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Educating the Healthcare Community About Safe Medication Practices

Too many barcodes and dates can be confusing and result in an error

A nurse scanned the linear barcode on the label of an oxytocin 30 units/500 mL intravenous (IV) bag (by QuVa Pharma) and administered the infusion to the patient. When discarding the bag, the nurse identified that the bag had expired prior to use. A pharmacy technician had stocked both QuVa Pharma (**Figure 1**) and Fagron (**Figure 2**) oxytocin 30 units/500 mL bags in the automated dispensing cabinet (ADC). Both products were made by 503B outsourcers and had multiple dates on each bag (e.g., compounded date, beyond-use date [BUD], expiration date of the 0.9% sodium chloride bag used to compound the product). When the technician who was loading the ADC documented the date of the first bag to expire in the ADC, they inadvertently entered the expiration date of the 0.9% sodium chloride bag, which was much further out than the compound's actual BUD, so no ADC warning was generated. The hospital discovered that many patients had received expired bags made by both QuVa Pharma and Fagron. There was no reported harm.

A second hospital reported that QuVa Pharma's oxytocin bag had multiple barcodes. It contained both a linear barcode and a 2-dimensional (2D) barcode on the oxytocin label, plus a linear barcode and 2D barcode on the 0.9% sodium chloride bag used to compound the product. The hospital was concerned that practitioners may scan the 0.9% sodium chloride barcode rather than the actual barcode that identifies the product as oxytocin. In addition, the 2D barcode on the oxytocin label contains the expiration date and lot number, which could help capture if a product has expired—but only if practitioners know which barcode to scan and the electronic health record software can recognize the information.

continued on page 2 — Barcodes and dates >

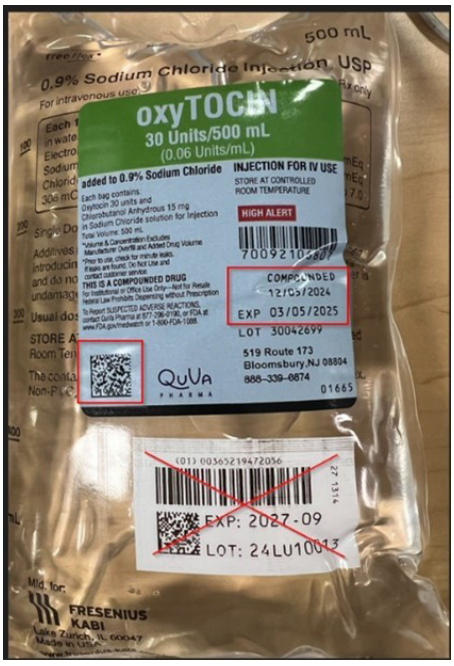

Figure 1. QuVa Pharma's oxytocin 30 units/500 mL bag had a compounded date (12/05/2024), an expiration date (EXP) or BUD of the compound (03/05/2025), and an expiration date of the 0.9% sodium chloride injection bag that was used to compound the product (2027-09).

Figure 2. Fagron's oxytocin 30 units/500 mL bag had a compounded date (04/23/2024), BUD (07/22/2024), and an expiration date of the 0.9% sodium chloride injection bag that was used to compound the product (2025-12).

SAFETY wires

Urgent Hazard Alert: Broselow Tape error. ISMP, in collaboration with the American Society of Health-System Pharmacists (ASHP) and Pediatric Pharmacy Association (PPA), has issued a joint hazard alert regarding a recalled version of the AirLife Broselow Rainbow Tape that contains incorrect medication dosing information.

The recalled tape includes incorrect dosing for vecuronium, flumazenil, and ketamine, which could pose serious risk of patient harm during pediatric emergencies.

What healthcare organizations should do now:

- Conduct a thorough search and check the inventory in all locations where impacted tape may be used
- Meet with key stakeholders and conduct a failure mode and effects analysis (FMEA) before implementing risk mitigation strategies
- Consider alternative products, such as well-vetted software, phone applications, or organization-specific weight-based emergency medication tables
- Educate staff and clearly communicate both the risk and the actions taken

There is currently no replacement product available; a corrected tape is expected to be available in the second quarter of 2026.

To read the complete hazard alert click here.

Paralytic agent mixed in bin with insulin. A nurse went to remove a 10 mL vial of 100 units/mL **HUMULIN-R** (regular insulin human injection) (Eli Lilly) from the automated dispensing cabinet (ADC) refrigerator. They discovered 7 vials of rocuronium 50 mg/5 mL (Meitheal), mistakenly stored with Humu**LIN**-R vials in the insulin ADC bin (**Figure 1**, page 2). The vials were similar in size and both had a yellow cap. The rocuronium vial label states,

continued on page 2 — SAFETY wires >

> **Barcodes and dates** — continued from page 1

We received reports of errors that occurred because an infusion bag had more than one barcode. In one report, a nurse scanned the manufacturer's barcode on the dextrose 5% water (D5W) bag that the pharmacy used as a diluent to compound an amiodarone infusion, rather than the pharmacy-generated barcode identifying the compounded amiodarone product. The patient also had an order for a D5W infusion, the amiodarone was infused at the prescribed D5W rate, resulting in an overdose.

Having multiple barcodes and dates on an infusion bag can lead to confusion about which barcode to scan and when the product actually expires. We have reached out to QuVa Pharma and Fagron and recommended reviewing how barcodes and dates are displayed on IV bags. Quva notified us that they engaged human factors engineers and redesigned their oxytocin label. The label now covers the diluent bag barcode so that a single barcode and expiration date of the compounded product is available for practitioners. We encourage all 503B outsourcers to ensure that the final BUD of the compounded product is more prominent and consider covering the manufacturer's diluent (e.g., 0.9% sodium chloride) barcode and expiration date, when possible.

Errors like this call for an evaluation of your policies and procedures regarding how the pharmacy displays barcodes and BUDs on pharmacy-prepared products and how they are displayed on outsourced infusion bags that the pharmacy purchases. Educate staff on where to find the product's BUD and which barcode to scan. Report errors to 503B outsourcers and to ISMP.

Worth repeating...

Patient given oral cromolyn via nebulizer—again!

A prescriber ordered cromolyn nebulization solution via inhalation for a hospitalized patient to treat bronchospasm. However, the pharmacy dispensed a nearly identical-looking cromolyn oral solution concentrate, made by Woodward. A nurse administered a dose of the oral solution via nebulization to the patient before identifying the error. Fortunately, no harm was reported.

The outer package states, "FOR ORAL USE ONLY—NOT FOR INHALATION OR INJECTION" (**Figure 1**), but once the medication is removed from the foil packaging, the plastic unit dose containers (**Figure 2**) look identical to nebulized solutions for inhalation. In addition, the plastic containers have difficult-to-read embossed information and do not have a barcode.

Figure 1. Cromolyn oral solution foil package looks similar to packaging for nebulization, although the foil wrap says, "FOR ORAL USE ONLY—NOT FOR INHALATION OR INJECTION."

We previously wrote about this issue in our May 2018 article, Safety with Nebulized Medications Requires an Interdisciplinary Team Approach, so it is ***Worth* repeating**. In one 2018 case, a hospitalized child received **GASTROCROM** (oral cromolyn solution) via nebulization instead of the cromolyn inhalation solution. The child was receiving both forms of cromolyn, and the respiratory therapist mistakenly removed one of the oral cromolyn solutions from the patient's drawer and administered it via inhalation. The child was monitored but was not harmed.

Figure 2. Plastic containers of cromolyn oral solution are packaged similarly to the nebulization product.

Dispense and store the cromolyn oral and nebulization products in their original foil pouch and/or the original carton. Stock cartons/foil pouches of each nebulizer medication and oral solution in a separate pocket in an automated dispensing cabinet (ADC). Use barcode scanning to stock the ADC and to verify that the correct product has been placed in each pocket. Procure products

continued on page 3 — *Worth* repeating >

> *SAFETY* wires continued from page 1

"Warning: Paralyzing Agent" and "Warning: Paralyzing agent. Causes Respiratory Arrest. Facilities must be immediately available for artificial respiration." The vial also has a warning on the top of the yellow cap (**Figure 2**) noting it is a paralyzing agent. These warnings can be easily missed, especially when reaching into a bin that is supposed to contain insulin.

Figure 1. Similar-sized vials of Humu**LIN**-R and rocuronium, both with yellow caps, were found mixed in the Humu**LIN**-R ADC refrigerator bin.

Figure 2. The cap on the rocuronium 50 mg/5 mL vial by Meitheal states, "Paralyzing Agent."

In this hospital, in the ADC refrigerator, rocuronium is stored in an orange lidded bin with labels stating "Warning: Paralytic agent," and insulin is stored in a blue bin

continued on page 3 — *SAFETY* wires >

>Worth repeating

continued from page 2

whose unit doses are individually barcoded by the manufacturer. Otherwise, create a flag label that incorporates the appropriate barcode and attach it to the tab of the plastic container; avoid auxiliary labels or the use of ink directly on the part of the plastic container in contact with the solution, as volatiles can leach through the plastic. Educate staff on the risks of mix-up once individual plastic containers have been removed from the foil overwrap. Require nurses and respiratory therapists to use a barcode scanning system prior to the administration of oral and nebulized medications.

Topical medication in parenteral syringe was injected

A 5-year-old child presented to the emergency department with a dog bite to the wrist. The prescriber applied 1.5 mL of topical lidocaine gel, which also contained **EPINEPH**rine and tetracaine (often referred to as L.E.T.—an abbreviation we do not recommend using) with the intention of closing the bite wound with a stitch. Even though the mixture is for topical use only, Fagron (a 503B outsourcing facility) packages the gel in a parenteral (luer) syringe (**Figure 3**). Due to the child's distress and inconsolable crying, the prescriber decided to forgo the stitch. Since the child was not vaccinated, the prescriber ordered intramuscular (IM) doses of tetanus vaccine and tetanus immune globulin. The nurse placed the vaccine and immune globulin syringes next to the partially used syringe containing topical lidocaine, **EPINEPH**rine, and tetracaine gel. The nurse attached a needle to what she thought was the syringe containing tetanus immune globulin and administered the IM injection. After administration, she scanned the medication barcode and identified it was the topical lidocaine, **EPINEPH**rine, and tetracaine gel. The prescriber contacted Poison Control who advised them to monitor the child via cardiac telemetry and hourly neurological checks for 6 hours. No harm was reported.

Figure 3. Parenteral needle attached to luer lock syringe containing the topical lidocaine, **EPINEPH**rine, and tetracaine gel by Fagron.

ISMP has written about this type of error multiple times, most recently in a ***Worth* repeating** article, Never Prepare Oral or Topical Medications in a Parenteral Syringe, published April 2023. Although the lidocaine, **EPINEPH**rine, and tetracaine gel syringe has a warning on the cap that says, "FOR EXTERNAL USE ONLY" in large font and a warning in smaller font on the barrel of the syringe that says, "TOPICAL USE ONLY" (**Figure 4**), once the cap is removed, there is only the smaller font warning that can easily be missed.

Figure 4. When practitioners remove the cap from the topical lidocaine, **EPINEPH**rine, and tetracaine gel by Fagron, they can attach a needle to the parenteral syringe or connect the syringe to an intravenous (IV) set.

We reached out to Fagron again and recommended that they package the topical lidocaine, **EPINEPH**rine, and tetracaine gel in a container that practitioners would expect, such as a tube or jar, to help prevent the inadvertent administration of the medication via the parenteral route. If your organization uses this product, consider purchasing an alternative product that is not packaged in a parenteral syringe. Educate practitioners about the importance of scanning medication barcodes prior to administration.

>SAFETY wires

continued from page 2

that does not have a lid. During the event investigation, a pharmacist found that a pharmacy technician student had refilled the ADC. They were unfamiliar with rocuronium and did not realize that it was a paralytic agent. Thus, they did not know that the rocuronium vials were supposed to be placed in the lidded bin labeled with warnings. The pharmacist also uncovered that the ADC was not configured to require users to scan the bin barcode when refilling medications.

The hospital that reported this has changed the ADC configuration so that the user is required to scan the ADC bin and medication barcode for all paralytic agents. However, this would not prompt scanning or prevent situations like this, where the technician student was supposed to be refilling insulin or another medication, but unknowingly had a paralytic agent in hand. For this reason, the ISMP Guidelines for the Safe Use of Automated Dispensing Cabinets recommend using machine readable codes (e.g., barcode scanning technology, radio frequency identification [RFID]) to promote accurate placement of all medications in the correct ADC drawer or pocket location.

In addition, the ISMP Targeted Medication Safety Best Practices for Hospitals, Best Practice 7, calls to segregate, sequester, and differentiate all neuromuscular blocking agents (NMBs) from other medications, wherever they are stored in the organization, and place them in a sealed kits or in lock-lidded bins in an ADC. If your organization purchases these products, ensure they are stored separately and that barcode scanning is used when receiving, dispensing, refilling the ADC, and prior to administration. During onboarding, educate new practitioners and students about high-alert medications, including paralytic agents and insulin, and the safeguards the organization has in place to prevent errors with these drugs.

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