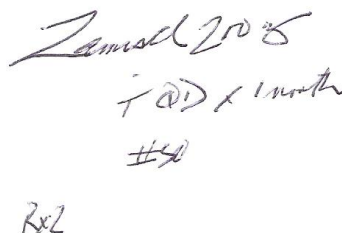


## Technician Tutorial: Preventing Med Errors

The role of the pharmacy technician can encompass a variety of functions. Depending on the setting, technicians can process orders or prescriptions, prepare IV admixtures, order stock and manage inventory, work with billing, etc. Through all of this, preventing medication errors is vital. In fact, it's a responsibility shared by ALL healthcare professionals.

In order to help prevent medication errors, it's important to understand what a medication error is, and how medication errors occur.



Handwritten prescription: Zanaflex 200's  
TAD x 1 month  
#50  
Rxl

*You get a prescription for Ms. Bee, a 52-year-old female patient. As you enter the prescription into the computer, you notice that Ms. Bee has not had this drug before. In the past, she has only filled prescriptions for oral contraceptives (but not for a few years), and now she gets Premarin. She also gets a water pill, hydrochlorothiazide. Once, after a minor car accident, she filled a prescription for Percocet.*

### **What is a medication error?**

A medication error is defined as “any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the healthcare professional, patient, or consumer. Such events may be related to professional practice, healthcare products, procedure, and systems, including prescribing; order communication; product labeling, packaging, and nomenclature; compounding; dispensing; distribution; administration; education; monitoring; and use.”

In the U.S., about two people are injured every minute because of a medication error. Medical errors (including medication errors) are the third leading cause of death in the U.S. Fortunately, medication errors are preventable and healthcare is in a constant state of evolution to improve patient safety.

### **How do medication errors happen?**

You might be surprised to find out that medication errors are generally not considered to be the “fault” of individuals, or to occur because a person was negligent or unintelligent. Experts say that medication errors usually happen because of “system failures.” This means that multiple people (e.g., prescribers, nurses, pharmacists, pharmacy technicians, respiratory therapists, etc) might miss opportunities to catch an error. Or the error might even go undetected by technology, such as computer software and barcode scanners.

Often, the “system” will fail in several different places, which results in a medication error. This is sometimes called the “Swiss cheese model.” Picture the holes in several pieces of Swiss cheese lining up, so the error can slip right through multiple layers of protection.

Because system failures are often to blame for errors, rather than a specific person, it's important for pharmacy technicians to let a pharmacist or administrator know if a system-based process isn't working. Then, the process can be examined and changed, hopefully before an error actually occurs.

Say, for example, there's a new drug on the market. It's getting a lot of hype and you've already filled several prescriptions for it. You notice that when you've reached for it on the shelf, you've picked the wrong product, with very similar packaging, more than once. You should discuss this with a pharmacist, to figure out how to prevent this potential error from happening in the future. If it's happened to you, other technicians and pharmacists are probably running into the same problem.

On the other hand, if an error has already occurred, it's very important for processes to be examined and corrected, so that the same error doesn't happen again. Don't ever feel like you are "tattling" if you report an error. Reporting errors and "near-misses" is a key part of improving patient safety.

### ***How can I help prevent medication errors?***

The Institute for Safe Medication Practices (ISMP) emphasizes different points in the dispensing process where pharmacy technicians might have the opportunity to prevent errors.

**Prescription drop-off.** Good communication is key. The more information you have, the better positioned you are to catch an error. Of course, **date-of-birth and current allergy information** should always be obtained from every patient.

Date-of-birth gives you another identifier, besides name, to help avoid mix-ups between patients with the same or similar names. In the hospital setting, a medical record number (MRN) or date-of-birth can be used as a second identifier to prevent mix-ups with the same or similar names. (Things that are subject to change, such as a hospital room number, are not dependable ways to identify patients.)

Current allergy information is important because a patient may have experienced a reaction since the last time he or she had a prescription filled. This should include both the cause of the reaction and the specific reaction that the patient had. For example, if a patient reports an allergy to amoxicillin, you will want to ask them what actually happened, such as whether they had stomach upset, hives, or trouble breathing, and document that information as well.

You'll also want to get information about a patient's food allergies because some drugs shouldn't be used in patients with certain food allergies. If your computer system doesn't allow food allergies to be entered in the same way as drug allergies, try to make a note in the patient's profile about the food allergy.

For patients in the hospital, no medication should be dispensed before allergy information is obtained. An exception to this might be for a patient with a life-threatening condition, who is unable to communicate. However, any allergies should be recorded as soon as the information is available.

Consider asking patients for **basic information about medical conditions**, and recording these in their profiles. Having this information can be very important. For example, if a patient is pregnant, certain medications should NOT be used, and the pharmacist can determine this. Also, knowing a patient's medical conditions can help the pharmacist double-check the appropriateness of prescriptions. The pharmacist can ask the patient for more information if necessary.

For babies and children, it's important to ask for a current weight with every new prescription. This is necessary so the pharmacist can check that doses are appropriate, since pediatric doses are usually based on both age and weight.

*When Ms. Bee handed you her prescription, you asked for her allergies. She verified that she has no drug or food allergies. You ask about medical information, and she says that she is completely fine, except for occasional hot flashes and a pesky nail fungus.*

**Order entry.** When you are processing prescriptions, it's best to **minimize distractions**. Keep personal business, like conversations and phone calls, to a minimum. Focus on the task at hand. It's easy to get caught up in the "buzz" of things. But when an error happens, reality can quickly set in. Stay present and keep your mind on your work. Encourage others to do the same.

At order entry, familiarity with drug names, especially **new drug names**, is very important. We have a list of new drugs hitting the market in the U.S. and in Canada. The lists have a short description of each agent. It's a good thing to stay on top of what's new, so you know to expect prescriptions for these new products.

Look-alike/sound-alike drug names, also referred to as "LASA," or "SALAD" for "sound-alike/look-alike drugs," can be problematic when you're entering orders. Some examples of **look-alike/sound-alike drug names** are atomoxetine and atorvastatin; methadone and methylphenidate; risperidone and ropinirole; *Topamax*, *Toprol-XL* (U.S.), *Tegretol*, *Tegretol-XR* (U.S.), and *Tegretol-CR* (Canada); and *Ultram* and lithium. Another example is *Celebrex*, *Celexa*, and *Cerebyx* (U.S.). And the list goes on. It's easy to see how these drug names could be confused with each other. To add to the confusion, some of the available strengths of these drugs overlap.

Ten-fold dosing errors can come up, especially with meds that come in similar-looking strengths, such as *Abilify* 2 and 20 mg, heparin 1,000 and 10,000 units, and prednisone 5 and 50 mg. Plus, drug names that end in the letter "L" can fool the eyes, where the "L" is seen as a "1" in front of the dose, leading to errors such as misreading lisinopril 2.5 mg as lisinopril 12.5 mg. These situations really drive home why it's important to carefully read orders and Rxs, and to clarify anything that is confusing, hard to read, etc.

Drug name suffixes, like XL, CD, SR, etc, can also lead to errors. There's not a uniform meaning for most **suffixes**. Common errors with drug names with suffixes include incorrect dosing interval and mistakenly omitting a suffix. For example, a prescription for the immediate-release metoprolol tartrate given once daily (which should normally be given twice daily), or a prescription for the long-acting metoprolol succinate given twice daily (which should normally be given just once daily) should be questioned. These drugs may sometimes be dosed in this manner, but it's always a good idea to double-check. Another common mix-up is with the long-acting bupropion products, *Wellbutrin XL* and *Wellbutrin SR*, and their respective generics. Pay close attention to a prescription for any drug with a special suffix to ensure that you are selecting the right form. Also keep in mind that sometimes prefixes can cause confusion. For example, the prefix "Depo-" can lead to errors. These long-acting injectable versions can get mixed up with the regular versions, such as with *Depo-Medrol* and *Medrol*.

Drugs that come in different salt forms are also prone to errors. For example, oral doxycycline comes as both a hyclate salt and a monohydrate salt. Nasal fluticasone comes as either furoate or propionate. **Different salts of drugs** might have differences such as dosing or side effects. If you have questions about which salt form of a drug to choose, double-check with the pharmacist.

In addition to mix-ups between drug names, abbreviations can be problematic. There's a **long list of abbreviations** that should not be used in healthcare. They are known to increase the risk for errors, often because they can be misread. The following list gives a few examples of dangerous abbreviations:

Abbreviation	Intended Meaning	Common Error
U	Units	Mistaken as a zero or as a “4” Can also be mistaken for “cc”
µg	Micrograms	Mistaken for “mg”
Q.D.	Every day	The period after “Q” can be mistaken for an “I,” so that the abbreviation is misread as “QID” or four times daily.
Q.O.D.	Every other day	Mistaken for “QD” or “QID”
SQ or SC	Subcutaneous	Mistaken as “SL”
TIW	Three times a week	Misinterpreted as “three times a day” or “twice a week”
HS	Half-strength	Misinterpreted to mean “at bedtime”
cc	Cubic centimeters (same as mL)	Mistaken as “U” for units
AU, AS, AD	Both ears; left ear; right ear	Misinterpreted as “OU” (both eyes), “OS” (left eye), or “OD” (right eye)
IU	International unit	Mistaken as “IV” or “10”
MS, MSO <sub>4</sub> , MgSO <sub>4</sub>	MS and MSO <sub>4</sub> = Morphine sulfate MgSO <sub>4</sub> = Magnesium sulfate	Can be confused for one another
APAP	Acetaminophen	May not be recognized as meaning acetaminophen

If you run into an ambiguous abbreviation (for example, is it a “U” or is it a “0”?), always alert the pharmacist so that he or she can clarify the prescription with the prescriber if needed.

Be alert for instructions requiring a patient to **split or crush a tablet** (or open a capsule or crush its contents). Many tablets and capsules must be taken without any kind of alteration. Some reasons for this include:

- Splitting or crushing a tablet, or opening a capsule would destroy an extended-release mechanism. If an extended-release mechanism is destroyed, a large portion of the dose can be “dumped” all at once, which could result in an overdose.
- Some medications taste very bad.
- Some medications might be irritating to the GI tract. Destroying a coating that is meant to protect the gastrointestinal tract can result in GI irritation.
- Some medications might be harmful to the person administering them if they are not administered intact.

Most of the time, single-ingredient tablets that aren’t coated and aren’t extended-release can be split or crushed. If a tablet is scored, then you know it can be split. Some capsules can be opened, and the contents administered with a beverage or mixed with a food such as applesauce. Examples of these include *Depakote Sprinkle* and *Adderall XR*.

It’s not always possible to determine if a tablet can be split or crushed, or if a capsule can be opened, by simply looking at it. This information may be found in the package insert. Alert the pharmacist if you have a concern.

It's important to be extra cautious when processing prescriptions for **“high-alert” medications**. The reason that certain medicines are designated as high-alert isn't because they are more likely to be involved in errors. It's because patients are more likely to have very serious harm if these medications are misused and patients get too much or too little of the medication. For example, medication errors with oral hypoglycemics for diabetes or insulin can be deadly because hypoglycemia, or low blood sugar, can cause patients to lose consciousness. Be vigilant when dispensing high-alert medications and question any part of an order or prescription that seems inappropriate or ambiguous.

Here's a list of “high-alert” medications:

- Chemotherapy drugs (e.g., capecitabine [*Xeloda*], cyclophosphamide, methotrexate)
- Oral hypoglycemics for diabetes (e.g., glimepiride, glyburide)
- Insulins (e.g., *Humulin*, *Lantus*, *Novolin*)
- Methotrexate (for noncancer use)
- Opioids for pain (e.g., codeine, fentanyl, hydrocodone, methadone, morphine, oxycodone)
- Opium tincture
- Anticoagulants used to thin the blood (e.g., warfarin, heparin, enoxaparin [*Lovenox*], dabigatran [*Pradaxa*])
- Injectable electrolytes (e.g., potassium chloride, potassium phosphate, hypertonic sodium chloride, magnesium sulfate)
- Sedative agents (e.g., chloral hydrate, midazolam, dexmedetomidine [*Precedex*])
- Paralyzing agents (e.g., cisatracurium, rocuronium, succinylcholine)
- Injectable vasopressin

A good rule of thumb is to **question any dose that requires more than three or four dosing units**. For example, if four tablets are needed to make up one dose, alert the pharmacist to double-check the dose. If you are in the hospital setting and mixing up an IV medication that requires more than three or four vials, have the pharmacist double-check the dose.

**Unclear prescriptions and medication orders should always be clarified.** We know handwritten prescriptions may be especially prone to errors due to poor legibility. But keep in mind that errors can still happen even with electronic prescriptions. Watch out for common problems such as mismatches between drug and dosage form (e.g., a medication that comes as a tablet ordered as a capsule or liquid), or free text in the “notes” field that could easily be missed. If you encounter an unclear medication order or prescription, don't ever guess. Let the pharmacist know so that he or she can check with the prescriber. Also, clarify “use as directed” sigs to help prevent patient confusion and other problems such as pharmacy audits.

If your computer allows you to use shortcut sig codes, such as entering “PAX20” for *Paxil* 20 mg, make sure and match up the drug, strength, and directions on the prescription label to the hard copy of the prescription as a double check.

You might feel bombarded by **drug alerts** from your computer system. But don't ignore them. Always alert the pharmacist. Some drug alerts are very serious, while others may not be a problem. The pharmacist can decide what action needs to be taken to avoid a potential problem.

In relation to clarification of unclear prescriptions and orders, medication reconciliation or “med rec” is required by regulatory agencies at transitions of care as another way to gather information and identify med errors. At this point, the patient's entire med list can be examined, and any problems can be sussed out.

*As you start to enter Ms. Bee's Rx into the computer, your initial impression is that it reads "Lamictal" with some suffix, at a dose of 50 mg. Because the script isn't clear, you ask the pharmacist to take a look. The pharmacist is puzzled as well, but asks "what's new with Ms. Bee?" You tell him nothing, except the nail infection. Then, you both realize that the prescription is actually written for Lamisil, at a dose of 250 mg once daily. The pharmacist takes a moment to speak with Ms. Bee to verify that this new Rx is intended to treat her nail infection.*

**Filling/dispensing.** Choosing the wrong product can happen for a variety of reasons, including **look-alike packaging or labels and the location of a product on the shelf**. It's best to keep look-alike/sound-alike products, such as *Toprol-XL* and *Tegretol-XR*, physically separated from one another on pharmacy shelves. (In the hospital setting, you'll want to pay extra attention to med vials that look alike, due to similar size, labeling, or cap color.) Shelf tags are also a good strategy, as is the use of "TALL man" lettering to help differentiate similar drug names.

In some cases, it may be helpful to place a "spacer" or other marker on the correct shelf spot to indicate that a product has been relocated, and point to its new location. This will help ensure that products are stocked in the correct location, and also prevent other staff from incorrectly assuming a product is not in stock if it's not immediately located on the pharmacy shelves. Some pharmacists or technicians use an empty Rx bottle with a note on the label, like "*Tegretol-XR* stocked on shelf 12." A small plastic bin can be turned upside down in the refrigerator to indicate a relocation of refrigerated products, such as insulin.

In the hospital setting, it's important to remember that products with look-alike labels and packaging should be separated not only in the pharmacy, but also when they're stocked on patient care units or in automated dispensing cabinets.

**Barcode technology** is another way to help make sure that the right products are chosen. Barcode technology only works to improve patient safety if you use it correctly and avoid shortcuts and workarounds. If scanning is problematic, troubleshoot before you resort to manual override. If multiple doses, bottles, vials, etc need to be scanned, make sure and scan each one. Don't scan the same one multiple times.

Also avoid using shortcuts and workarounds with **automated dispensing devices** (*Parata, Pyxis, ScriptPro*, etc). Bypassing necessary steps can increase the risk for med errors and inventory issues. Make sure you fill these with the correct drug. Use barcoding as a double check if possible. Don't forget to double-check expiration dates of meds before filling these devices.

*As you go to the shelf to pull the Lamisil 250 mg tablets (which you rarely dispense), you are aware that the Lamictal tablets (which are more frequently used) are in such close proximity. You alert the pharmacist that these should be physically separated. Unfortunately, you have limited space in your pharmacy, so there's really no way to move the Lamictal tablets. Instead, you place a look-alike/sound-alike alert on the shelf for both drugs.*

**Distributing meds to patients.** Errors can also occur after the dispensing process is complete and a patient is picking up their medicine from the pharmacy. One example of an error at point-of-sale is handing a filled and bagged prescription to the **wrong patient**. To prevent this from happening, always ask the person picking up the prescription for a second identifier such as an address or date-of-birth to avoid mix-ups with same or similar patient names. You can also use barcode technology to prevent these types of errors. Either way, pay close attention, even if you personally know the patient.

Be extra careful when combining **multiple meds** into one bag. Match the name and address for all the meds. Also, take extra steps to make sure nothing is missing from a patient's order by matching up the number of receipts and filled prescriptions.

Another example of an error at point-of-sale is handing out **an oral suspension that hasn't been reconstituted**. This error has been reported multiple times in pediatric patients for products like amoxicillin. In some cases, parents have administered the prescribed amount of *powder* instead of the *reconstituted liquid*, resulting in a trip to the emergency room. Consider the current system in your pharmacy for dispensing drug products that require reconstitution. Is there a double check before the drug is handed to the patient to be sure that it got mixed?

Be sure to include an **appropriate calibrated measuring device** when you dispense oral liquids. Patients shouldn't be using household spoons to measure out doses because they can be very inaccurate. Try to choose a measuring device that's a correct size for the patient to measure the dose just once. For example if a dose is 15 mL, dispense a measuring device that holds at least 15 mL. If you dispense one that holds only 5 mL, the patient will need to pull up doses three separate times for each 15 mL dose. Or the patient could mistakenly think that the 5 mL device holds the full dose of 15 mL, which could lead to underdosing and less effective treatment.

To be safe, pharmacists should personally hand patients prescriptions for high-alert medications if at all possible. This way, they can help clear up any confusion or answer any questions patients may have about these meds. Note on the outside of the prescription bag that there's a high-alert medication inside. (In the hospital setting, you may be required to attach "high-alert" auxiliary labels to these orders, to let nurses know to take any required precautions.) Other things that might be noted on the outside of a prescription bag to prompt referral of the patient to the pharmacist include if the patient is new or if there are major changes in medications or doses.

Finally, keep the will-call bin tidy by removing discontinued or unclaimed meds. If it's overflowing, avoid stacking bags on top of bags. Instead, alert the pharmacist and look for solutions to make more room for these filled Rx's.

In the hospital you should also watch for similar or duplicate patient names when delivering meds to patient care units. Double-check date-of-birth or MRN to make sure you are delivering to the right patient. As previously mentioned, don't depend on room numbers as a double check since these can change and aren't foolproof. Also, be sure to remove meds from patient care units if they have been discontinued or if the patient has been discharged or transferred, according to your pharmacy's policies and procedures.

**Encourage patients to ask questions.** If there are questions, don't hesitate to alert the pharmacist. There's movement toward empowering patients to share in the responsibility for their care. Plus, with availability of medical information on the internet, patients have access to more information than ever before. Also help facilitate routine counseling of patients. This is the last chance the pharmacist will have to check a patient's prescription and make sure that the patient understands any special techniques required such as using an inhaler or injecting a medication. Look for any notes the pharmacist may have attached to the Rx receipt or bag, in case the pharmacist uses this strategy to let you know they'd like to speak with a patient.

**Pay attention to anything that seems odd or off.** For example, in the hospital setting, if you notice that a particular item is being used up very quickly from floor stock, or from an automated dispensing cabinet, let the pharmacist know. The use could be totally legitimate, but it could also indicate that there's a problem somewhere. For example, a nurse called the pharmacy twice in one shift to ask for more IV magnesium for floor stock. The pharmacist asked why the magnesium had been used up twice during one shift. The nurse responded that she was using a dose every hour for one particular patient. It turned out

that the order for magnesium supplementation had been entered into the computer incorrectly. The patient should have received two doses, but had instead received eight doses! Too much magnesium could cause the patient to have very serious heart problems. The nurse stopped giving magnesium, the prescriber was called, blood levels of magnesium were checked, and the patient's heart rhythm was monitored for a period of time to watch for problems.

***What's the bottom line?***

Pharmacy technicians are an integral part of the team providing medication therapy to patients. Establishing an awareness of things that can increase the risk for medication errors is important. Be on the lookout for areas that can use improvement, and help strategize to minimize the risk for errors. Always question anything that looks "fishy." And remember that guessing or cutting corners to save time is ALWAYS a bad idea.

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***Cite this document as follows: Technician Tutorial, Preventing Med Errors. Pharmacist's Letter/Pharmacy Technician's Letter. November 2017.***

***---Please continue to the next page for a Cheat Sheet on med error prevention---***



## ***“Cheat Sheet”-What You Need to Know About Preventing Med Errors***

### ***Why do med errors happen?***

Med errors often happen because of system failures. This means that multiple safety checks fail, not that a single person “drops the ball.”

### ***How can med errors be prevented?***

It’s best to be vigilant and look for opportunities for errors to happen, and to report these to a pharmacist or administrator so that safety checks can be put into place. But reporting errors that do happen, and putting safety checks into place even after the fact, helps prevent errors from being repeated in the future.

### ***What practices can I incorporate into my routine to help prevent med errors?***

- Ensure you have all the patient information you need:
  - A second identifier other than name such as date of birth or medical record number
  - Current allergy information (meds, food, etc)
  - Basic medical info
  - Current weight (especially for babies and children)
  
- Watch for problems at order entry, especially with:
  - Look-alike/sound-alike drug names
  - Meds that come in multiple strengths
  - Medication name suffixes
  - Meds that come in different salt forms
  - Dangerous abbreviations
  - Meds that have special instructions such as to crush a tab or open a cap
  - High-alert meds
  
- Watch for problems when dispensing or stocking meds, especially those with any of the above attributes, or meds that have look-alike packaging.
  
- Avoid technology workarounds, such as manually overriding barcode technology.
  
- Ensure safety when meds are distributed to patients, such as by:
  - Checking a second identifier other than name
  - Ensuring a calibrated measuring device is included with oral liquids
  - Flagging patients who are receiving high-alert meds to receive counseling from the pharmacist
  - Encouraging patients to get their questions answered
  
- Stay alert for situations that seem odd or off, since these can be red flags for actual problems.
  
- Always clarify anything that’s questionable. Don’t guess.

[November 2017; 331183]