

Technician Tutorial: Stay Cool: Storing Meds in the Fridge or Freezer

Some medications must be refrigerated while stored in the pharmacy. These may also have special storage requirements after being dispensed to the patient. A few meds must be frozen prior to use. Meds that may require refrigeration mainly include vaccines and other injectables, but any dosage form can require refrigeration. Meds that must be frozen are much less common. Storing a med that requires refrigeration or freezing at a temperature outside of the required range (such as at room temperature) can have a number of consequences, including reduced shelf-life of the med, loss of physical integrity (e.g., suppositories melt), and partial or total loss of effectiveness of the med. Some refrigerated or frozen meds cost hundreds or thousands of dollars. It's easy to see how improper storage could lead to patient harm and/or significant financial loss for the pharmacy. You should become familiar with the specific products your pharmacy carries that require refrigeration or freezing. Technicians can help prevent problems by appropriately storing, handling, and labeling these meds.

*Levemir
10u SQ HS
#1 pen*

Mr. Colsmann, a 64-year-old male patient, drops off an Rx for Levemir 10 units to be injected subcutaneously once daily at bedtime. One pen is to be dispensed. You notice that Levemir is a "look-alike, sound-alike" medication that can be confused with Lantus, another insulin product available in pen form. You see that the prescriber has also used abbreviations considered to be error-prone. The abbreviation "u" for units can be misread as "0," "4," etc. The abbreviation "SQ" can be misinterpreted as "sublingual" or "5 every," and the abbreviation "HS" misread as "half-strength." You ask the pharmacist to help clarify this prescription because of the potential for mix-ups with these abbreviations.

Which medications must be stored in the refrigerator in the pharmacy?

Most insulins and vaccines are stored in the refrigerator in the pharmacy. Other injectable drugs such as adalimumab (*Humira*) and epoetin alfa (*Epogen*, etc [U.S.]; *Eprex* [Canada]), oral drugs such as ritonavir capsules (*Norvir*) and sirolimus oral solution (*Rapamune*), ophthalmic drugs such as azithromycin (*AzaSite*-U.S. only) and latanoprost (*Xalatan*), nasal drugs such as calcitonin (*Miacalcin*, etc), and suppositories such as promethazine (*Phenergan*) must be stored in the refrigerator in the pharmacy. If you are unsure of the storage requirements for a med, check the package insert. This info will typically be found toward the end (U.S.) or right around the middle (Canada) of the product labeling.

To keep everyone on the same page with regard to the special storage requirements for refrigerated or frozen meds, it's helpful to post a list of refrigerated or frozen meds, possibly on the door of the drug fridge and/or freezer. This can help prevent improper storage of these meds, which could be costly to the pharmacy. In the hospital setting, you can expect to see many refrigerated meds, whereas fewer meds used in the community setting are refrigerated.

Which meds must be stored in the refrigerator by patients?

Some meds, such as some interferons (e.g., *Pegasys*) and teriparatide (*Forteo*) must be refrigerated both in the pharmacy and once they are dispensed to patients. Many meds that require refrigeration in the pharmacy can be stored at room temperature once they are dispensed. This is very convenient for patients. The catch is that once these drugs are out of the fridge, they usually must be discarded after a certain number of days. A good example is insulin. Patients can keep insulin at room temp. However, many insulin vials must be discarded once they've been outside of the fridge for 28 days.

Remember that some meds, such as pediatric oral suspensions that are reconstituted prior to dispensing, don't necessarily require refrigeration in the pharmacy, but they may require refrigeration after reconstitution. Improper storage of these suspensions might not only affect stability, but also the flavor or pourability of the product. Like insulins, these are usually good only for a certain number of days after reconstitution and dispensing to the patient.

Once again, storage requirements for meds can be found toward the end of the package insert (U.S.) or around the middle of the package insert (Canada). In addition, specific instructions for patients regarding storage may be included in a "patient information" section of the package insert.

Which medications must be stored in the freezer in the pharmacy?

It is rare that a medication must be stored in the freezer. However, there are a few to remember. The measles, mumps, rubella, and varicella (chickenpox) vaccine (*ProQuad*-U.S. only) as well as the chickenpox vaccine (*Varivax*-U.S. only) must be frozen prior to use. (Freezing is optional for *Varivax III* in Canada.) The shingles vaccine (*Zostavax*) must also be frozen prior to use. (NOTE: In Canada, a refrigerator-stable shingles vaccine is also available. *Zostavax II* and its diluent should be stored in the refrigerator. While both products are on the market, extra care will be needed to prevent mix-ups in their storage.) These vaccines all come with diluents that should be stored in the fridge and NOT the freezer.

In the hospital setting, individual doses of some meds such as reconstituted oral antibiotic suspensions might be stored in the freezer to prolong their shelf-life. Then they can simply be thawed within a matter of minutes and dispensed when needed. Be sure to note the date that these types of products are thawed since the countdown on their shelf lives will start at that time.

What should be done in the pharmacy to ensure proper storage of refrigerated or frozen meds?

Proper storage both before and after dispensing is important to keep meds safe and effective. Here are some general rules for storing meds that must be refrigerated or frozen in the pharmacy:

- Frozen medications should be stored at -15°C (5°F) or colder.
- Refrigerated medications should be stored at temperatures between 2°C and 8°C (35°F to 46°F). Refrigerator settings should be mid-range at +5°C (41°F) to allow the highest safety margin.
- Never store medications in the refrigerator or freezer unless they are meant to be stored this way. Temperatures that are too warm OR too cold can harm meds.
- Avoid using household refrigerator/freezer combinations or dorm-style refrigerators, especially if you are storing vaccines. These can have significant fluctuations in temperature. A stand-alone freezer should always be used to store frozen meds. The refrigerator only of a combo unit can be used to store vaccines if absolutely necessary, but a stand-alone refrigerator unit is best.
- Store refrigerated medications in their original packaging. This helps protect them from light and keeps them visually distinct to avoid mix-ups. For medications with similar names or packaging (e.g., insulins; adult and pediatric vaccines), use shelf tags or store in different locations within the refrigerator.

- Don't crowd medications in the refrigerator. For consistent temperatures, allow air circulation between items.
- Store products in the middle of the refrigerator, on the shelves, not in bins or door compartments. Also place them at least two to three inches away from the floor, coils, walls, ceiling, and vents. This helps ensure stable temperatures.
- Do not store food and beverages in the same refrigerator as medications. There may even be regulations against this practice in your area.
- To keep temps stable, make sure your refrigerator has a tight seal and that your freezer does not have frost build-up. Set up a schedule for cleaning and defrosting this equipment.
- Examine arriving orders for refrigerated packaging, and unpack them immediately.
- Follow your pharmacy's policy for checking and logging the refrigerator temperature. This should be done twice daily.
- Follow your pharmacy's policy for dealing with out of range temperatures. Temps that are too high or too low may require action, such as checking with the drug manufacturer to find out if a medication should be discarded.

You go to the refrigerator to pull Levemir for Mr. Colsmann's prescription. You notice a bottle of soda pop in the door, along with a box of flu vaccine that just came in with your daily drug shipment. You take the Levemir back to the counter and place appropriate labeling, including an auxiliary label reminding Mr. Colsmann to discard the Levemir after 42 days since it will not be in the fridge.

After you finish filling the prescription, you go back and remove the soda. You are working with a very new technician, so you politely ask if the soda belongs to him and remind him that food and drink are never to be stored in the med refrigerator. You also remind him that refrigerated meds should not be stored in the door of the refrigerator, and that storing meds toward the middle of the fridge on the shelves helps ensure more consistent temperatures.

What do you need to consider when filling and dispensing prescriptions for meds that require refrigeration?

Meds that require refrigeration usually require a bit of special attention when dispensing. Take the extra steps to help your patients store these meds correctly.

Storage. Once a prescription for a med that must be refrigerated is filled and checked, it should be stored in the refrigerator until picked up by the patient. Workflow procedures for storage and retrieval of filled prescriptions for refrigerated meds can vary among pharmacies. Many pharmacies place an empty bag, label, and receipt in an alphabetized bin near the cash register, but store the actual medication in a "patient pickup" bin in the refrigerator. With this method, the prescription bag is easily located in the normal pharmacy storage area, while the med is properly stored in the fridge. Make sure to use a "refrigerate" sticker or another reminder on the receipt and/or bag to ensure that the medication is retrieved from the refrigerator and placed in the bag when the patient pays for the prescription. Whatever method your pharmacy uses, always store meds requiring refrigeration appropriately until they are picked up.

When meds that require refrigeration are dispensed in the hospital setting, it is important that they are placed in the refrigerator of the patient care area upon delivery.

Auxiliary labeling. It's important to provide patients with clear and correct information regarding the storage of their meds, especially those with special requirements such as refrigeration. You will need

to place a “refrigerate” label on meds that must be refrigerated by patients. You may also need to place an auxiliary label with a “use by” date for meds that must be refrigerated in the pharmacy (e.g., insulin, latanoprost) but can be kept at room temp by patients. (These rules hold true in the hospital setting as well.) Also remember that oral suspensions, which may not require refrigeration in the pharmacy but may require refrigeration after reconstitution, will usually need to have an auxiliary label with a “use by” date so patients know when they must be discarded.

Refer patients who have prescriptions for meds that require refrigeration to the pharmacist. He or she may want to give the patient advice about not leaving the med in a hot car, what to do when traveling, what to do if there’s a power outage, what to do if the med gets frozen by accident in the refrigerator, etc.

Mr. Colsmann returns to the pharmacy to pick up his prescription. While he is paying for the medication, he reports that he still has a few more errands to run. He asks you if it is okay to leave the medicine in the car for a few hours or if he needs to go home first and drop it off in the fridge. He’s a little worried since it’s mid-July and it’s been really hot lately. You alert the pharmacist about Mr. Colsmann’s question, and the pharmacist advises him to take his med home first, since the very hot temperature in his car could be harmful to his Levemir.

What should you do when a patient accidentally stores a med inappropriately?

It’s not uncommon for patients to forget to refrigerate their meds. If a patient calls or comes in with concerns about whether or not he or she has stored a med correctly, refer him or her to the pharmacist. The pharmacist may need to call the manufacturer to find out whether the med should be used or replaced. Go ahead and ask the patient how long the med was stored outside of proper conditions, such as outside the fridge, and for the lot number of the med, since the manufacturer will likely require this information.

In the hospital, nurses may find meds that require refrigeration but that have been left at room temperature accidentally. Refer these calls to the pharmacist.

Mr. Colsmann calls on the phone a couple hours later. He stopped on the way home to help his neighbor who had been in a fender bender at an intersection near the pharmacy. This kept him occupied for about two hours, and he left the bag with his insulin right on the front seat of his car in the sun. You ask the pharmacist to take the call. The pharmacist asks Mr. Colsmann if the insulin vial is warm to the touch, and he says, yes it is and it does not feel cold at all. The pharmacist tells Mr. Colsmann to come back and get a replacement, since the insulin may have been affected by the hot temperature.

What should you do when meds are stored inappropriately in the pharmacy?

It’s important to quickly address any issues with meds stored at inappropriate temperatures. This might include meds that are accidentally left out of the fridge or freezer, or when the temperatures inside the fridge or freezer are found to be out of range for any reason. As mentioned, temperatures that are either too cold or too warm can have bad effects on meds. You might be surprised, but some refrigerated vaccines such as hepatitis B and tetanus-containing vaccines are actually very sensitive to freezing temperatures.

You’ll want to quarantine any meds that have been stored inappropriately and mark them “do not use.” Store these meds under appropriate conditions as soon as possible while working to find out what the next step will be. The next step might be returning the meds to stock, marking the meds with a shorter

shelf-life, or discarding the meds altogether. The manufacturer will likely need to be contacted in order to make the determination. Lot numbers of the meds, as well as information from temperature tracking equipment on your fridge or freezer, such as how long the temperature was out of range, will be helpful for the manufacturer to know.

What should you do about refrigerated and frozen meds if there's a power outage in the pharmacy?

Be familiar with your pharmacy's action plan for handling power outages. If your facility does not have a back-up generator, it's a good idea to have an agreement in advance with another local facility that does have a back-up generator (e.g., hospital, clinic, wholesaler) for product storage. If you are in a hospital or other facility that has a generator, plug your fridge and freezer into outlets with back-up power. These are usually color-coded. Ask your supervisor for information if you are not sure.

You will need to get as much information as you can regarding the temperatures inside your fridge or freezer as well as the duration of the power outage. However, do not open the refrigerator or freezer until absolutely necessary, such as when you are ready to transport products to a working refrigerator or freezer. This will keep the cold air in as long as possible, and keep warmer air out.

If the temperature in the refrigerator or freezer has exceeded a product's recommended storage temperature, the product may need to be discarded and replaced. Or, it may still be usable, but its shelf-life may be reduced. In this case, the new expiration date should be noted on the product. Once again, the manufacturer can be contacted to assist with these determinations.

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