

Community/Ambulatory Care

ISMP Medication Safety Alert!®

Educating the Healthcare Community About Safe Medication Practices

Safeguard pediatric patients—The 2025 KIDs List

PROBLEM: Pediatric patients are vulnerable to higher rates of adverse drug events for a variety of reasons, including frequent off-label drug usage, individualized dose calculations, and age-related differences in drug disposition and effect. Practitioners who are not specialized in pediatrics may be unfamiliar with a medication's use, maximum dose, contraindications, side effects, recommended monitoring parameters, or other safety concerns that could cause harm.

To create a standard of care for the safe use of medications in pediatric patients, the Pediatric Pharmacy Association (PPA) commissioned a group of pediatric pharmacists to evaluate the literature and compile a list of potentially inappropriate drugs for pediatric patients. The PPA KIDs List of Key Potentially Inappropriate Drugs in Pediatrics was published in the *Journal of Pediatric Pharmacology and Therapeutics* in 2020 and became the first list of drugs that should be "avoided" or "used with caution" in all or a subset of pediatric patients.¹ It is akin to the Beers Criteria for older adults, but it's for pediatric patients. ISMP served as a reviewer for the project. The KIDs List Collaborators were recognized with an ISMP Cheers award in 2021 for their passion to improve the safe use of medications in pediatric patients and inspire future medication safety research in children.

In 2025, twelve pediatric pharmacists reviewed and updated the KIDs List. For each potentially inappropriate medication, they evaluated primary, secondary, and tertiary literature; US Food and Drug Administration (FDA) pediatric safety communications; the UpToDate Lexidrug database; and product information. ISMP served as a reviewer for the updated list. After critical analysis and reorganization, the second edition of the KIDs List contains 39 medications and/or drug classes (refer to Table 1 in the journal article) and 10 excipients (refer to Table 2 in the journal article). There were several major updates, including those described below.²

Examples of Updates from 2020

- The first edition in 2020 provided recommendations based on age categories (e.g., newborn, infant, preschool child, child, adolescent). However, in the second edition, as no specific break-points between these groups consistently correlated with the available evidence, the panel opted to report specific ages (e.g., less than one year old) to avoid or use caution with the drug rather than age categories.
- Addition of the following drugs:
 - Angiotensin receptor blockers (caution in less than 1 month of age due to risk of renal tubular dysgenesis)
 - Mirabegron (caution in less than 3 years of age due to risk of increased blood pressure)
 - Molnupiravir (caution in 18 years of age and younger due to risk of bone and cartilage toxicity)
 - Montelukast (caution in 18 years of age and younger due to risk of sleep disturbances)
 - Ribavirin oral inhalation (caution in less than 2 years of age due to risk of sudden respiratory deterioration)

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SAFETY briefs

⚡ Symbol misinterpreted resulting in the wrong directions. With the expanded use of electronic prescribing, pharmacy staff are seeing fewer and fewer handwritten prescriptions. Staff, especially those with less experience, may not be familiar with the shorthand and abbreviations prescribers have traditionally used for handwritten prescriptions. Recently, a prescriber ordered a patient to take 1 **VESICARE** (solifenacin) 10 mg tablet daily to treat an overactive bladder. However, the dispensing pharmacy shared that a pharmacy technician misinterpreted the "T" included in the sig (**Figure 1**) as the letter "T" rather than as the intended meaning of "one." As a result, the technician read "TPO" was TID and entered the prescription with directions to take 1 tablet 3 times a day. The medication was

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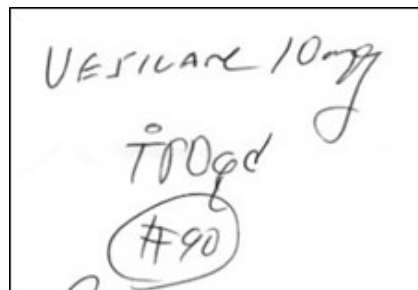


Figure 1. A pharmacy technician misinterpreted the symbol "T" as the letter "T" rather than as the intended meaning of "one," resulting in the wrong directions, "Take 1 tablet 3 times a day," being entered into the pharmacy computer system.

Share Your Stories with Us

Articles in this publication are based on actual reports from practitioners. We'd like to hear from you, too! Please share reports of medication errors and prevention recommendations, in confidence. Reports of near misses and errors may be submitted [online](#) or by calling 1-800-FAIL-SAFE. ISMP guarantees the confidentiality of information received.

> **KIDs List** — continued from page 1

- Codeine and tramadol recommendations updated to reflect the latest FDA guidance (risk of respiratory failure and death)
- Revision of guanylate cyclase-c agonists recommendation based on updates to the package insert, which shows a risk of death from dehydration in patients less than 2 years of age (linaclotide) and 18 years and younger (plecanatide)
- **DAPTO**mycin was removed due to emerging case series describing safety
- Ivermectin (oral) was removed due to emerging case reports and series describing safe use in specific disease states in patients less than 15 kg
- Expansion of the tetracycline class with stratification of quality based on evidence regarding tooth discoloration
- Significant revision of **DOP**amine antagonists based on emerging evidence, along with reorganization as first-generation antipsychotics, second-generation antipsychotics, and other **DOP**amine antagonists
- Midazolam quality of evidence changed from high to low after reappraisal of cited evidence
- Revision of ethanol/ethyl alcohol, polysorbate 80, and propylene glycol recommendations due to emerging evidence/guidance

SAFE PRACTICE RECOMMENDATIONS: The KIDs List is a remarkable step forward for pediatric medication safety. We encourage organizations that treat pediatric patients to review the updated KIDs List and operationalize this guidance in the clinical setting. Consider the following recommendations.

Safeguard medication reconciliation. If the practitioner completing a pediatric patient's medication history determines that the child is taking a drug on the KIDs List and it has an applicable warning (e.g., avoid use in their particular age range), they must escalate this to the prescriber. The prescriber should then evaluate why the patient is taking the drug. Consider whether an alternative drug or formulation is appropriate and/or if additional monitoring should be done.

Evaluate order sentences. Review if there are order sentences and/or order sets available in the electronic health record (EHR) for the medications on the KIDs List. Consider if changes are needed, such as indication-based sentences with dosing guidance based on the child's age/weight, or additional monitoring parameters. Include discharge orders, order sets, and prescriptions in the review to assess if improvements are necessary.

Use dose range checking. Test your EHR and pharmacy dispensing system settings to determine if it will generate a dose range checking (DRC) alert based on the KIDs List recommendations. For example, if a prescriber orders loperamide for a child less than 3 years old for acute infectious diarrhea, does the computer system warn the prescriber and/or pharmacist that this could result in ileus or lethargy? Ensure alerts are meaningful and easy to understand so practitioners can act upon them.

Enhance clinical decision support. Consider whether additional changes to clinical decision support (CDS) should be implemented (e.g., hard stop, contraindication warning). For example, if a prescriber orders a sodium phosphate solution enema rectally for a child less than 2 years old, what type of alert is generated? Is the warning a soft stop that can be easily overridden, or is it a

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dispensed to the patient with the incorrect directions; however, they took the medication correctly (i.e., one tablet daily) as directed by their prescriber. The error was caught in the pharmacy when the patient requested a refill. The pharmacy noted that staff unfamiliarity with the dosing frequency of Vesicare may have contributed to the error.

Even though handwritten prescriptions are less common today, share this event with staff and discuss lessons learned. Provide staff with education and assess their competency regarding interpreting information that may be presented in a prescription. Reinforce with staff that they should ask for assistance or seek clarification from the prescriber if the information on the prescription is unclear. Ideally, prescribers will use electronic systems to generate and transmit prescriptions to pharmacies to reduce the need for manual transcription. Also, never use error-prone abbreviations and symbols such as "qd" (as seen in **Figure 1**, page 1) or others listed in the ISMP [List of Error-Prone Abbreviations, Symbols, and Dose Designations](#).

Look-alike valsartan and febuxostat bottles. A pharmacist reported the potential for wrong-drug errors involving bottles containing valsartan 40 mg tablets and bottles containing febuxostat 40 mg tablets, both marketed by Solco Healthcare. The bottles look almost identical (**Figure 1**). They are the same size, use the same blue color for most of the principal display panel of the label, and feature the strength

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Figure 1. Bottles of valsartan (left) and febuxostat (right) from Solco Healthcare appear nearly identical.

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hard stop that indicates this may result in electrolyte abnormalities, acute kidney injury, arrhythmia, and death?

Complete a gap analysis and determine a risk-mitigation plan. Review the updated KIDs List and conduct a gap analysis of drugs used or dispensed within your organization. Use this to create a comprehensive risk-mitigation plan. Understanding that there are quite a few medications and excipients on this comprehensive list, determine where the organization is most vulnerable, focusing on those drugs that present the highest risk to your patient population.

Educate practitioners. While practitioners may be more familiar with the Beers Criteria for older adults, they may be less familiar or even unaware that the KIDs List exists as a valuable safety resource. Educate practitioners about the KIDs List during orientation, annual competency assessments, huddles, and/or staff meetings. Discuss how to safely use drugs on the KIDs List and what actions have been taken to protect pediatric patients from harm.

Monitor. Monitor patients for adverse drug events, including those involving drugs on the KIDs List, and evaluate if additional system changes are needed. Regularly review order sets, DRC settings, alerts generated through CDS, and corresponding actions taken. Frequent bypassing of dose limits or system warnings should prompt a review of their appropriateness.

Collaborate with vendors. Work with technology vendors to discuss the capability of the CDS for drugs and excipients on the KIDs List and provide feedback for upcoming enhancements.

Report errors. Report errors and close calls with medications, including those on the KIDs List, internally and to [ISMP](#).

References

- 1) Meyers RS, Thackray J, Matson KL, et al. Key potentially inappropriate drugs in pediatrics: the KIDs List. *J Pediatr Pharmacol Ther.* 2020;25(3):175-91.
- 2) McPherson C, Meyers RS, Thackray J, et al. [Pediatric Pharmacy Association 2025 KIDs List of key potentially inappropriate drugs in pediatrics.](#) *J Pediatr Pharmacol Ther.* 2025;30(4):422-39.

Welcome 2025-2026 Fellow

Kara Jensen, PharmD, BCPS is the 2025-2026 **ISMP Safe Medication Management Fellow**, supported by the US Army. Kara is an active-duty US Army Officer and most recently worked as the Deputy Commander for Nursing at Wiesbaden Army Health Clinic in Germany. She received her Doctor of Pharmacy Degree from Virginia Commonwealth University/Medical College of Virginia in Richmond, VA. In her previous positions, Kara has actively contributed to medication safety through participation on various safety committees where she gained an interest in medication safety. In July, Kara returned to the United States to begin her Fellowship. Throughout the year, she is looking forward to learning more about medication safety which will further equip her to promote and implement best practices within the Army Pharmacy system. Please join us in welcoming Kara to our team.

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in black lettering with a pink, stylized background. Valsartan is an angiotensin II receptor blocker indicated for the treatment of hypertension, heart failure, and to reduce the risk of cardiovascular mortality post-myocardial infarction. Febuxostat is indicated for the chronic management of hyperuricemia in adult patients with gout. The reporter indicated that additional medication products by Solco Healthcare may also look similar.

One strategy to prevent mix-ups is to purchase products from different manufacturers to reduce the risk of look-alike containers, which the reporter indicated they are doing. Thankfully, since the names start with either "v" or "f," it is less likely they will be stored next to one another alphabetically on a pharmacy shelf; however, they could be misplaced when stocking or returning the drugs to pharmacy shelves. Barcode scanning prior to dispensing is essential to prevent errors from reaching patients.

Special Announcement

Virtual MSI workshop

You still have time to join us for our last **ISMP Medication Safety Intensive (MSI)** of the year. 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. The last session in 2025 will be held: **December 4 and 5, 2025**. For more information and to register, click [here](#).

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Editors: Michael J. Gaunt, PharmD; Shannon Bertagnoli, PharmD; Ann Shastay, MSN, RN, AOCN; Rita K. Jew, PharmD, MBA, BCPPS, FASHP. ISMP, 3959 Welsh Road, #364, Willow Grove, PA 19090. Email: ismpinfo@ismp.org; Tel: 215-947-7797.



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