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ISMP Institute for Safe Medication Practices
An ECRI Company

Acute Care
ISMP Medication Safety Alert!®
Educating the Healthcare Community About Safe Medication Practices

Having dedicated medication reconciliation practitioners reduces harm

Problem: Discrepancies in medication histories and incomplete or inaccurate medication reconciliation are common causes of errors during transitions in care. Drug omissions, wrong doses, wrong drugs, additional drugs, and drugs inappropriate for the patient have all been a result of errors during this vulnerable process. We recently received two reports that emphasize the value of organizations prioritizing a structured medication reconciliation process to detect and mitigate medication errors. This includes having a specially trained, dedicated practitioner (e.g., medication reconciliation technician) complete a thorough and accurate medication history as early as possible, ideally before admission orders are written; and a designated prescriber complete medication reconciliation and resolve discrepancies at each transition of care, including identifying pre-existing errors in the patient's home medication regimen.

Errors Reported to ISMP

Case 1: *An elderly patient was admitted to a hospital for a planned procedure. The medication reconciliation (pharmacy) technician reviewed the patient's home medication list with the patient. The patient reported that they had just started taking oral methotrexate for rheumatoid arthritis. An outpatient pharmacy had dispensed methotrexate 2.5 mg tablets with the directions to take 20 mg of methotrexate (8 of the 2.5 mg tablets) by mouth once weekly on Friday. The patient reported that they took 4 tablets (10 mg) twice daily on Friday, Saturday, Sunday, and 4 tablets on Monday morning before being admitted. The technician educated the patient that the prescription was for 20 mg once weekly.*

The technician notified the pharmacist, who then communicated the error to the admitting prescriber. The prescriber ordered a complete blood count (CBC), which was within normal limits on the day of admission. The patient underwent the scheduled procedure and was kept in the hospital for close monitoring. The patient remained stable until day three after the procedure, when they developed mouth sores. A repeat CBC showed a drop in the white blood cell count, presumably from the methotrexate. The pharmacist contacted the attending prescriber and recommended a hematology consultation, notification to the patient's rheumatologist who prescribed the methotrexate, and notification to the outpatient dispensing pharmacy. Once the patient's condition stabilized, they were eventually discharged with outpatient CBC orders.

Although we have no additional details on why the patient was taking the incorrect dose or if they received counseling at the pharmacy, errors related to inadvertent daily dosing of oral methotrexate have been reported to ISMP over the years. For this reason, ISMP Targeted Medication Safety Best Practices for Hospitals, Best Practice 2, and ISMP Targeted Medication Safety Best Practices for Community Pharmacy, Best Practice 3, call for system safeguards to ensure a weekly dosage regimen default for oral methotrexate in electronic systems when medication orders are entered. Organizations should provide patients with education for all oral methotrexate discharge orders, and double-check all printed medication lists and discharge instructions to ensure that they indicate the correct dosage regimen. Practitioners must ensure that the process for providing discharge instructions for oral methotrexate includes clear written instructions AND clear verbal instructions that specifically review the dosing schedule and emphasize the danger with taking extra doses. When methotrexate is picked up at the pharmacy, require counseling to ensure the

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SAFETY briefs

Coming soon! Tranexamic acid—Joint announcement from APSF and ISMP. After repeated warnings of the catastrophic risk of wrong drug–wrong route errors, where vials/ampules of intravenous (IV) tranexamic acid injection has been inadvertently administered intrathecally instead of local anesthetics (in similar looking vials/ampules), the Anesthesia Patient Safety Foundation (APSF) and ISMP will be releasing a joint announcement (in the coming week), Preventing Wrong Drug–Wrong Route Errors Involving Tranexamic Acid and Local Anesthetics. We are united in applauding the US Food and Drug Administration (FDA) for increasing awareness regarding this potentially fatal patient safety issue by requiring the following changes to the tranexamic acid injection prescribing information:

- Add a Boxed Warning to communicate the risk of medication errors involving inadvertent neuraxial administration of tranexamic acid injection
- Add a statement to the package insert indicating that tranexamic acid injection is contraindicated as a neuraxial injection
- Update the Dosage and Administration section to clarify that tranexamic acid injection is only to be administered intravenously and to provide instructions for preparing and administering the diluted solution

Additionally, FDA is recommending that the container labels for tranexamic acid injection prominently display the product name and IV route of administration.

Organizations should review and implement recommendations in the joint announcement, which calls for the removal of tranexamic acid vials/ampules from perioperative areas and to instead provide ready-to-administer tranexamic acid premixed IV bags from

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pharmacist reviews the dosing schedule with the patient. Require the patient to repeat back the instructions, at every encounter, to validate that the patient understands the dosing schedule and toxicities of the medication if taken more frequently than prescribed. Provide all patients with a copy of the ISMP high-alert medication consumer leaflet on oral methotrexate.

Case 2: *A prescriber ordered the wrong strength of* ***BIKTARVY*** *(bictegravir/emtricitabine/tenofovir alafenamide) for an adult patient. Instead of prescribing Biktarvy 50 mg/200 mg/25 mg tablets, they ordered Biktarvy 30 mg/120 mg/15 mg, which is the appropriate strength for pediatric patients weighing 14 to less than 25 kg. The outpatient pharmacy did not catch the error and dispensed a 90-day supply to the patient. The patient received suboptimal therapy for nearly a month until they were admitted to the hospital, and a medication reconciliation technician identified the error. The pharmacy informed the infectious diseases provider about the error; the patient's outcome was not known at the time of the report. The organization's electronic health record (EHR) did not distinguish between the adult and pediatric dose strengths.*

In our January 26, 2023 article, Pediatric Strength Biktarvy Was Accidentally Prescribed and Dispensed to Adults, we noted that we have received multiple reports in which an adult patient was ordered and dispensed the pediatric strength of Biktarvy in error. The practitioners involved in prescribing and dispensing this medication were not familiar with human immunodeficiency virus (HIV) medications and their various formulations, which could have contributed to the error. We called for educating prescribers, nurses, and pharmacy staff who may manage HIV medications on the various dosing regimens and combination therapies. Create weight-based order sentences with dose range checking in the EHR to guide prescribers to select the correct dose and automatically link the corresponding formulation in the pharmacy system. Pharmacy computer systems should alert and prevent entry of the pediatric formulation for adult patients and vice versa, using patient information such as age and/or weight. If your organization only treats adult patients, consider removing the pediatric formulation from your preferred drug list.

Although these events had unique contributing factors, in both cases, the dedicated medication reconciliation technician acted as a safety net to identify the error and mitigate further harm to the patient.

Safe Practice Recommendations: As outlined in the ISMP Targeted Medication Safety Best Practices for Hospitals, Best Practice 21, establishing organizational expectations and a medication reconciliation policy for conducting medication history collection, verification, and reconciliation, as well as designating trained individuals to complete each process step, are key to improving safe care handoffs. In our March 23, 2023 article, Implement Strategies to Prevent Persistent Medication Errors and Hazards, we call for multidisciplinary medication reconciliation teams to review current processes, identify gaps and opportunities for improvement, and lead process design and redesign within the organization by considering the following strategies to prevent and detect medication errors at transitions of care.

Admission

- Have practitioners approach admission medication reconciliation as a three-step process:
  - **Collect medication history.** Assign dedicated practitioners (e.g., medication reconciliation technicians) to obtain the most accurate medication list possible (see ISMP Canada's Best Possible Medication History). Ideally, the best possible medication history should be collected before admission orders are written, and before the first dose of medication is administered. Incorporate prompts in the EHR for staff to ask about allergies and associated reactions, prescription and over-the-counter medications (including herbals and dietary supplements), and non-enteral medications (e.g., transdermal patches, injections, infusions, implantable pumps).

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manufacturers, compounding pharmacies, or institutional pharmacies. In addition, use barcode scanning or other technology-assisted machine-readable code at the point of care for verification before administration.

HIGH-ALERT

Hazard! Broselow Rainbow Tape contains incorrect vecuronium and flumazenil dose. The Broselow Rainbow Tape is a tool used during emergencies that has color zones with precalculated information for medication dosages, equipment sizes, and other procedures based on the child's height, measured using the tape. We have received multiple reports that the AirLife brand, Revision 3, 36-23446, Print Version Broselow Rainbow Tape contains incorrect dosing information in the calculation basis section. The vecuronium dose is listed as

RED TO HEAD

CALCULATION BASIS

ALL DRUGS GIVEN BY IV CAN BE GIVEN IO

LEGEND			
Fluids/Blood Products (IV/IO)			
Crystalloid (0.9 NS or LR)	10-20 mL/kg		
Blood Products	10 mL/kg		
Maintenance Fluids (IV/IO)			
0.9 NS with appropriate potassium chloride (KCl) and dextrose	American Academy of Pediatrics 2018 Clinical Practice Guideline Maintenance IV/IO Fluids as per the Holliday-Segar Rule		
4 mL/kg/hr for the first 10 kg of body weight (3-10 kg)			
2 mL/kg/hr for the second 10 kg of body weight (11-20 kg)			
1 mL/kg/hr for any kg of body weight above 20 kg (>20 kg)			
ASTHMA			
Albuterol (nebulized) up to 10-20 mg/hour			
DexAMETHasone IV/IO 0.6 mg/kg			
MethylPREDNISolone IV/IO 1-2 mg/kg			
Magnesium Sulfate IV/IO 50 mg/kg			
AIRWAY MANAGEMENT		**SEIZURE**	
PRE-RSI/RSA SEDATIVES AND/OR ANALGESICS		Fosphenytoin IV/IO	20 mg PE/kg
		LevETIRAcetam IV/IO	50 mg/kg
Etomidate IV/IO	0.3 mg/kg	LORazepam IV/IO	0.1 mg/kg
FentaNYL IV/IO	1 mcg/kg	Midazolam IV/IO	0.1 mg/kg
Ketamine IV/IO	1 mg/kg	**INCREASED INTRACRANIAL PRESSURE**	
Midazolam IV/IO	0.1 mg/kg		
PRE-RSI/RSA NEUROMUSCULAR BLOCKERS		3% HYPERtonic Saline IV/IO*	2-5 mL/kg
Rocuronium IV/IO	1 mg/kg	Mannitol IV/IO	1 g/kg
Succinylcholine IV/IO	2 mg/kg	**HYPOGLYCEMIA**	
Vecuronium IV/IO	0.1 mg/mL	Dextrose IV/IO (D10, D25, & D50)	0.5 g/kg
POST-RSI/RSA SEDATIVES AND/OR ANALGESICS		**TOXICOLOGY (800-222-1222)**	
FentaNYL IV/IO	1 mcg/kg	Naloxone IV/IO	0.1 mg/kg
Ketamine IV/IO	1 mg/kg	Flumazenil IV/IO	0.1 mg/kg
Midazolam IV/IO	0.1 mg/kg	Charcoal PO/NG	1 g/kg
POST-RSI/RSA NEUROMUSCULAR BLOCKERS		**PAIN**	
		FentaNYL IV/IO	1 mcg/kg
Rocuronium IV/IO	1 mg/kg	Ketamine IV/IO	1 mg/kg
Vecuronium IV/IO	0.1 mg/kg	Morphine IV/IO	0.1 mg/kg
		*Can also be used to treat severe, symptomatic hyponatremia	
Note: Consider reducing RSA/RSI sedative and/or analgesic doses in the context of poor perfusion			

Figure 1. The impacted Broselow Rainbow Tape lists an incorrect vecuronium dose of 0.1 mg/mL, rather than the correct 0.1 mg/kg dose, and an incorrect flumazenil dose of 0.1 mg/kg, rather than the correct 0.01 mg/kg dose.

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- **Clarify.** The process of collecting the best possible medication history may include the use of at least one outside resource (e.g., pharmacy, prescriber, clinic note) to verify the history provided by the patient/family/caregiver.
- **Reconcile.** The designated prescriber should compare the prescribed admission medications to those on the medication history list and resolve any discrepancies. Document any modifications made to the current therapy upon admission, with each change in the level of care, and at discharge to promote a continuum of safe medication use.

Transfer

- Each time a patient transfers from one level of care or setting to another (e.g., critical care to medical/surgical, operating room to medical/surgical), review previous medication orders alongside new and discontinued orders and the plan of care to resolve any discrepancies.
- Establish an organizational policy that standardizes which prescriber completes this reconciliation (e.g., transferring prescriber versus receiving prescriber).
- Document and communicate information about this reconciliation during handoffs.

Discharge

- Before discharge, designate a prescriber to reconcile the patient's list of home medications with medications used during admission and those proposed for use after discharge. Any differences must be resolved before discharge.
- Provide the patient with an updated medication list and communicate which medications they are to continue taking, those they should stop taking, and any new medications for them to start taking. Educate patients on each medication's indication, how they should take it, and common side effects.
- Send a complete list of the patient's medications to the next service prescriber when discharging or transferring the patient to another level of care within the organization or to another care setting outside the facility. Even if the patient is going home, send the list directly to the patient's primary care provider (PCP).
- Educate patients on the importance of maintaining and carrying a complete and up-to-date medication list. Encourage patients to share the list during all healthcare encounters (e.g., prescriber's office, pharmacies, hospitalizations). Show them how to review their medication list in the organization's patient portal and ensure this information is also kept up to date.

Special Announcements

Midday symposium at ASHP Midyear

If you are attending the 2025 ASHP Midyear Clinical Meeting and Exhibition in Las Vegas, NV, join us on **December 9, 2025**, for our midday symposium, ***Safety Considerations for IV Push Amid Drug Shortages***. Speakers will review adverse drug events (ADEs) associated with intravenous (IV) push medications and present safe practice guidelines and system-level strategies to prevent errors. For more information and to register, click here.

Virtual MSI workshop

You still have time to join us for our last ***ISMP Medication Safety Intensive (MSI)*** workshop of the year, which will be held **December 4 and 5, 2025**. This two-day virtual workshop is designed to help you successfully address current medication safety challenges that impact patient safety. Program faculty will provide you with the knowledge, as well as specific tools and resources needed to establish and sustain an aggressive, yet focused medication safety program. For more information and to register, click here.

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0.1 mg/mL rather than the **correct dose of 0.1 mg/kg**, and the flumazenil dose is listed as 0.1 mg/kg rather than the **correct dose of 0.01 mg/kg** (**Figure 1**).

Vecuronium, a neuromuscular blocking agent, is a high-alert medication which bears a heightened risk of causing significant patient harm if used in error. Flumazenil is used to reverse the effects of benzodiazepines. The flumazenil prescribing information contains a Boxed Warning: *The use of flumazenil has been associated with the occurrence of seizures. These are most frequent in patients who have been on benzodiazepines for long-term sedation or in overdose cases where patients are showing signs of serious cyclic antidepressant overdose. Practitioners should individualize the dosage of flumazenil and be prepared to manage seizures.* A tenfold overdose of flumazenil may put patients at increased risk of side effects.

We have contacted AirLife to notify them of this concern. AirLife has responded that they take all customer feedback and complaints seriously and are following their internal processes. We look forward to their follow-up. ISMP has heard that some organizations have crossed out the incorrect information and/or added a sticker with the correct dose, which is not without risk. Organizations should meet with key stakeholders to discuss the risk and determine mitigation strategies. Educate practitioners about this safety concern and the actions you have taken. Report issues to AirLife, the US Food and Drug Administration (FDA), and ISMP.

To subscribe: www.ismp.org/ext/1367

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Report medication and vaccine errors to ISMP: Please visit www.ismp.org/report-medication-error or call 1-800-FAIL-SAF(E). ISMP guarantees the confidentiality of information received and respects the reporters' wishes regarding the level of detail included in publications.

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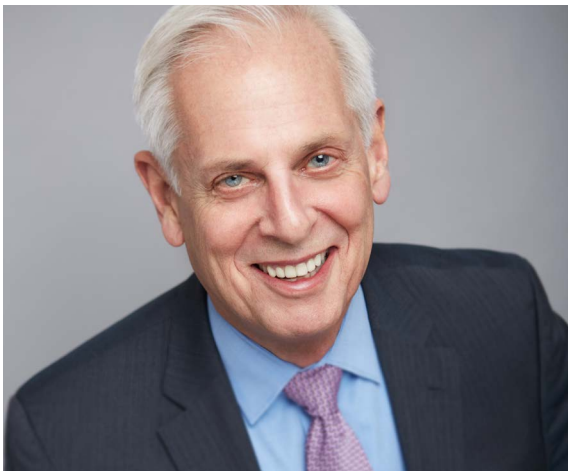
SHARING A SAFETY MISSION

ISMP 28TH ANNUAL CHEERS AWARDS

Tuesday, December 9, 2025

House of Blues – Las Vegas, NV 6:00 pm



The 28th Annual ISMP Cheers Awards will celebrate individuals and organizations on a mission to make strides in medication safety. Support ISMP's ONLY annual fundraising event or attend the awards dinner to honor them and advance our shared goal of preventing errors and protecting patients!

For support opportunities and/or to register for the dinner, visit: https://home.ecri.org/pages/cheers-event

The Michael R. Cohen Lifetime Achievement Award Winner:
Martin J. Hatlie, JD
Founding Member, Director for Policy & Advocacy, Patients For Patient Safety US

ISMP will be at the 2025 ASHP Midyear Clinical Meeting
Educational Sessions with ISMP Speakers:

Sunday, December 7, 2025

How Smart Are Smart Infusion Pumps in Preventing Medication Errors?
9:00 am – 10:15 am PT

ISMP Medication Safety Update 2025
3:30 pm – 5:00 pm PT

Tuesday, December 9, 2025

A Winning Strategy: Confronting the Top 10 Patient Safety Challenges of 2025 with ISMP
10:00 am – 11:00 am PT

Symposium: Safety Considerations for IV Push Amid Drug Shortages
11:30 am – 1:00 pm PT
Mandalay Bay Convention Center - South Pacific D - Lower Level
Preregister here: https://home.ecri.org/blogs/ismp-upcoming-events/safe-iv-push-practices-amid-drug-shortages

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