MSOS Member Briefing
July 2024

Moderated by: E. Robert Feroli, PharmD, FASHP

MSOS
MEDICATION SAFETY OFFICERS SOCIETY

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PLANNING FOR AND UTILIZING LEARNERS ON MEDICATION SAFETY ROTATIONS

Liz Hess, PharmD, MS, FISMP, CPPS

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OBJECTIVES

- Identify opportunities to promote non-direct patient care rotations
- Outline steps to create a structured rotation
- Identify components of an organized rotation

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PRACTICE GAP

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July 2024

RECRUITMENT

Intern	APPEs	Residents
☐ Establish internship	☐ Establish elective	☐ Establish elective
☐ COP emails	☐ Tell interns	☐ Attend resident events
☐ Tell interns	☐ During lecture	☐ Attend resident orientation
☐ During class	☐ Intern shadowing	☐ Participate in non-rotation activities, e.g. advisor
☐ Annual intern recruitment	☐ Intern journal clubs	
☐ LinkedIN		

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ORGANIZATION

Intern	APPE	Residents
☐ On-site	☐ Hybrid	☐ Hybrid
☐ Hours/timecard	☐ Primary preceptor	☐ Projects planned
☐ Projects	☐ Projects planned	☐ Data prepped
☐ Expectations	☐ Data obtained	☐ DropBox
	☐ DropBox	

Share Outlook Calendar and Forward Meetings

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SKILL SETS

Intern/APPE	PGY1	PGY2
• SBAR • Outlook • Microsoft • Daily/weekly check-ins	• Excel – pivot table • Self-schedule topics • Weekly touch points	• Power BI • Recommend workflow changes

Independence, Self-Scheduling

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INTERN PROJECTS

- Look Alike Sound Alike list
- Patient weight conversion chart
- Lexicomp updates
- Unit audits/inspections
  - Insulin
  - Neuromuscular Blockers
- P&T Drug Shortage database creation
- Adverse Drug Reaction quarterly data
- Vaccine data analysis

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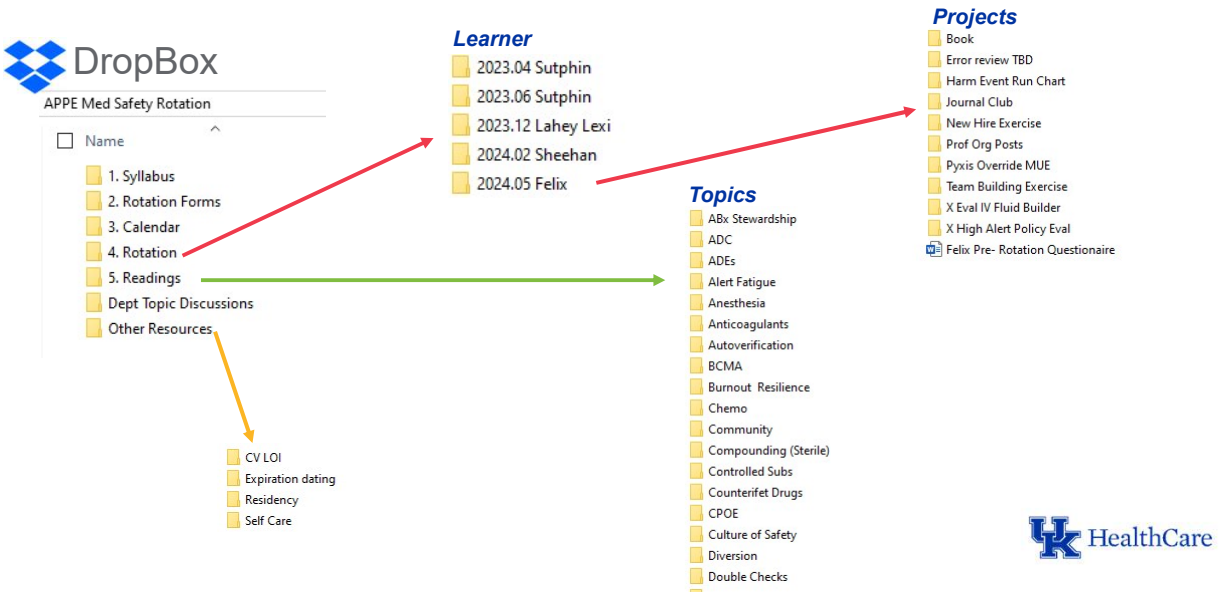
PLANNING THE ROTATION



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ROTATION QUESTIONNAIRE

Questionnaire

1. Goals: Short Term/Long Term/Rotation Goals
2. Where do you see yourself after school/residency?
3. How do you learn best?
4. For students, do you have a job outside of school? If so, where?
5. What are you most interested in learning this month and why?
6. What are you least interested in this month and why?

Introductory Readings/Quiz

- **All**
  - Digital Doctor - How medical tech gave a patient a massive overdose (Bactrim Error)
- **PGY1**
  - Lesson from the Denver medication error/criminal negligence case: look beyond blaming individuals. Hosp Pharm. 1998 June; 33(6):640-657
- **PGY2**
  - Shaping systems for better behavioral choices: lessons learned from a fatal medication error. Jt Comm J Qual Patient Saf. 2010 Apr;36(4):152-63.
- **Quiz**
  - Hosp Pharm 1994 Orientation teaching tool to prevent medication errors

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APPE PROJECTS

- Leadership Book
- Journal Club
- **IHI Open School** – Basic Certificate in Quality & Safety
- **Shadowing experience**
  - Nurses, Pharmacy Operations
- **Medication Error Investigation**
- **Other Projects** - Standardize for safety gap analysis, Dispensing Delays, ISMP QAA
- Topic Discussions
  - Definitions & Taxonomy – ADE, ADR, Med Error, NCCMERP

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PGY1 RESIDENTS

- Leadership Book
- Med Error Investigation
- **Med Error Analysis**
  - Opioids, insulin, transplant meds, antibiotics
- **Professional Organization Post Response**
- **Meeting Minutes**
- Topic Discussions
  - High Alert Medications
  - Look Alike Sound Alike Medications
  - Just Culture
  - Root Cause Analysis

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PGY2 RESIDENTS

- Leadership Book
- Med Error Analysis
- Med Error Investigation
- Professional Organization Post Response
- Meeting Minutes
- **Policy Review**
- **TJC experiences**
- New Hire Exercise
- **Other Projects – ADC Overrides, Partial Doses**
- Topic Discussions
  - Just Culture
  - Root Cause Analysis
  - Culture of Safety

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LEADERSHIP BOOKS

Books (Pick 1 from this list)

- Crucial Conversations ★
- It's your ship
- If Disney ran your hospital ★
- The Tipping Point
- Hardwiring Excellence ★
- 7 Habits of Highly Effective People ★
- Good to Great
- Great by Choice
- The Power of Full Engagement
- Principle Centered Leadership
- Emotional Intelligence

Other Books that are leadership
(not for rotation)

- 5 Dysfunctions of a team
- Being Mortal
- Checklist Manifesto
- Executive Presence
- The First 90 days
- 5 days at Memorial (emergency preparedness)
- The immortal life of Henrietta Lacks
- Cheating Death
- Thinking fast and slow
- Whack-A-Mole
- Josie's Story
- Fatal Care
- Digital Doctor
- How We do harm

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Type B Insulin Resistance Treatment: Clinical and Operational Challenges

Melissa Thompson Bastin, PharmD, PhD, BCCCP, FCCM, FCCP
Blake Barlow, PharmD, MBA, MS, BCPS

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Clinical Case

- 33-year-old male with no known past medical history presented with hematuria, fatigue, polyuria, and polydipsia for one week
- Glucose of **473 mg/dL**, **AG of 13**, beta hydroxybutyrate of **3.49 mmol/L**, **HgbA1C 8.6%**, WBC **2.8 × 10^9/L**, ANC **1420**, and platelets of **83**, proteinuria, and hematuria on urinalysis
- HD3 DKA with insulin drip up to 70u/hr | Kidney biopsy, Anti-Nuclear Antibody (ANA) and Smith auto-AB confirmed lupus nephritis with Type B insulin resistance
- Transferred to the ICU for insulin management

Diabetes Care 2018;41:2353-2360

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Clinical Case

- Transferred to MICU for NIH immunosuppression induction and insulin drip titration per MICU PharmD
  - Methylprednisolone 1gm, Dexamethasone 40mg daily x 4d, Rituxan (paused for Tb test), Cytoxan, PLEX x5 sessions
- Providers: NIH endocrinology, UK endocrinology, rheumatology, nephrology, pulmonary critical care intensivist, and pharmacy teams
- Goal BG 300-500 mg/dL | Drip titrations approximate to change in glucose (25% increments)
- Drip titrated up to **11,000 u/hr** with **2000 u boluses** and **U500 SQ TID**
- Insulin drip concentration up to (96 u/ml) due to AKI and technician compounding time
- Q30m-1h BGs via midline (eventually)
- **MICU PharmD 0730-1600; PM MICU PharmD 1600-2300; PharmD on call 2300-0700**
- **Dosing decisions made in conjunction with RN, Pulm APP, Endocrine via secure chat**

Diabetes Care 2018;41:2353-2360

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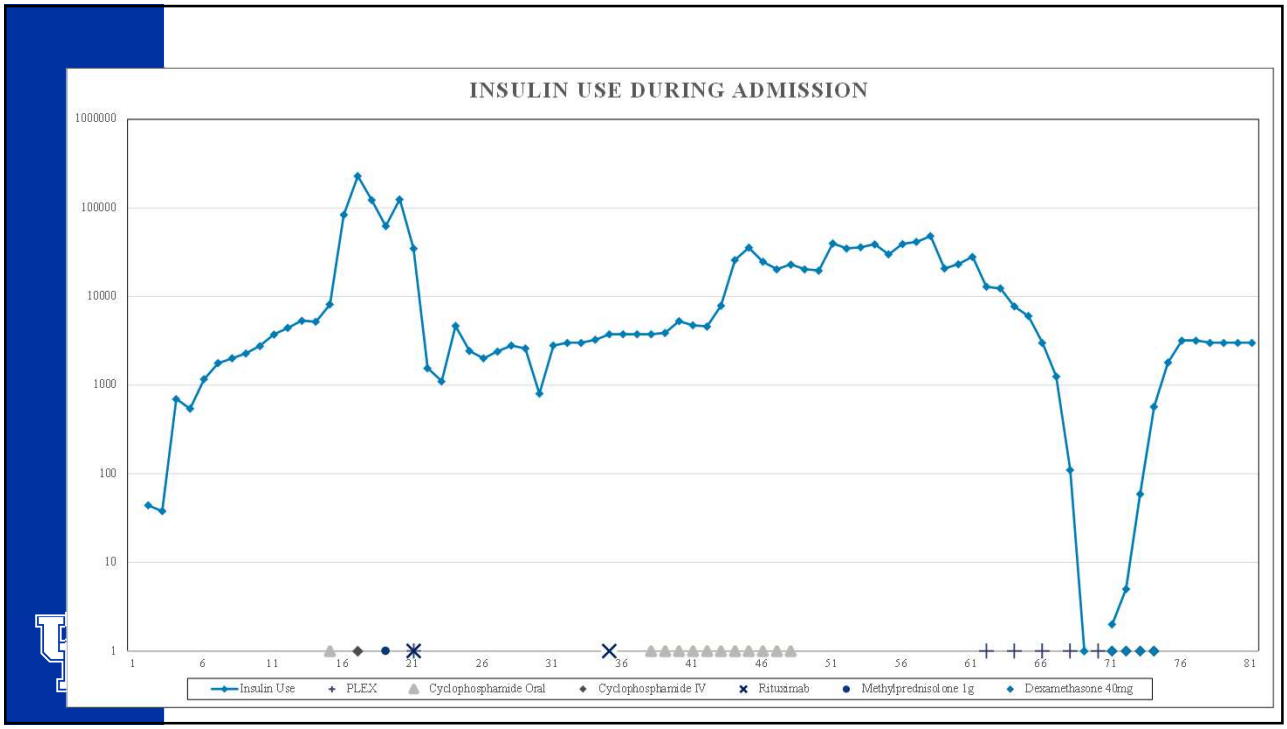

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Clinical Challenges

- Staff unfamiliar with extremely high doses --> no protocol
- Epic System limited compounding options
  - Urgent build on a weekend
- Positive Tb test, steroid induced hyperglycemia, neutropenia
- Patient centered care
  - De-escalation of finger sticks
  - Utilizing larger U500 syringe sizes (to avoid 12+ injections per dose!)
  - Continuous glucose monitor for inpatient use
  - Spanish speaking

Diabetes Care 2018;41:2353-2360

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Operational Impacts & Considerations

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Initial Insulin Regular Infusion

(2/10/24 – 2/12/24)

Insulin Requirements & Compounding Logistics

- Weekend insulin requirements spike:
  - Insulin requirements increase to 9,000 – 11,000 units/hr
  - Formulary insulin regular 1 unit/mL infusion insufficient
  - Previously validated insulin regular 6,000 units/250 mL infusion (Rabson-Mendenhall syndrome) required multiple bags/hour to be compounded/administered
- Custom order entered for insulin regular 48,000 units/500 mL (96 units/mL) infusion
  - At 9,000 units/hr, each bag would last ~5 hours
  - Each bag required #48 vials of insulin regular 100 units/mL 10 mL
- Supply Chain considerations
  - Using over #200 insulin regular 100 unit/mL 10 mL vials/day
  - Insulin regular 100 units/mL 3 mL vials were formulary product, so non-formulary purchasing required
  - All insulin regular products were also on shortage.
  - Significant efforts were required to purchase hundreds of 10 mL vials

Safety Considerations & Concerns

- Custom order for insulin regular 48,000 units/500 mL (96 units/mL) infusion bypassed typical safety protocols and validations in EHR for preparation, dispensing, and administration
  - No smart pump infusion parameters exist
- Accidental administration of this product to the wrong patient = serious harm; likely death
  - If this bag was lost after delivery, significant effort must be made to locate it immediately
- The patient's dynamic clinical condition was largely unpredictable
  - The 96 units/mL infusion could quickly turn from therapeutic to harmful without notice

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Revised Insulin Regular Infusion

(2/12/24 - onwards)

Leadership Meeting and Discussion

- Pharmacy representatives from multiple areas met to discuss
  - Pharmacy leadership, clinical and operations pharmacists, medication safety, supply chain, etc.
- Created standardized infusion protocol to meet patient's needs while reducing overall safety risk
- New infusion protocol:
  - Max concentration of insulin infusion: 24 units/mL
    - To match previously validated Rabson-Mendenhall build
  - Final bag volume depends on infusion rate threshold
    - 0 – 100 units/hr: 100 units/100 mL
    - 100 – 300 units/hr: 250 units/250 mL
    - 0 – 4,999 units/hr: 6,000 units/250 mL
    - 5,000 – 10,999 units/hr: 12,000 units/500 mL
    - 11,000 – 15,000 units/hr: 24,000 u/1,000 mL
- Restarted insulin regular U-500 subcutaneous therapy to assist with infusion requirements
- Significantly increased Supply Chain purchasing of U-100, U-500, and U-500 syringes

Additional Safety Parameters Established

- Established daily morning call between pharmacy leadership, operations, Med Safety and the clinical teams
- Started daily email summaries to all pertinent parties describing updates to the order(s) and any inventory needs
- Created ongoing secure chat between the clinical team pharmacist, operations team members, and Nursing team
  - Allowed for close-loop communication between Nursing and pharmacy operations regarding new bag requests, start/completion of compounding, and delivery expectations
  - Provided consistent pass off between shifts for Nursing, and Pharmacy operations (including Central Pharmacy vs. ICU Satellite Pharmacy)
- Never compound additional "back-up" bags to store in patient-specific bin; only hand-deliver directly to the RN

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Subcutaneous Insulin U-500 Challenges

Dedicated (Green) Insulin SQ U-500 Syringe

- **Pros:**
  - Ensures subcutaneous administration vs. Luer Lock
  - Calibrated specifically for U-500 insulin
  - Color-coded to indicate U-500
- **Cons:**
  - Max 250 units/syringe **(>40 injections/day)**
    - 3,000 – 4,000 units TID
  - Dose must be ordered as multiple linked orders in 5 unit increments with max 250 units per order
    - Safety challenges with order entry, calculating total insulin requirements, etc.

Luer Lock Syringe w/ SQ Needle Attached

- Dispensing in 3mL Luer Lock syringe
  - Max 1.5 mL (750 units) per syringe
  - Dispensed with 25 gauge x 5/8" Luer Lock subcutaneous needle attached
- **Pros**:
  - Drastically reduced injections per day (42 -> 14)
  - Simplified and increased accuracy of order entry
- **Cons**:
  - Potential for accidental IV administration
  - Increased potential for wrong-patient administration compared to green U-500 syringes

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Additional Considerations

- Discharge/"Meds to Beds" challenges
- Stocking insulin U-500 in the compounding area
  - Locked/lidded bin, significant high-alert labeling
  - Discussion at weekly huddles
  - Joint Commission surveyor
- After discharge, maintaining stock of U-500 vials and syringes despite non-formulary status
- After-hours re-admissions
- EHR challenges
  - Specific instructions for manipulation on verification required
  - Re-ordering from prior encounters causes problems

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Questions?

Thank you!

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The Power of Advanced Medicine

Oxytocin Best Practice Implementation: Journey and Lessons Learned

Mark Wolf Jr, PharmD, BCPS
Pharmacist Program Coordinator – Medication-Use Safety and Quality, Pediatrics and Women

Noelle Leung, PharmD, BCPPS
Maternal Fetal Medicine and Obstetrics Clinical Pharmacist

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New Targeted Medication Best Practice

- In 2022, the Institute for Safe Medication Practices (ISMP) released three new best practices.

NEW Best Practice

NEW BEST PRACTICE 17:

Safeguard against errors with oxytocin use.

a) Require the use of standard order sets for prescribing oxytocin antepartum and/or postpartum that reflect a standardized clinical approach to labor induction/augmentation and control of postpartum bleeding.

b) Standardize to a single concentration/bag size for both antepartum and postpartum oxytocin infusions (e.g., 30 units in 500 mL Lactated Ringers).

c) Standardize how oxytocin doses, concentration, and rates are expressed. Communicate orders for oxytocin infusions in terms of the dose rate (e.g., milliunits/minute) and align with the smart infusion pump dose error-reduction system (DERS).

d) Provide oxytocin in a ready-to-use form. Boldly label both sides of the infusion bag to differentiate oxytocin bags from plain hydrating solutions and magnesium infusions.

e) Avoid bringing oxytocin infusion bags to the patient's bedside until it is prescribed and needed.

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How Are We Doing?

We learned that we were **partially compliant**

Require use of standard order sets	Not Implemented - Oxytocin can be ordered outside of order set
Standardize to a single concentration	Not Implemented - Had 20 units/1000mL and 40 units/1000mL available
Standardize doses and rates	Not Implemented - Expressed in either milliunits/min and milliliters/hr per indication
Provide in a ready-to-use form	Partially Implemented - Used commercially available bag or pharmacy kit
Avoid bringing bags to patient bedside until prescribed	Fully Implemented - Ordered via admit order set and obtained from Pyxis when needed

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Our Recommendations

Remove previous oxytocin concentrations and add new concentration

- Changed from 20units/1L to 30units/500mL

Optimize Computerized Provider Order Entry (CPOE)

- Standardize infusion units to milliunit/min
- Remove IM oxytocin from preference list
- Remove Low-Dose oxytocin from order set
- Update provider personalized order sets

Update Pyxis Inventory

Update and optimize Alaris Library

Go-live education

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Identified Barriers

Safety Concerns

- Administration errors with product 3x more concentrated
- Confusion with Magnesium Sulfate supplied in 500mL bags

Drug Shortages

- Recurrent for different premade concentrations
- Initially more frequent and severe with the 30unit/500mL product

Hemorrage Management

- Urgent/Emergent Cases
- Concern with timing of administration, dose, volume, and onset of response

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Working to Gain Consensus

Benefits

- Decreased volume overload
- Encouraged increased smart pump utilization
- Eliminate bedside admixture for postpartum hemmorrhage

Safety

- Physically separated magnesium and oxytocin in pyxis
- Backup compound recipe during product shortage

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Meticulous Planning and Implementation

Meeting between nursing, clinical pharmacy, operations, and medical staff to create timeline

- Pre-implementation procedure blocking
- 8AM – touch base with team
- 10AM – obtain list of patients on oxytocin
- 11:30AM – Change out Pyxis stock
- 11:30AM – Alaris updates pushed into product
- 12:05PM – Reverification of previous oxytocin orders
- 12PM – Epic Changes pushed live
- 12:10PM – Ensure Alaris pumps are restarted

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Disaster Struck!

2/20 12:22 PM

Something is wrong with alaris. It shows its updated but oxytocin is not in there

- Clinical Nurse Specialist rounded on unit to help troubleshoot non-functioning pumps
- Some pumps were working while others were not
- Brought functioning pumps to the unit and retrieved previous oxytocin concentrations
- Critical Incident Debrief following discovery

Clipart: https://japaclip.com/en/worried-doctors/

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Post-Implementation Review

Pump Programming	Perceived Delayed Onset	Hypotension
• Difficulty changing between regular and high dose oxytocin • Need for a new bag to run postpartum pitocin due to smart pump programming • Need to adjust the administered volume to allow for 1 or 2 total bag dose	• Potential administration of IM doses • Rapidly switching to high dose when may not be indicated	• Report from OR due to overutilization of high dose/prolonged high dose without fluid volume

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Post-Project Reflection

What Went Well

- Multidisciplinary Teamwork
- Quick action once issues were identified

Lessons Learned

- Always have a rollback plan
- Bidirectional communication with contracted services is vital

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References

1. ISMP. (2022, February 16). *Three new best practices in the 2022-2023 targeted medication safety best practices for hospitals*. Institute For Safe Medication Practices. https://www.ismp.org/resources/three-new-best-practices-2022-2023-targeted-medication-safety-best-practices-hospitals

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Institute for Safe Medication Practices
An ECRI Affiliate

ISMP Update
MSOS Briefing July 2024

Rita K. Jew, PharmD, MBA, BCPPS, FASHP
President
Institute for Safe Medication Practices

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Medication Safety Membership Survey

Thank You!!

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ISMP Cheers Awards – Nominations Close Soon!

- Award is given to an individual or organization who has demonstrated exemplary commitment to medication safety through an innovative and creative project, program, educational effort, and/or research.
- **Nominations will close on August 2, 2024**
- Go here to nominate: **https://home.ecri.org/pages/cheers-nominations**

https://home.ecri.org/pages/cheers-awards

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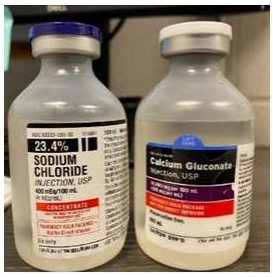
NAN Alert

Manufacturer's dexmedeTOMIDine premixed IV bags may be packaged within an overwrap labeled as acetaminophen!

Vials Switched on Automated Compounder

17 infusions for three patients were impacted



- Prescribed: 3.6 g of calcium gluconate & 96 mEq of sodium prescribed (zero mEq from sodium chloride). Compounded: no calcium gluconate & 242 mEq of sodium (146 mEq from sodium chloride).
- Prescribed: 2.2 g of calcium gluconate & 184 mEq of sodium (123 mEq from sodium chloride). Compounded: 3 g of calcium gluconate & 150 mEq of sodium (88 mEq from sodium chloride).
- Prescribed: 1.1 g of calcium gluconate & 79 mEq of sodium (26 mEq from sodium chloride). Compounded: 0.651 g of calcium gluconate & 98 mEq of sodium (45 mEq from sodium chloride).

Safe Practices

- Develop standard operating procedure for automated compounding devices
  - Standard setup, considering product characteristics
  - Scan product barcode before connecting it to tubing, trace tubing to port, scan barcode tag for port. This should be done for each product, one at a time. This process should be followed when replacement vials are used.
  - A second individual should verify device setup steps, including barcode verification and line tracing.
  - Define how overrides of system warnings or alerts are to be managed, building in a second verification before a warning is overridden.

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Upcoming Educational Programs

- Medication Safety Intensive Workshops
  - Aug 8 & 9
  - Oct 3 & 4
  - Dec 5 & 6
- Medication Safety Intensive Workshops for Community & Specialty Pharmacies
  - Sep 20 & 27

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ISMP Website Demo

How to find Resources

How to find Action Agendas

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Questions?

- A copy of today's slides will be posted on our website.
  - Next MSOS Briefing date – September 26th, 2024.

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