

Nurse AdviseERR®

Educating the Healthcare Community About Safe Medication Practices

Implement strategies to prevent administration of ear drops into the eyes

When a practitioner, patient, or caregiver accidentally instills ear drops into the eye, it may lead to an immediate burning and/or stinging sensation, and the patient may later experience pain, redness, swelling, or blurred vision. Patients may need to flush their eyes with water or normal saline and/or apply warm or cold compresses. Others may need to go to the emergency department (ED), an ophthalmology clinic, or their eye doctor for care.

Aside from look-alike names and containers, eye and ear drops are often confused when the words “optic” and “otic” are used. Also, practitioners and patients sometimes use the term “eyedropper” when referring to the container used to instill both eye and ear drops, which could lead the person reading the label to miss information, such as the product formulation, a warning, or a picture/icon of an eye or ear. The eyes and ears are relatively close together anatomically, which adds a “human anatomy factor” to the equation. While ear drops should never be used in the eyes, eye drops are made to be gentle and are sometimes used in the ears due to cost or availability. This practice can contribute to practitioners using products interchangeably. While barcode scanning can prevent administration to the wrong patient and confirm the right product, it does not ensure the medication will be given via the correct route.

It has been more than 15 years since we warned that ear drops are frequently administered into patients’ eyes (www.ismp.org/node/926). However, recent reports suggest wrong route errors still occur.

A prescriber ordered two eye drops and one ear drop, carbamide peroxide (for earwax accumulation), for a patient. The patient’s nurse used barcode scanning to verify the medications were correct. However, the nurse administered all drops via the ophthalmic route. The nurse was used to carbamide peroxide being dispensed in a bottle with a long neck, making it obvious that it was an otic formulation. Before this event, the nurse had requested a replacement bottle from the pharmacy, and this time it was dispensed in a bottle resembling an ophthalmic container (Figure 1).

A provider prescribed neomycin sulfate 3.5 mg/mL, polymyxin B 10,000 units/mL, and hydrocortisone 1% ophthalmic drops for a patient with conjunctivitis. After picking up the medication and instilling 4 drops into their eye, the patient felt severe burning. They read the label and realized the product was an otic suspension. The patient flushed their eye with water, but it did not relieve the pain. (An example of look-alike cartons is shown in Figure 2.)

To reduce the risk of administering ear drops into the eyes, consider the recommendations listed in the **Check it Out!** column to the right.



Figure 1. Carbamide peroxide 6.5% ear drops by Major Pharmaceuticals (left) is packaged in a dropper bottle similar in size and shape to an eye drop container. **DEBROX** by Prestige Consumer Healthcare has a long neck for otic administration and the label states “EARWAX REMOVAL AID” in large font (right).

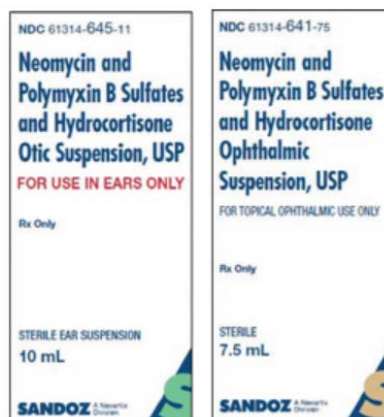


Figure 2. The carton of neomycin, polymyxin B, and hydrocortisone otic suspension (left) states “FOR USE IN EARS ONLY,” but this can be overlooked when eye (right) and ear product cartons look similar.

check it out

Consider the following recommendations to prevent administering ear drops into the eyes.

- ✓ **Storage.** Keep medications in their original cartons, as icons of an ear or eye (**Figure 3**) are sometimes on boxes but not on dropper bottles. Separate the storage areas for ear and eye drop bottles in storage locations or automated dispensing cabinets (ADCs).



Figure 3. Examples of standard graphics that manufacturers can use on cartons and container labels to visually portray use in the ear (left) or the eye (right).

- ✓ **Prescribing.** When order sets are built in the electronic health record (EHR), they should guide prescribers to select the appropriate route, and automatically link the order with the corresponding product formulation. The route of administration should be spelled out (e.g., right eye, left eye, each eye) and never abbreviated as OD, OS, or OU, which can be mistaken as AD, AS, or AU (e.g., right ear, left ear, each ear) (www.ismp.org/node/8). Ear drops should never be ordered for the eye.
- ✓ **Dispensing.** Ask pharmacy to consider placing an auxiliary label with a photo of an ear or eye (**Figure 3**) on the dropper bottle to specify “ear” or “eye” drops.

- ✓ **Administration.** Ear drops and eye drops should be administered on different schedules (e.g., if given once daily). Use barcode scanning before administration and confirm the medication, route, and indication with the patient before administering.
- ✓ **Patient education.** Instruct patients to keep ear and eye drops in the carton, store them in separate locations at home, and discard any leftover medication. Visit our consumer website for more tips: www.ismp.org/ext/1258.

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what's in a Name?

The “cef-/ceph-” drug stem name

Medications with the prefixes “cef-” and “ceph-” belong to a class of medications known as cephalosporins. Cephalosporins are a class of antibiotics that are considered bactericidal (kill bacteria). They also inhibit bacterial cell wall formation which eventually destroys the bacteria. Unlike other antibiotic classes, such as penicillin which exhibit limited coverage, cephalosporins have a broad-range antibiotic effect against gram-positive bacteria (i.e., *Staphylococcus Aureus*, *Streptococcus*) and gram-negative bacteria (i.e., *Escherichia coli*, meningococcus, gonococcus). This class of antibiotics is divided into “five generations” based on various factors such as its antibacterial spectrum and route of administration among other factors. Generally, first generation cephalosporins work primarily against gram-positive bacteria, while the second and third generations have more activity against gram-negative bacteria. The fourth and fifth generation cephalosporins are usually reserved for more severe infections or those that do not respond to other antibiotics. Also, some cephalosporins are formulated in combination with a beta-lactamase inhibitor to combat resistant bacteria. This article does not cover combination products.

Cephalosporins are usually used for skin and bone infections, urinary tract infections, strep throat, ear infections, upper and lower respiratory tract infections, meningitis, gonorrhea, and sepsis. They can also be given prophylactically, prior to surgery, to prevent postoperative infections.

These medications can be given orally as suspensions, capsules, or tablets; and are also available for injection intramuscularly (IM) or intravenously (IV). Cephalosporins are metabolized by the kidney and dose adjustment is needed for those with renal impairment.

Cephalosporin antibiotics are usually well tolerated and considered safe to use during pregnancy. However, caution should be exercised with regard to breastfeeding since they can be present in breast milk. Common side effects are gastrointestinal (GI) related (i.e., nausea, vomiting, diarrhea) and headache. Although very unlikely, some patients may develop super-infections following long-term use. For example, patients can develop *Clostridium difficile* (*C. diff*) exhibited by severe diarrhea or *Candida albicans* which causes thrush (yeast overgrowth).

Table 1. List of cephalosporin antibiotics in the United States

Generation	Generic (Brand) Name
First	cefadroxil
	ce FAZ olin
	cephalexin
Second	cefaclor
	cefo TE tan
	cefo OX itin
	cefprozil
	cefuroxime
Third	cefdinir
	cefixime (SUPRAX)
	cefotaxime
	cefopodoxime
	cef TAZ idime (TAZICEF)
	cef TRIAX one
Fourth	cefepime
Fifth	ceftaroline fosamil (TEFLARO)

SAFETYwires

⚡ Confusing Fluzone high-dose packaging leads to error. Last month, we received a report about a concern with this year's **FLUZONE** (influenza) high-dose quadrivalent vaccine. The product is manufactured by Sanofi Pasteur and is packaged in cartons that contain 10 single-dose prefilled syringes. However, within the carton are five sealed trays, each containing two 0.7 mL single-dose syringes (**Figure 1**). The concern is that some may think both syringes are needed to administer a dose, especially since it is referred to as a “high dose” influenza vaccine (intended for people 65 years and older).

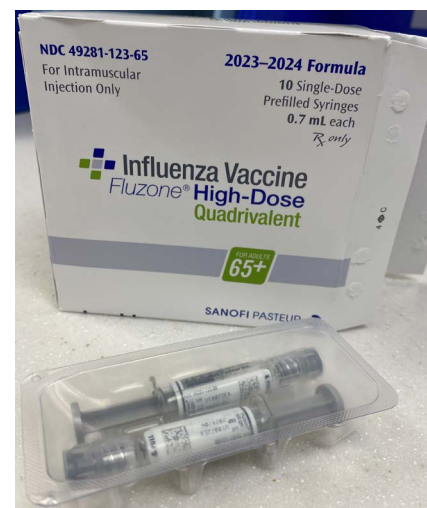


Figure 1. Fluzone (high-dose) comes with two single-dose syringes sealed in each tray.

After hearing about this issue, we did receive a report in which a patient was given a double dose due to the confusing packaging. We have notified the company about this concern. In the meantime, if your organization purchases this vaccine, notify staff and ensure barcode scanning is used when dispensing and administering the vaccine. Pharmacy should either dispense as a unit dose syringe or, if the entire carton must be dispensed, auxiliary labels should be added to the carton noting that each dose requires only one syringe.

⚡ Foiled again: “Major Rugby” barcode scanning issues. ISMP has received more than a dozen reports from healthcare practitioners who are unable to scan barcodes on unit dose packages of various over-the-counter medications from Major Pharmaceuticals and Rugby Laboratories

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Worth repeating...

Education in proper use of insulin pen needles is needed

A pharmacist reported an event in which a nurse asked if they could withdraw insulin out of an insulin pen cartridge using an insulin syringe. Since insulin sometimes dripped from the pen needle after injection, the nurse was concerned that the patient would not receive the full dose if using the pen. Upon further investigation, the pharmacist discovered that, earlier in the day, the nurse had withdrawn a dose of U-500 insulin (5 times more concentrated than U-100 insulin) out of the pen cartridge because pen needles were not available. The nurse used a U-100 insulin syringe (U-500 insulin syringes were not available) and withdrew the insulin volume to the 25 unit mark on the syringe, intending to provide the prescribed 25 units of U-500 insulin. However, since they used a U-100 syringe, this resulted in a 5-fold overdose. The patient subsequently required treatment for hypoglycemia.

The nurse previously worked in other organizations in which the unsafe practice of using insulin pen cartridges as vials was common. In this case, the nurse also checked with a more experienced nurse on the unit, who completed the independent double check and validated that this process was acceptable. Both nurses were unaware of the differences between U-100 and U-500 insulin concentrations, which required corresponding syringes.

It has been a while since we wrote about errors with U-500 insulin, but some key points are **Worth repeating**. ISMP highly recommends the use of insulin pens for patients who require U-500 insulin. There is not a safe way to use U-500 insulin vials in hospitals since available U-500 syringes lack a safety guard to prevent needlestick injuries. Use of a U-100 syringe with U-500 insulin is also not safe because it often leads to dosing errors, as happened in this case. However, even with U-500 pens, healthcare professionals must recognize that pen cartridges should **never** be used as an insulin vial for many reasons, including possible contamination. Pharmacy and nurse educators should reinforce this information since pockets of “air” have been observed in cartridges of insulin pen injectors after aspirating some of the insulin with a needle. If the pen injector or cartridge is not discarded, and the air is not eliminated before delivering a subsequent dose, the patient could receive less than the desired dose of insulin as well as a subcutaneous injection of air.

Ensure there is an adequate supply of insulin pen needles on patient care units. Review proper administration techniques, such as using a new pen needle with each injection, keeping the needle under the patient’s skin for at least 10 seconds after administration to reduce leakage from the injection site or needle once it is withdrawn (www.ismp.org/ext/1130), and never using the pen for more than one patient. Educate staff about the differences between U-500 and U-100 insulin and their associated insulin syringes. If U-500 insulin vials must be used instead of U-500 pens, consider having pharmacy dispense patient-specific doses in U-500 syringes. Consider building these reminders into applicable order comments in the electronic health record and medication administration record.

For more strategies on preventing errors with insulin, review the **ISMP Guidelines for Optimizing Safe Subcutaneous Insulin Use in Adults** (www.ismp.org/node/93), which discuss additional risks associated with the use of U-500 insulin, as well as insulin pens, and offers safe practice recommendations.

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(Major Rugby). Poor barcode readability when black ink is printed on reflective foil backing (**Figure 1**) is a long-standing issue. Several health systems reported a decrease in barcode scanning compliance from nearly 100% down to as low as 40%. One organization shared a downloadable list of the National Drug Codes (NDCs) on products that may be impacted (www.ismp.org/ext/1200).



Figure 1. Magnesium Oxide 400 mg tablets by Major Rugby with paper-backed foil (left) and the difficult-to-scan reflective foil backing (right).

The manufacturer notified the health system that the war in Ukraine has worsened an industry-wide supply issue with foil. As a result of the foil shortage, they made a short-term change to the type of foil backing they use. Major Rugby is expediting a return to the original paper-backed foil and plans to have them available for distribution. In the meantime, consider repackaging or relabeling these products with readable barcodes.



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HITTING THE SAFETY HIGH NOTES



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