-prevent-serious-tissue-injury-iv-promethazine

Promethazine: Safety for your Institution

ISMP recommends:

- Run at an IV line at the port furthest from the patient's vein
- Use large patient vein (not hand/wrist)
- Administer slowly over 10–15 minutes
- Max IV peripheral dose = 12.5 mg

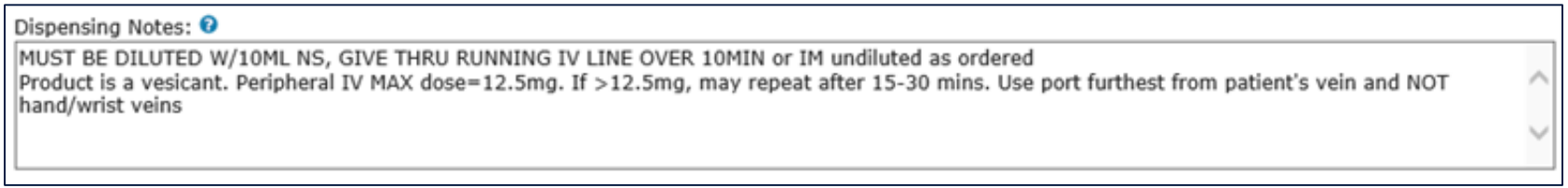


Source: Action Needed to Prevent Serious Tissue Injury with IV Promethazine. August 10, 2006. Retrieved from https://www.ismp.org/resources/action-needed-prevent-serious-tissue-injury-iv-promethazine

Promethazine: Safety for your Institution

ISMP recommendations in place at the automated dispensing cabinet:

- When medication is being dispensed from the machine, the following note populates for the nurse to read

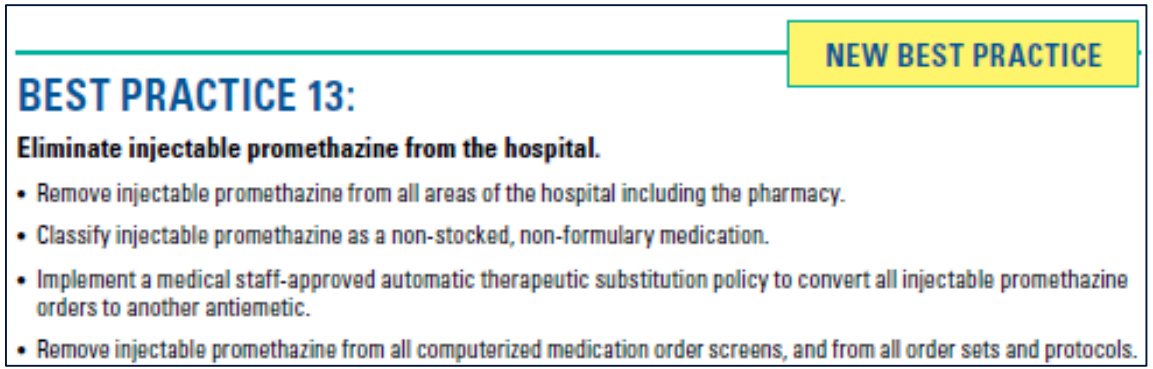


Source: Action Needed to Prevent Serious Tissue Injury with IV Promethazine. August 10, 2006. Retrieved from https://www.ismp.org/resources/action-needed-prevent-serious-tissue-injury-iv-promethazine

Promethazine: What Options Do We Have?

ISMP 2018-2019 Targeted Medication Safety Best Practices for Hospitals

- Best Practice 13: Eliminate injectable promethazine from the hospital



NEW BEST PRACTICE

BEST PRACTICE 13:

Eliminate injectable promethazine from the hospital.

- Remove injectable promethazine from all areas of the hospital including the pharmacy.
- Classify injectable promethazine as a non-stocked, non-formulary medication.
- Implement a medical staff-approved automatic therapeutic substitution policy to convert all injectable promethazine orders to another antiemetic.
- Remove injectable promethazine from all computerized medication order screens, and from all order sets and protocols.

Source: 2018-2019 Targeted Medication Safety Best Practices for Hospitals. December 4, 2017. Retrieved from https://www.ismp.org/guidelines/best-practices-hospitals

Promethazine: What Options Do We Have?

Consider an alternative agent:

Serotonin Receptor Antagonists	Dopamine Receptor Antagonists	Antihistamines	Anticholinergic	Neurokinin Receptor Antagonists	Glucocorticoids
ondansetron	**prochlorperazine**	**diphenhydramine**	**scopolamine**	**aprepitant**	**dexamethasone**
granisetron	**chlorpromazine**	dimenhydrinate		**fosprepitant**	
dolasetron	droperidol	cyclizine			
palonosetron	**haloperidol**	**meclizine**			
	metoclopramide				

Review Question #1

- Which are possible options to prevent harm with promethazine?
  - A. Restrict IV promethazine dose to a max dose of 12.5 mg
  - B. Create order entry for promethazine IV to include diluent
  - C. Add prompts at the automated dispensing cabinet upon removal of promethazine outlining need to dilute for IV, risk of being a vesicant and max doses
  - D. Remove promethazine from formulary
  - E. Do not include information on proper promethazine administration through a large vein in medication order
  - F. A - D

Review Response #1

- Which are possible options to prevent harm with promethazine?
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  - D. Remove promethazine from formulary
  - E. Do not include information on proper promethazine administration through a large vein in medication order
  - **F. A - D**

Intravenous anticoagulant high alert drug documentation in the electronic health record

National Patient Safety Goal for Anticoagulant Therapy

NPSG.03.05.01: Reduce the likelihood of patient harm associated with the use of anticoagulant therapy.

Requirement	EP 1: The [hospital/organization] uses approved protocols and evidence-based practice guidelines for the initiation and maintenance of anticoagulant therapy that address medication selection; dosing, including adjustments for age and renal or liver function; drug-drug and drug-food interactions; and other risk factors as applicable.

Source: National Patient Safety Goal for anticoagulant therapy. December 7, 2018. Retrieved from https://www.jointcommission.org/assets/1/18/R3_19_Anticoagulant_therapy_FINAL2.PDF

Expansion of Indications for Anticoagulant Infusions

Anticoagulant infusion entries are not used solely for systemic anticoagulation:

- Heparin infusion
  - Systemic standard and low dose
  - Impella
  - ECMO
  - EKOS
- Argatroban infusion
  - Systemic none/mild and moderate/severe hepatic dysfunction dose
  - Impella
  - ECMO
- Bivalrudin infusion
  - Impella
  - ECMO

Medication Error Outlining Importance of Anticoagulation-indication Specific Documentation

CVICU

New medication order for a heparin infusion with an indication of use with an EKOS catheter

Transfer

Patient transferred to a medical/surgical floor with infusion order still active on eMAR

Med/Surg Unit

Nurse attempted to order/adjust the heparin infusion based on an aPTT level

Med/Surg Unit

Heparin infusion was discussed and discovered to not be a systemic indication, drip was D/C

Documentation in the Electronic Health Record

Addition of administration documentation of anticoagulant infusions:

- Information is now accessible to healthcare providers through the electronic healthcare record
  - Includes the correct indication for therapy
  - Requirement of a nursing co-signature for adjustment of systemic IV infusions
  - Aids in the ability for pharmacy to monitor the nursing-driven protocol

Assessment of Opportunities for Electronic Health Record Documentation

Intravenous Anticoagulant views in the Electronic Health Record/Automated Dispensing Cabinet

Indication	Labs	Pharmacy order entry	Physician order entry	ADC location	Nursing view	Nursing administration documentation

Assessment of Opportunities for Electronic Health Record Documentation

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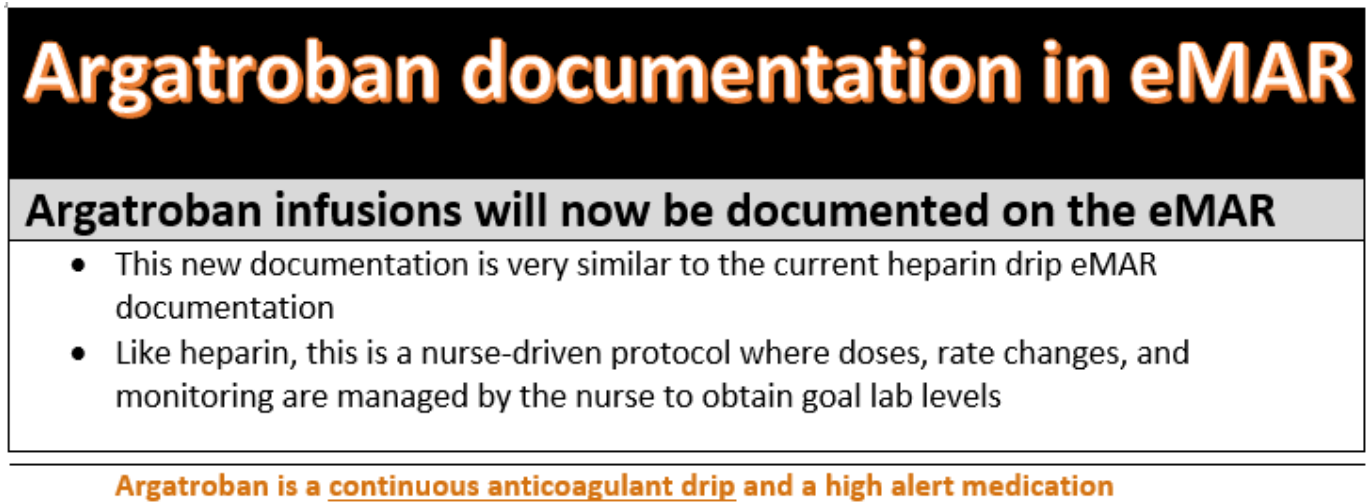
Intravenous Anticoagulant views in the Electronic Health Record/Automated Dispensing Cabinet

Indication	Labs	Pharmacy order entry	Physician order entry	ADC location	Nursing view	Nursing administration documentation

Documentation in the Electronic Health Record

Addition of administration documentation of anticoagulant infusions:

- Argatroban IV systemic infusion



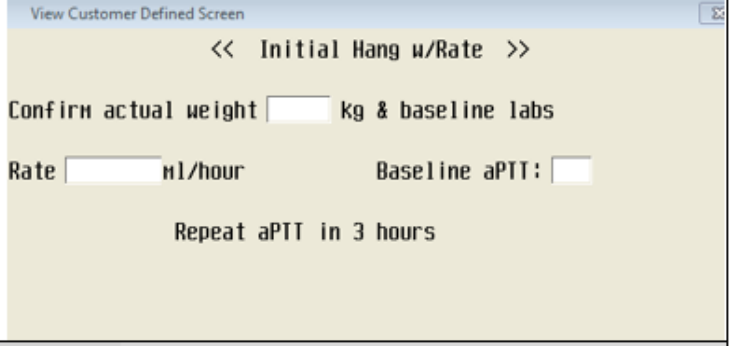
Documentation in the Electronic Health Record

Addition of administration documentation of anticoagulant infusions:

- Argatroban IV systemic infusion

Upon argatroban initiation, the patient's actual weight, initial infusion rate, and baseline aPTT level will be prompted to be entered into the eMAR

- Baseline labs must be completed prior to starting infusion
- You must obtain and verify the patient's actual weight
- Do not record patient-reported or previously documented weights



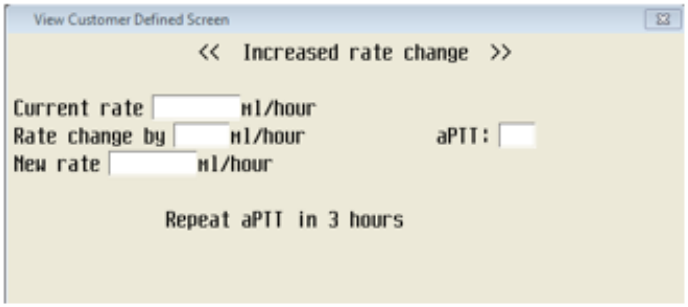
Documentation in the Electronic Health Record

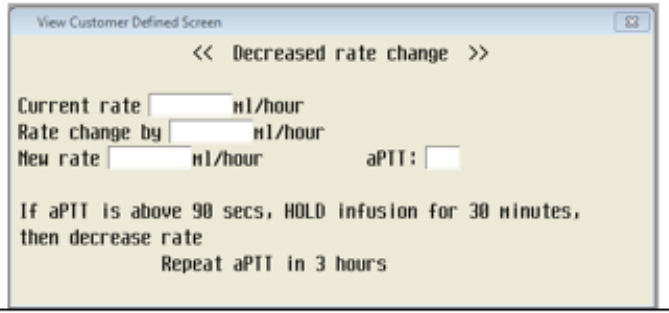
Addition of administration documentation of anticoagulant infusions:

- Argatroban IV systemic infusion

Rate changes will documented in the eMAR

- Rate change instructions can be found within the comment bubble icon





Documentation in the Electronic Health Record

Addition of administration documentation of anticoagulant infusions:

- Argatroban IV systemic infusion

Co-signatures are required for the initial hang and with increased or decreased infusion rates

Review Question #2

- Multiple indications exist for intravenous anticoagulants. Implementing documentation screens specific to each indication in the electronic health record is one way to improve safety surrounding this high alert medication.
  - True
  - False

Review Response #2

- Multiple indications exist or intravenous anticoagulants. Implementing documentation screens specific to each indication in the electronic health record is one way to improve safety surrounding this high alert medication.
  - **True**
  - False

Hospital-wide RSI kit implemented in automated dispensing cabinets

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ISMP Recommendations for Safe Practice with Neuromuscular Blockers

"A fatal accident involved an accidental administration of a neuromuscular blocker to a patient by a practitioner who thought a different drug was being administered."

Ensuring safety surrounding neuromuscular blocker placement hospital-wide:

General Safety Features
Manage override lists
Utilize warnings during medication removal
Limit access

Source: Safety Enhancements Every Hospital Must Consider in Wake of Another Tragic Neuromuscular Blocker Event. January 17, 2019. Retrieved from https://www.ismp.org/resources/safety-enhancements-every-hospital-must-consider-wake-another-tragic-neuromuscular

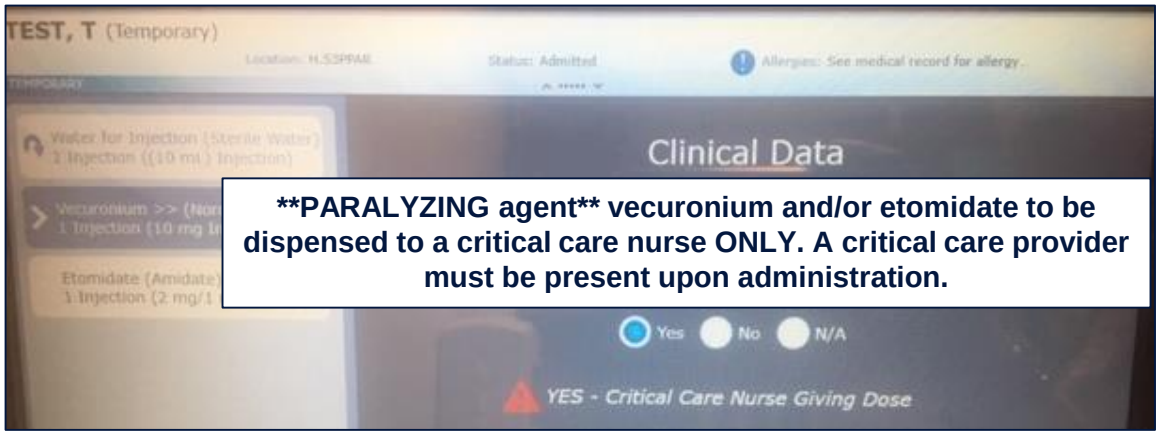
Hospital-wide RSI Kit Available in Automated Dispensing Cabinet

Critical Care Committee identified an opportunity to have a rapid sequence intubation kit available in all areas of the hospital:

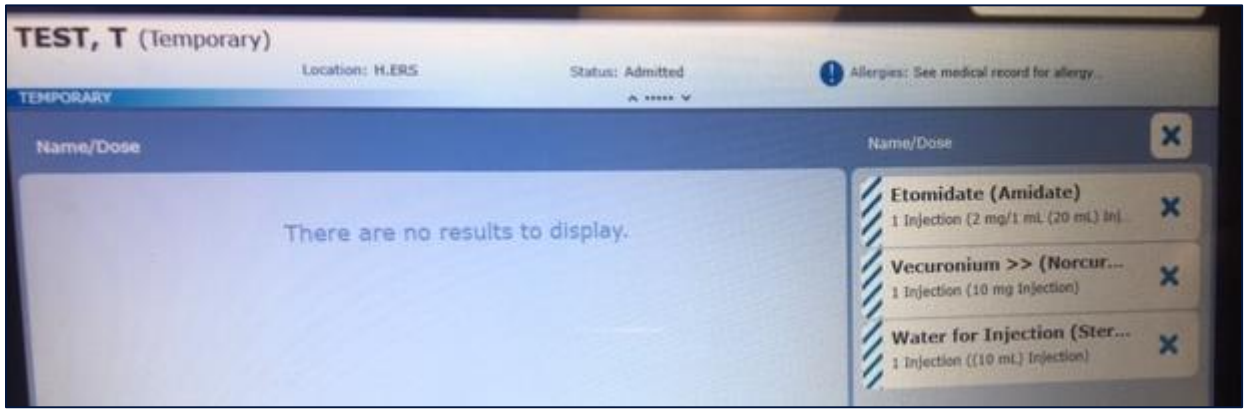
- Restricted access to critical care charge nurses as a part of the rapid response team
  - Nurse prompted at dispensing of vecuronium ensuring the medication pull is intended
- RSI virtual kit built into the automated dispensing cabinet to support correct medications obtained
- Vecuronium chosen as the paralyzing agent as it is stored at room temperature
  - Lock-lidded pocket

Restricted Access to Critical Care Charge Nurses as a Part of the Rapid Response Team

- Nurse prompted at dispensing of vecuronium, ensuring the medication pull is intended



RSI Virtual Kit Built into the Automated Dispensing Cabinet to Support Correct Medications Obtained



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Vecuronium Chosen as the Paralyzing Agent

- Stored at room temperature
- Stored in a lock-lidded pocket in the automated dispensing cabinet
  - Ensures it will not inadvertently be removed from the machine in mistake for another drug

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Communication of a Paralyzing Agent

- Adding a PARALYZING agent sticker to the vial
  - Follows the vial from the automated dispensing cabinet to the patient

Source: Pre-Printed Flag Labels, Paralyzing Agent Use with Caution. Retrieved September 4, 2019 from https://shop.gohcl.com/default.aspx?page=item%20detail&itemcode=17438
Safety Enhancements Every Hospital Must Consider in Wake of Another Tragic Neuromuscular Blocker Event. January 17, 2019. Retrieved from https://www.ismp.org/resources/safety-enhancements-every-hospital-must-consider-wake-another-tragic-neuromuscular

Review Question #3

- What are key words describing the neuromuscular blocker you can add to your automated dispensing cabinet to populate during removal of the medication to make the removal safer?
  - A. Controlled medication
  - B. Paralyzing agent
  - C. Anticoagulant
  - D. Co-signature required
  - E. None of the above

Review Response #3

- What are key words describing the neuromuscular blocker you can add to your automated dispensing cabinet to populate during removal of the medication to make the removal safer?
  - A. Controlled medication
  - **B. Paralyzing agent**
  - C. Anticoagulant
  - D. Co-signature required
  - E. None of the above

Drug recall process standardization

Drug Recalls

A drug recall is an effective way to protect consumers from a potentially harmful product.

- A drug recall is a voluntary action by the producing company, to remove the product from the market.
- A pharmacy buyer or identified staff member can manage a standardized process for ensuring completion of drug recalls within a facility

Source: Drug Recalls. (n.d.) Retrieved August 26, 2019 from https://www.fda.gov/drugs/drug-safety-and-availability/drug-recalls

Pharmacy Buyer: Plan of Action

1 Receives the recall information	2 Is the NDC orderable/ in stock	3 Is the drug in stock	4 Facilitate identification /removal of affected product
• From supplier	• Supplier stock	• Main pharmacy stock	• Pharmacy buyer
• From recall management systems	• Supply chain warehouse	• IV room	• IV room pharmacy technicians
	• Pharmacy stock	• Prepackage room	• Prepack technician
		• Satellite pharmacy	• Satellite pharmacist
		• Offsite pharmacy locations	• Floor stock pharmacy technicians
		• Free standing emergency rooms	• Free standing emergency pharmacist
		• Automated Dispensing Cabinet	
		• Crash cart trays	

Facilitate Identification & Removal of Affected Product

Several other pharmacy team members are enlisted:

- The pharmacy buyer utilized a checklist to ensure all possible locations are addressed

Recall Process Standardization CHECK LIST			
Locations where drug may be affected	Buyer communicated?	Response back?	Product quarantined at main hospital?

Pharmacy Buyer: Follow Up

Once product has been identified and quarantined:

- Sort by lot # to determine quantity
- Follow directions outlined in the recall on how to proceed with returning affected product
- A debrief on the affected recall will be done with pharmacy management (once complete) to review completed check list and work through identified opportunities

Review Question #4

- Entire pharmacy engagement in drug recalls ensures the process will be done completely so the recalled medication does not reach the patient.
  - True
  - False

Review Response #4

- Entire pharmacy engagement in drug recalls ensures the process will be done completely so the recalled medication doesn’t reach the patient.
  - **True**
  - False

Implementing standardized programmable infusion pump guardrail libraries

What are Smart Infusion Pumps?

- **Smart Infusion Pump Technology**
  - Term used to describe computerized infusion pumps that contain error reduction software
  - Contain programming parameters with organization-specific dosing guidelines
  - Produce real time alerts to notify practitioners that infusion is outside safe parameters

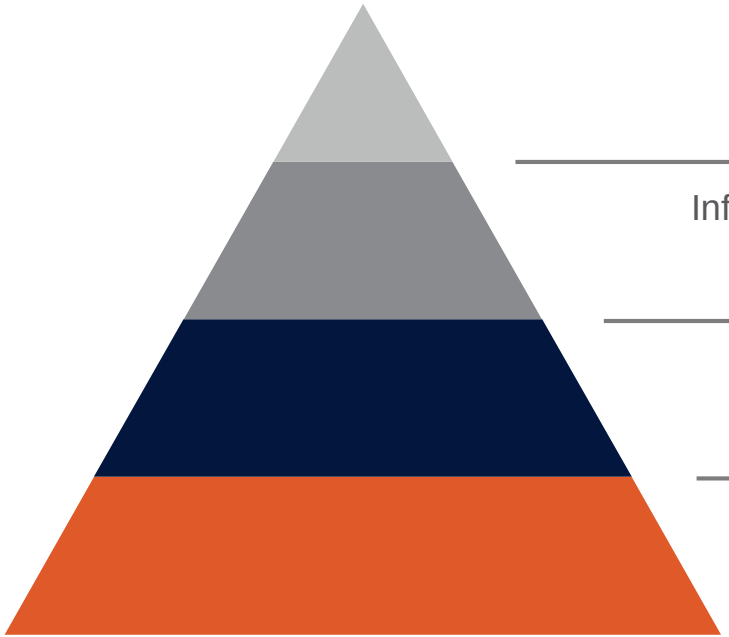
Sources: Mansfield J, Jarrett S. Optimizing Smart Pump Technology by Increasing Critical Safety Alerts and Reducing Clinically Insignificant Alerts. *Hosp Pharm.* 2015;50(2):113-117.
Paparella S. “Get Smart” About Infusion Devices. *J Emer Nurs.* 2009;35(1):52-54.

Drug Library—Preventing Medication Errors

- Drug library software datasets can prevent confusion of weight-based dosing versus strength-based dosing
- It provides for a second check of manual calculations when dosing and units can be confused
  - Grams/hour, grams/kg/hour, grams/minute, mg/hour, mg/kg/hour, mg/minute, mcg/kg/minute, mcg/minute

Sources: Maddox RR, Danello S, Williams C, et al. Intravenous Infusion Safety Initiative: Collaboration, Evidence Based Best Practices, and "Smart" Technology Help Avert High-Risk Adverse Drug Events and Improve Patient Outcomes. *Advances in Patient Safety: New Directions and Alternative Approaches.* 2008;4:1-14

Infusion Safety



Interoperability

Infusion pumps with dose error reduction software (DERS)

Infusion Pumps

Gravity Infusion “counting drops”

Sources: Mandrack, M. (2018). ISMP Guidelines for Optimizing Safe Implementation and Use of Smart Pumps (PowerPoint slides]. 20178 Midyear Clinical Meeting and Exhibition.

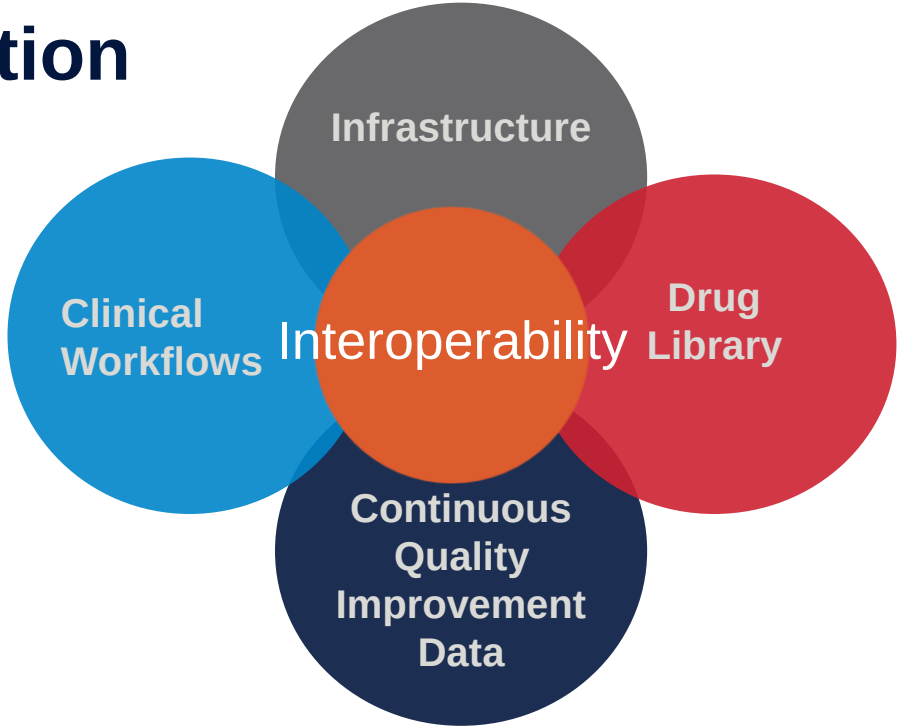
Interoperability: The Goal

"Many medication errors resulting in patient harm involve the IV infusion devices, with the most common cause of these errors being incorrect programming."

"In the medication use process, the nurse at the bedside is the most vulnerable to errors. Compared with other steps in the process, the administration stage has the fewest safeguards and the fewest support mechanisms."

Sources: Cohen MR, Schneider P, Niemi K. Effective Approaches to Standardization and Implementation of Smart Pump Technology. Institute for Safe Medication Practices website. https://www.ismp.org/profdevelopment/SmartPumpTechnologyforwebce.pdf. Accessed June 4, 2015.
Maddox RR, Danello S, Williams C, et al. Intravenous Infusion Safety Initiative: Collaboration, Evidence Based Best Practices, and "Smart" Technology Help Avert High-Risk Adverse Drug Events and Improve Patient Outcomes. *Advances in Patient Safety: New Directions and Alternative Approaches.* 2008;4:1-14

Standardization

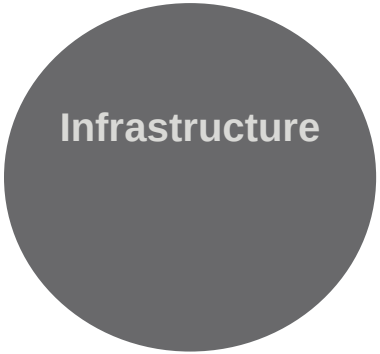


Sources: Mandrack, M. (2018). ISMP Guidelines for Optimizing Safe Implementation and Use of Smart Pumps (PowerPoint slides). 2018 Midyear Clinical Meeting and Exhibition.

Standardization

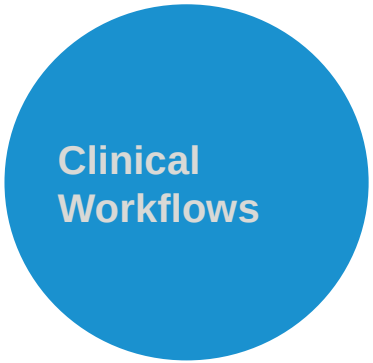
Considerations:

- Wireless pumps
- A strong network



Source: Gerhart, D. (2018). The Journey Towards Smart Pump Interoperability: Lessons Learned to Help You Prepare [PowerPoint slides]. 2018 Midyear Clinical Meeting and Exhibition.

Standardization



Considerations:

- Electronic health record
- Drug library guardrails
- Central distribution

Source: Gerhart, D. (2018). The Journey Towards Smart Pump Interoperability: Lessons Learned to Help You Prepare [PowerPoint slides]. 2018 Midyear Clinical Meeting and Exhibition.

Standardization

Considerations:

- Timely and consistent updating of the drug library

Source: Gerhart, D. (2018). The Journey Towards Smart Pump Interoperability: Lessons Learned to Help You Prepare [PowerPoint slides]. 2018 Midyear Clinical Meeting and Exhibition.

Standardization

Considerations:

- Infusion pump team who meets quarterly to review
  - Usage statistics
  - Top overridden alerts
  - Library changes
  - Education needs
  - Standardization of practices

Source: Gerhart, D. (2018). The Journey Towards Smart Pump Interoperability: Lessons Learned to Help You Prepare [PowerPoint slides]. 2018 Midyear Clinical Meeting and Exhibition.

Interoperability Readiness

Team Approach:

- Project Manager
- Biomedical Engineering
- Information Technologies
- Pharmacy
- Nursing

Source: Gerhart, D. (2018). The Journey Towards Smart Pump Interoperability: Lessons Learned to Help You Prepare [PowerPoint slides]. 2018 Midyear Clinical Meeting and Exhibition.

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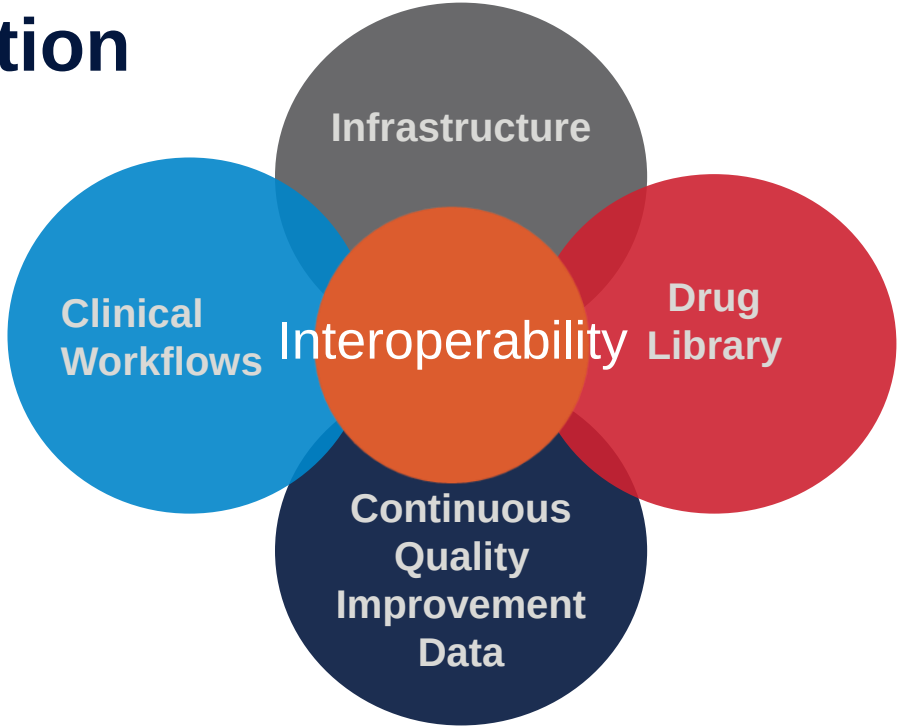

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Review Question #5

- What are the four standardization keys to working toward the goal of interoperability?
  - A. Infrastructure, reliability, drug library, continuous quality improvement
  - B. Infrastructure, clinical workflow, drug library, continuous quality improvement
  - C. Clinical workflow, drug library, continuous quality improvement
  - D. Infrastructure, clinical workflow, drug library, donuts

Review Response #5

- What are the four standardization keys to working toward the goal of interoperability?
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  - **B. Infrastructure, clinical workflow, drug library, continuous quality improvement**
  - C. Clinical workflow, drug library, continuous quality improvement
  - D. Infrastructure, clinical workflow, drug library, donuts

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Thank you!

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