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ISMP
An ECRI Affiliate

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

Dosing error with sildenafil oral suspension and its enclosed dosing syringe

Problem: Sildenafil (**REVATIO**) is used to treat pulmonary arterial hypertension (PAH) in both adult and pediatric patients. The recommended oral dose to treat PAH is 10 mg (for pediatric patients weighing 20 kg or less) or 20 mg three times a day (for adult and pediatric patients weighing more than 20 kg). To facilitate use in the pediatric population, an oral suspension (10 mg/mL once reconstituted) is available. This product is packaged with a 2 mL oral syringe with only 0.5 mL (5 mg) and 2 mL (20 mg) dose markings. This means that patients or caregivers administering a 10 mg dose will need to measure to the 0.5 mL marking two times.

Also, some patients may need doses of less than 10 mg. For example, *Pediatric and Neonatal Lexi-Drugs* provides dosing information for neonatal and infant patients with PAH based on a mg/kg/dose (e.g., 0.25 mg/kg/dose or 0.5 mg/kg/dose every eight hours). These dosing regimens may not result in 5 mg doses, introducing the risk that caregivers may try to use the enclosed syringe even though it does not have the appropriate dose markings.

In a recent case, an infant was prescribed sildenafil oral suspension with a dose of 0.5 mg/kg/dose which equated to 2.5 mg or 0.25 mL every 8 hours. While the pharmacy label included instructions in terms of the volume to be administered, the patient's after-care summary included both the mg (2.5 mg) and volumetric (0.25 mL) doses. Also, when the pharmacy dispensed the oral suspension, they did not remove the enclosed syringe which could not measure 0.25 mL (**Figure 1**). At home, the patient's family used the mg dose number (2.5) to measure the medication which resulted in them administering a 10-fold overdose (25 mg/2.5 mL).

Figure 1. The oral syringe included with sildenafil oral suspension only includes dose markings for 0.5 mL and 2 mL. However, weight-based dosing for infants may result in doses less than 0.5 mL which cannot be measured with this oral syringe.

This is not the first time we have received a report in which a patient or caregiver has confused a mg dose for a volumetric dose when both are presented on the pharmacy label or in after-care summaries. However, it is also possible that the syringe contributed to the confusion as there are no markings for 0.25 mL, but caregivers could use the syringe twice to administer 2.5 mL (one 0.5 mL dose plus one 2 mL dose). The error was not discovered until the family requested a refill which was too early based on the volume originally dispensed. The patient was monitored without any adverse effects noted.

Safe Practice Recommendations: It is critical that pharmacies review the dosing devices that come with manufacturer products and those that they purchase. When dispensing an oral liquid, provide the most appropriate device to measure the dose (e.g., a dosing device that most closely matches the prescribed dose volume and limits the number of fills needed to administer one dose). In this case, for doses less1 mL, pharmacies should provide 1 mL oral syringes. Also, keep in mind that the patient instructions printed on the pharmacy label should include the dose in the unit of measure used for administration, which in this case would be mL. Printing both the mg and mL on the pharmacy label can increase the risk of confusion for the patient. Use the teach-back method to teach patients and/or caregivers how to measure and administer this medication in order to verify their understanding.

SAFETY briefs

Clotrimazole topical solution bottle resembles eye drops. A pharmacist was checking a patient's prescriptions for two eye drops and came across what he thought was a third eye drop. The medication was clotrimazole 1% topical solution (NDC 10135-067-01) 10 mL bottle made by Marlex (**Figure 1**). Upon further inspection, the pharmacist noted that despite being packaged in what looks like a dropper bottle that may contain an eye medication, it was actually a topical product not for use in the eye. Towards the bottom of the label, it states "Not for Ophthalmic use" in a tiny font size, making it difficult to see and read.

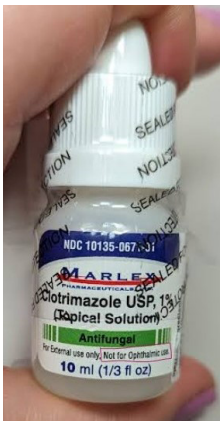

Figure 1. Clotrimazole 1% topical solution by Marlex comes in a container that looks like an eye dropper bottle even though it should not be administered in the eye.

The pharmacy plans to add an auxiliary label warning patients that this is for topical use and not for use in the eye. They are also ensuring that prescription labels include, "for topical use only" and "apply to a specified location."

We have notified the US Food and Drug Administration (FDA) and Marlex of this concern and recommended modifying the package so that this topical medication comes in a container that facilitates topical application (e.g., with a built-in applicator), which would make it difficult to apply to the eye or ear, and does not look like an eye or ear drop bottle. Store this medication separately from eye drops and consider the use of signage or other warnings such as auxiliary labels to place on the bottle and

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Prevent errors with look-alike bottles through purchasing decisions and barcode scanning

Problem: We have recently received multiple reports of different manufacturer bottles that look similar which have contributed to or have the potential to contribute to errors. In one case, a mix-up occurred between prasugrel 10 mg tablets and flecainide 100 mg tablets, both manufactured by Amneal. A patient had undergone a percutaneous coronary intervention (PCI) in the hospital's catheterization laboratory (cath lab) and had a stent placed. Following the procedure, the patient was prescribed prasugrel, an antiplatelet agent, and directed to take 10 mg daily. The prescriber wrote the prescription for a 90-day supply. However, the pharmacy dispensed a mix of prasugrel and flecainide, an antiarrhythmic agent, to the patient.

Amneal manufactures prasugrel 10 mg tablets in bottles containing 30 tablets, and product labeling requires the pharmacy to dispense the medication in the original manufacturer's container. As a result, to fill a 90-day supply, the pharmacy must dispense three unopened bottles. However, this pharmacy also stocks 100-count bottles of flecainide 100 mg tablets from Amneal which look virtually identical to the prasugrel bottles (**Figure 1**). Both bottles are the same size, are white with white lids, and the same colors and layouts are used on the container labels. Due to the look-alike packaging, staff, prior to the event, had inadvertently shelved the flecainide bottles with the prasugrel bottles.

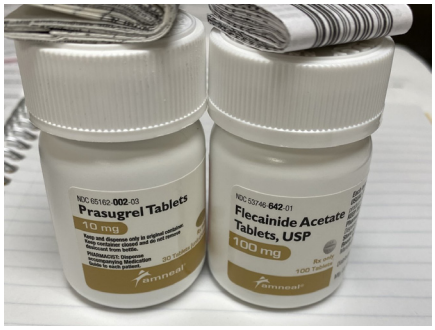

Figure 1. Bottles of prasugrel 10 mg tablets (left) look very similar to bottles of flecainide 100 mg tablets (right), both marketed by Amneal. Flecainide bottles were inadvertently stored with the prasugrel bottles and subsequently dispensed instead of prasugrel.

When filling the prescription, a pharmacy technician accidentally grabbed one bottle of flecainide and only two bottles of prasugrel. They then affixed pharmacy prescription labels for prasugrel to each bottle. During product verification, the pharmacist scanned the barcode of only one bottle, which was all that was required by the pharmacy computer system. The bottle they scanned happened to be a prasugrel bottle, so they did not receive an error message and then did not recognize that one of the bottles contained flecainide and not prasugrel. At home, the patient opened the bottle of flecainide first and took the wrong medication for a month. They did not realize the error until they opened a bottle containing prasugrel.

In a second case, a mix-up between bottles of **HYDRO**codone and acetaminophen from two different manufacturers occurred. A bottle of **HYDRO**codone and acetaminophen 10 mg/325 mg from Amneal was found stocked with bottles of **HYDRO**codone and acetaminophen 7.5/325 mg from Eywa Pharma. These bottles look quite similar, with each being of similar size and using similarly colored bands to highlight the drug strengths (**Figure 2**). Thankfully, the mix-up was discovered before reaching any patient.

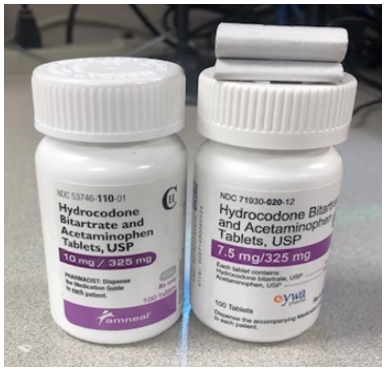

Figure 2. Look-alike bottles of **HYDRO**codone and acetaminophen 10 mg/325 mg from Amneal (left) and **HYDRO**codone and acetaminophen 7.5/325 mg from Eywa Pharma (right).

Another reporter shared that Lannett's bottles of doxycycline 100 mg tablets look similar to their bottles of dicyclomine 20 mg tablets (**Figure 3**, page 3). Both bottles are similar in size and use the same color scheme to highlight the dosage strengths. Since the drug names are similar, these may be stored near each other on the pharmacy shelf. As seen in **Figure 3**, the pharmacy staff also applied markings to the containers to indicate the bottles had been opened, which obscures part of the drug names increasing the risk of confusion.

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in storage locations. Prescribers should include the site of topical administration on the prescription. Use the teach-back method when educating patients about how to use this product to verify they understand where the medication should be applied.

Managing loading and maintenance doses to avoid errors. A health system specialty pharmacy (HSSP) recently reported errors related to choosing the incorrect refill dose (e.g., maintenance vs. loading dose) of a self-injectable medication within an integrated pharmacy software system. When the pharmacy system integrated into an electronic health record (EHR) years prior, specialty pharmacists worked closely with providers and clinic staff to create order sets to accommodate medications that required both a loading and maintenance dose. The order sets effectively coupled the regimens together and drove clear prescribing practices. However, the linked prescriptions generated from the order set inadvertently contributed to errors during the pharmacy dispensing process. With the loading and maintenance dose prescriptions being linked, deactivation of one prescription (e.g., the loading dose) led to inadvertent discontinuation of the linked prescription (e.g., the maintenance dose) from the patient's profile. To prevent inadvertent discontinuation, the pharmacy chose to keep both the loading and maintenance dose prescriptions active on the patient's pharmacy profile for the life of the prescription (up to one year). However, this has allowed pharmacy staff members to accidentally chose the incorrect dose during the refill process (e.g., dispense a loading dose when the maintenance dose was indicated). In addition, it was reported that when viewing a patient's profile in the integrated pharmacy system, both prescriptions look identical and pharmacy team members need to open each prescription to view the details (e.g., patient instructions).

Adding another layer of complexity, this HSSP utilizes a central fill system, which operates on a software system separate from the integrated pharmacy program. To mitigate the risk that the wrong prescription (e.g., loading

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Safe Practice Recommendations: To help prevent errors with look-alike packaging, explore purchasing one medication from each of these pairs from a different manufacturer. If you currently have these products, consider separating them; make sure staff are aware that they have been separated and where to locate the medications. The pharmacy should employ processes and technology that can intercept product selection errors. For example, pharmacies should utilize barcode scanning during production and scan each bottle used to fill a prescription, including each manufacturer bottle that may be dispensed to a patient. The pharmacy computer system should also require the pharmacist to scan each bottle dispensed during product verification. Avoid obscuring critical information (e.g., drug name, dosage strength, preparation instructions) on the manufacturer label, whether this is marking the containers with an "x" or affixing auxiliary labels, price stickers, or other labels. At the point-of-sale, open the bag and have the patient check what has been dispensed to make sure it is correct.

Figure 3. Bottles of doxycycline 100 mg tablets (left) look very similar to bottles of dicyclomine 20 mg tablets (right), both marketed by Lannett. The pharmacy staff applied markings that added to the potential for confusion.

Top 10 patient safety hazards for 2024

ISMP's affiliate, ECRI, recently released the ***ECRI's Top 10 Patient Safety Concerns for 2024*** (www.ismp.org/ext/1350). This annual report from ECRI and the Institute for Safe Medication Practices (ISMP) Patient Safety Organization (PSO) presents the top 10 patient safety concerns currently confronting the healthcare industry. Drawing on ECRI and ISMP's evidence-based research, data, and expert insights, this report sheds light on issues that leaders should evaluate within their own institutions as potential opportunities to reduce preventable harm. The 2024 list includes the following safety concerns:

1) Challenges transitioning newly trained clinicians from education into practice
2) Workarounds with barcode medication administration systems
3) Barriers to access maternal and perinatal care
4) Unintended consequences of technology adoption
5) Decline in physical and emotional well-being of healthcare workers
6) Complexity of preventing diagnostic error
7) Providing equitable care for people with physical and intellectual disabilities
8) Delay in care resulting from drug, supply, and equipment shortages
9) Misuse of parenteral syringes to administer oral liquid medication
10) Ongoing challenges with preventing patient falls

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

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vs. maintenance dose) is transmitted to the central fill operation, the pharmacy added a second pre-verification pharmacist check prior to pushing the prescription from the integrated system into the central fill system. This additional pharmacist check serves as the final review of the full prescription and accompanying clinical notes to ensure the correct dose was chosen. The pharmacist adds prescription notes during this step to communicate to the central fill production team that the dose is intended to be either a "loading" or "maintenance" dose.

It is important to understand the EHR and/or pharmacy computer systems' definitions of discontinuation, deactivation, and hold. Educate all members of the interdisciplinary team, including pharmacy staff, about these definitions and their implications for workflow. Build order sets such that they will generate separate loading dose and maintenance dose prescriptions with unique start/stop dates. Prescriptions should include the indication of the medication (e.g., ICD-10 code), and the patient directions should include "loading dose" or "maintenance dose." Work with information technology (IT) staff to ensure the full prescription details are able to be accessed and visible on a patient's profile.

We would like to hear from you. How does your pharmacy manage and differentiate loading and maintenance doses? Please share your strategies with us via email at: medicationsafety@ecri.org.

Special Announcement

Attend an MSI workshop

Register for a unique, virtual ***ISMP Medication Safety Intensive (MSI)*** workshop designed for those working in **community, mail order, and specialty pharmacies**. Learn how to identify risks before they cause harm and how to use data for continuous improvement. The next program will take place on **April 12 and 19, 2024**, from **7:30 am – 4:30 pm ET**. For more information, please visit: www.ismp.org/node/127.