

Long-Term Care Advise **ERR**TM

Educating the Healthcare Community About Safe Medication Practices

Do not let “Depo-” medications be a depot for mistakes

Today, several longstanding medications are available on the market with names that begin with the prefix “Depo-,” meaning they are administered via a *depot injection* that deposits the drug into localized tissue from which it is gradually absorbed by surrounding tissue. These injections, typically subcutaneous, intramuscular, or intra-articular, allow the active compound to be released consistently over a longer period of time. Many of these medications with the prefix “Depo-” have been on the market for 30 to 50 years, some even longer. Misadministration of these medications by the intravenous (IV) route has been consistently reported throughout the years, as has confusing one “Depo-” medication with another. More recently, mix-ups between different strengths and volumes of containers of a “Depo-” drug have occurred. The “Depo-” medications most often involved in these wrong route, wrong drug, or wrong strength/volume errors include:

- **DEPO-PROVERA** and **DEPO-SUBQ PROVERA 104** (medroxyPROGESTERone acetate): an intramuscular or subcutaneous progestin used as a contraceptive, or to treat endometriosis or endometrial carcinoma. Also, in long-term care (LTC) facilities, it is used for the treatment of sexually inappropriate behavior in elderly males with dementia or Alzheimer’s disease.
- **DEPO-MEDROL** (methylPREDNISolone acetate): an anti-inflammatory or immunosuppressive corticosteroid given via intramuscular or intra-articular injection. This medication is often used in seniors with osteoarthritis and carpal tunnel syndrome.
- **DEPO-TESTOSTERONE** (testosterone cypionate): an intramuscular androgen used to treat male hypogonadism and to treat sexual dysfunction in elderly males with low testosterone levels.

Examples of error reports submitted to the US Food and Drug Administration (FDA) Adverse Event Reporting System (FAERS) and/or the ISMP National Medication Errors Reporting Program (MERP) are provided below.

Depo-Provera vs. DEPO-Medrol

In early 2015, FAERS received a report involving a 44-year-old man with shoulder pain (non-impingement) who received an intra-articular injection of Depo-Provera instead of **DEPO-Medrol**. A box of Depo-Provera had been stored inadvertently in the bin where **DEPO-Medrol** was usually kept. Other than size, the medication cartons do not look similar, but both drug names start with “Depo-” and appear in the same black font (**Figure 1**). Two boxes were removed from the bin, one containing **DEPO-Medrol**, and the other Depo-Provera. The physician performing the shoulder injection read the label and concentration on the first box (**DEPO-Medrol**). Believing he had previously confirmed the

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Figure 1. Both “Depo-” products have been mixed up, despite dissimilar carton labels.

SAFETY wires



Buprenorphine can look like HYDRO-morphone.

A physician handwrote a prescription for buprenorphine. However, the pharmacist misinterpreted the drug name (**Figure 1**) as **HYDRO-morphone** and dispensed this instead of buprenorphine. The patient experienced some symptoms but was not harmed.

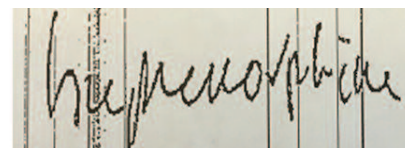


Figure 1. Handwritten prescription for buprenorphine misread as **HYDRO**morphone.

In addition to including the dosage form or route (in this case sublingual), purpose of the drug, and brand name on the prescription to help prevent this error, long-term care (LTC) facilities should pursue electronic prescribing of controlled substances (EPCS) to eliminate the role of handwriting in medication errors and combat prescription fraud and abuse. Every US state allows EPCS. If you have not yet implemented EPCS at your facility, check with your vendor to make sure your electronic health record system is certified and approved for EPCS, and work with them to get your practice up and running for EPCS. You can find more information about getting started with EPCS at: www.getepcs.com.



Harm from fluoroquinolones. Based on an ISMP review of reports submitted to the US Food and Drug Administration (FDA), fluoroquinolone antibiotics (e.g., ciprofloxacin) accounted for the largest number of reports of persistent, long-term adverse effects. In July, the FDA published a drug safety communication stating that fluoroquinolones used systemically (i.e., continued on page 2—**SAFETY wires** >

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drug and concentration, he withdrew the desired amount of an opaque white liquid similar in appearance to **DEPO-Medrol** (**Figure 2**).

About three-quarters of the 1 mL volume withdrawn into the syringe (about 112 mg of Depo-Provera) was administered. A medical assistant discovered the error while cleaning up afterwards. Within 3 days of the injection, the patient (who was living with his wife) experienced a lack of libido and had erectile dysfunction, which required prolonged use of testosterone and **CIALIS** (tadalafil). Since making the error, the physician learned that others have made the same error, mixing up **DEPO-Medrol** and Depo-Provera.

DEPO-Medrol vs. Depo-Provera

Several years ago, ISMP received a report of a similar mix-up, but in this case, the patient was supposed to receive Depo-Provera and incorrectly received **DEPO-Medrol**. Both medications had previously been stored in separate cabinets. However, a few days before the event, the medication cabinets had been consolidated, and the medications were stored alphabetically in bins. The stock in the consolidated cabinet had been correctly labeled as Depo-Provera and **DEPO-Medrol**, but were stored next to each other. Working with only a verbal order for the drug, the staff had accidentally selected a vial of **DEPO-Medrol** instead of the intended Depo-Provera.

Wrong strength Depo-Testosterone

ISMP has received reports regarding potential errors with Depo-Testosterone for which the wrong strength or volume of the drug might be administered to patients. This drug is available in two strengths: 100 mg/mL and 200 mg/mL. The 200 mg/mL strength is available in a 1 mL vial and a 10 mL vial. However, the vial sizes are extremely hard to differentiate when looking at the medication cartons (**Figure 3**).

Wrong route DEPO-Medrol

In late 2015, a patient received 100 mg of **DEPO-Medrol** IV. The route of administration was not specified on the written order given to the nurse, who assumed the drug should be administered IV, like the other medications the patient was receiving. The nurse did not recall seeing the statement, “Not for IV Use,” on the back of the vial label; the statement is in a very small font size. Fortunately, the patient was not harmed. The reporting pharmacist found many case reports of similar errors published in the literature.

Other errors involving **DEPO-Medrol** being administered IV instead of intramuscularly have resulted from mix-ups between **SOLU-MEDROL** (methylprednisolone sodium succinate) and **DEPO-Medrol**, often due to stocking errors. **DEPO-Medrol**’s milky white appearance rarely gives pause anymore before administration given the wide variety of other cloudy or opaque medications that are administered IV.

Aggregate reports

Analysis of aggregate data regarding mix-ups between **DEPO-Medrol** and Depo-Provera between 1999 and 2015 identified 5 additional cases reported to FAERS and 4 more reported to the ISMP MERP database, for a total of 11 reports. One of the events occurred as recently as December 2015, although the patient was not harmed

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Figure 2. Vials look dissimilar except for the “Depo-” part of the drug name and the opaque white liquid inside the vial.



Figure 3. Can you see the difference? The labeling on cartons of Depo-Testosterone makes it difficult to notice that one contains a 1 mL vial (L) and the other a 10 mL vial (R).

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tablets, capsules, injectables) are associated with disabling and potentially serious side effects that can occur together (www.ismp.org/sc?id=1755). These adverse effects can involve the tendons, muscles, joints, nerves, and the central nervous system, and they can be permanent! FDA further stated that these adverse effects generally outweigh the benefits for patients with acute sinusitis, acute bronchitis, and uncomplicated urinary tract infections who have other treatment options. Fluoroquinolones in patients with these conditions should be reserved for those without alternative treatment options. At greater risk are patients with organ transplants, renal impairment, recent exposure to topical or systemic corticosteroid therapy, and the elderly (Bidell MR, Lodise TP. Fluoroquinolone-associated tendinopathy: does levofloxacin pose the greatest risk? *Pharmacotherapy*. 2016;36(6):679-93).

If a resident reports serious side effects, **therapy should be stopped**. The resident should be switched to a non-fluoroquinolone antibacterial drug to complete the treatment course. Safe and judicious use of fluoroquinolones should be part of every facility’s antibiotic stewardship program (a new Centers for Medicare & Medicaid Services [CMS] requirement).



Misuse of new insulin strengths. Education is important regarding the new higher concentration insulin products that are available only in a pen, including U-300 **TOUJEO** (insulin glargine), U-200 **TRESIBA** (insulin degludec), and U-200 **HUMALOG** (insulin lispro). Residents and healthcare professionals may not understand proper dosing, dose measurement, and use of these pens with the higher concentration insulin products.

A patient who was previously using **LANTUS** (insulin glargine) U-100 vials was switched to Toujeo SoloStar U-300. He was given pen needles to use with the Toujeo, but at home, he decided to use up his supply of insulin

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after receiving an injection of **DEPO**-Medrol instead of Depo-Provera. Date ranges for the reported errors were distributed evenly between 1999 through 2015; therefore, we did not find any trends in the occurrence of the errors over time. In most of the cases (n=7), Depo-Provera was the intended drug and **DEPO**-Medrol was administered instead. The errors occurred in a variety of settings, so it is difficult to associate patterns of error within a specific clinical setting (e.g., hospital vs. LTC facility). Five of the reports identified the Pfizer **DEPO**-Medrol 80 mg/mL vials, and two involved the Pfizer Depo-Provera 150 mg/mL vials (both distributed by Pharmacia & Upjohn, a division of Pfizer).

In 4 of the 11 cases, both products were available as unit stock. This may have contributed to errors due to the similarities in the names. For example, confusion may have occurred if staff misread the drug name when stocking the drug product (i.e., stocked in the wrong bin) and then the wrong drug was selected prior to administration, leading to a medication error. Other than name similarity, none of the reports identified container labels or carton labeling similarities as a contributing factor.

Another analysis of aggregate data shows that the most frequent wrong route errors were associated with IV administration of the drug rather than intramuscular (IM). These events most commonly involved **DEPO**-Medrol (n=11 out of 12 total IV administrations). In 5 of these cases, the route of administration was misunderstood, and **DEPO**-Medrol was administered intravenously. In the remaining 6 cases, **Depo**-Medrol was administered in error when the order was for IV **SOLU**-Medrol. This issue is less likely to be a problem in LTC facilities that rarely administer IV drugs.

Although no errors have been reported to ISMP, another IM-only medication commonly used in LTC facilities for psychiatric residents is long-acting risperidone (**RISPERDAL CONSTA**). The fact that “Depo-” is not used in the brand name and the drug requires reconstitution with a diluent prior to use could be reasons for why there are less reported errors with this drug, but caution is still advised since the reconstituted product would look similar to other “Depo-” medications, especially in an unlabeled syringe.

Conclusions

Today, the “Depo-” naming convention would be a concern for FDA based on its guidance for proprietary name review criteria for the pharmaceutical industry. However, when these drugs were first approved, the risk associated with this prefix was not considered. It would be very difficult to change the names of these products today—it may even make the risk of errors greater since these drug names are widely recognized. However, there are steps manufacturers can take to clarify the labels so the differences are visible on the front label of cartons and vials. While we have suggested specific label enhancements to manufacturers, until label changes happen, consider the recommendations in the **check it out** column (below) to reduce the risk of potentially harmful mix-ups between these medications, strengths/container volumes, and routes of administration.

check it out

Consider the following recommendations to prevent errors with “Depo-” medications.

✓ **Keep vials apart.** Separate the storage of **SOLU**-Medrol, **DEPO**-Medrol, and Depo-Provera vials in the pharmacy and in all LTC facility areas where these drugs are stocked. Store only one medication in each bin or other storage container.

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syringes, so he used the insulin pen cartridge as a vial. He drew up a dose with a leftover U-100 syringe, filling it to the mark he previously used (100 units) for his daily Lantus dose. This resulted in a dose of 300 units of Toujeo, which led to hypoglycemia requiring hospital admission.

ISMP does not recommend using pen cartridges as vials. Yet, health professionals who administer insulin have used insulin pen cartridges as vials, sometimes even with facility authorization (www.ismp.org/sc?id=1748). With the new higher concentration insulins, using a U-100 syringe to measure doses of insulin could lead to a serious overdose, as in the above case.

U-500 insulin is now also available in a pen (**HUMULIN**), although vials remain on the market. In the past, many caregivers using vials of U-500 insulin measured the dose with a U-100 syringe but used the syringe scale to measure only 20% of the actual dose. For example, the 40 units’ mark on the U-100 syringe scale is 200 units of U-500 insulin. Remind staff, patients, and caregivers that when using the U-500 insulin pen, dial the exact number of units intended for the dose. There is no need to make any conversions. If the dose is 125 units, that is what the indicator should be dialed to on the pen. ISMP has already received a number of error reports related to improper conversion using the U-500 insulin pen, so it is important to inform both residents and staff of this risk.

Also, there is a new U-500 syringe that eliminates the need to make any dose conversions when using a U-500 insulin vial. As the new package insert for U-500 Humu**LIN** states, a tuberculin (TB) or U-100 syringe should no longer be used with U-500 insulin in vials. Make sure that pharmacy dispenses the new U-500 syringes when the U-500 insulin vial is dispensed for individual resident use in your facility.

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- ✓ **Differentiate products.** Ask pharmacy to consider stocking Depo-Provera in prefilled syringes for single resident use instead of single-dose vials. Depo-SubQ Provera 104 is available in single use 0.65 mL (104 mg) prefilled syringes for subcutaneous injections, and Depo-Provera 1 mL (150 mg) is available in prefilled syringes for intramuscular injections. Since **DEPO**-Medrol is not supplied in prefilled syringes, this may increase differentiation between the two products, but only if staff know to expect Depo-Provera in a syringe. Thus, staff awareness is a necessary component of this differentiation strategy.
- ✓ **Limit access.** Evaluate whether any of these drugs need to be stocked in the LTC facility, as these are not emergency drugs. If “Depo-” medications need to be stocked in the LTC facility, attempt to limit inventory of these products to a single product, strength and vial size. Store these products in areas where only staff who administer these products have access.
- ✓ **Include auxiliary labels.** Ask your pharmacy to highlight or circle important information on labels to draw attention to it, or add an auxiliary label if necessary. For example, given the small font of the warning on **DEPO**-Medrol vials, an auxiliary label that states, “IM Use Only” or “Intra-articular Use Only” may be required. For Depo-Testosterone labels, highlight, circle or point an arrow toward the total volume in each vial.
- ✓ **Express generic names safely.** Ask your IT vendor and pharmacy to use tall man letters when expressing both the trade and generic names of **DEPO**-Medrol and Depo-Provera (i.e., methyl**PREDNISolone**, medroxy**PROGES-TERone**) to prevent confusion. When expressing generic names for **SOLU**-Medrol and **DEPO**-Medrol, include the correct form of methyl**PREDNISolone** (i.e., acetate, or sodium succinate) to help differentiate the drugs.
- ✓ **Highlight the route.** Always include the route of administration, easily visible in a prominent location, on orders and medication administration records.
- ✓ **Use barcode scanning.** Implement barcode scanning to verify medications when stocking and restocking medications, and prior to drug administration at the bedside as a method to help mitigate confusion that may lead to wrong drug medication errors.
- ✓ **Increase staff awareness.** Assess staff understanding of the term “depot,” and increase their understanding regarding why “Depo-” medications should not be administered IV. Be sure staff know the risk of confusion between “Depo-” products with similar names, such as mix-ups between Depo-Provera and **DEPO**-Medrol, or the risk of errors related to labeling and packaging similarities with Depo-Testosterone. Ask your consultant pharmacist to provide education to nurses about “Depo-” products, and share this article with your staff.

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⚡ **Revision to drug name pairs with tall man letters.** Because of ISMP and ISMP Canada harmonizing certain drug name pairs that utilize tall man letters, a change was made to two name pairs on the US ISMP **List of Look-Alike Drug Names with Recommended Tall Man Letters** (www.ismp.org/Tools/tallmanletters.pdf).

The name pairs with revised tall man letters (followed by the other look-alike drug name in the pair in parentheses) are di**lTIAZ**em (diazep**AM**) and s**AX**-agliptin (**SIT**agliptin). We regret any confusion that this may have caused.

⚡ **NAN Alert about injectable syringe leakage.** An alert was distributed this past September through the National Alert Network (NAN) asking health-care staff to look for fluid leakage during the syringe-filling process. The alert was issued after the ISMP National Medication Errors Reporting Program (ISMP MERP) received reports of medication leaking beyond the injectable syringe plunger onto surfaces exposed to air. The leaks happened most frequently when the plunger and barrel were not vertically aligned while filling the syringe. Leakage has occurred with both hazardous and nonhazardous drugs. The reports included syringes of various sizes and were manufactured by BD. However, BD has determined the 10 mL syringe is most affected, and a correction is underway. ISMP recommends discarding syringes with fluid that has leaked past the black stopper on the plunger, as contents may be potentially contaminated or pose a risk to workers. The alert, which provides additional information and recommendations, is available at: www.ismp.org/sc?id=2811.

If you would like to subscribe to this newsletter, visit: www.ismp.org/sc?id=462



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