

SAFE Medicine®

Protect Yourself from Medication Errors

Preventing mix-ups between different types of insulin in the home

Some people with diabetes take insulin each day because their bodies do not make insulin, or the insulin they make is not working well. Insulin helps the body change carbohydrates in the food you eat into energy while keeping the blood sugar in the target range.

Types of insulin

There are several types of insulin grouped by how quickly they begin to work and how long they remain active in the body:

- **Rapid-acting insulin** starts working in 15 minutes, is strongest in 1 to 3 hours and lasts up to 6 hours. Because of its quick onset of action, it is best taken immediately before a meal to help break down the carbohydrates in food into energy. Examples include **insulin lispro (Humalog)**, **insulin aspart (Novolog)**, and **insulin glulisine (Apidra)**. Note: An ultra-rapid-acting insulin is also available, **Fiasp (insulin aspart)**, which starts working about 6 minutes earlier, peaks about 7 minutes earlier, and works harder during the first 30 minutes compared to traditional rapid-acting **insulin aspart**.
- **Short-acting insulin (regular insulin)** is taken within 30 minutes before a meal. It starts working in 30 minutes, is strongest in 2 to 4 hours, and lasts 6 to 8 hours. The effect may last longer for very concentrated **U-500 regular insulin**. Examples include **Humulin R** and **Novolin R**.
- **Intermediate-acting insulin (NPH)** starts working in 1 to 2 hours, is strongest in 4 to 12 hours, and lasts 14 to 24 hours. It is usually taken twice a day so that there is some insulin working both during and in between meals. Examples include **Humulin N** and **Novolin N**.
- **Long-acting (basal) insulin** starts working in about 1 to 4 hours and lasts for about 20 to 24 hours. It is usually taken once a day to keep the blood sugar steady between meals and overnight. Some people take a long-acting insulin twice a day to better control their blood sugar. Examples include **insulin degludec (Tresiba)**, **insulin detemir (Levemir)**, and **insulin glargine (Lantus, Toujeo, Basaglar)**.

Mixtures of different types of insulin are also available—for example, a rapid-acting insulin and an intermediate-acting insulin. Examples include **Novolog Mix 70/30 (insulin aspart protamine suspension and insulin aspart)** and **Humalog Mix 75/25 (insulin lispro protamine and insulin lispro)**.

A common mistake

People with diabetes make little or no insulin, so they may take both a rapid- or short-acting insulin along with an intermediate- or long-acting insulin. They take the rapid- or

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check it out

To help prevent mix-ups between the different types of insulin that may be used in the home, consider the following:

✓ **Read the label prior to injection.** Although consumers may be very familiar with their insulin products, they should always read the label on the container prior to each injection.

✓ **Add stickers in larger print.** If the small print on insulin labels is hard to read, keep a magnifying glass nearby, or ask a family member to put stickers on the containers with the name of the insulin in larger print. Labels and stickers should be placed on the base of a pen, not the cap, in case the caps of different pens get mixed up.

✓ **Make different by touch.** Make vials and pens look and feel different by placing adhesive tape, a rubber band, a hair tie, or some other type of tie or band around the container of one of the insulin products. This can help consumers with poor eyesight tell the difference between two different types of insulin by touch. Be sure not to cover any important label information on the pen or vial, and place the tie or band on the base of the pen, not the cover. The name and strength of the insulin should still be visible. Consumers also need to be able to see how much insulin is left in the pen cartridge or vial. Consumers should always attempt to read the label and not rely solely on first glance or touch to verify that they have the correct insulin in hand.

✓ **Store separately.** When the insulin products are refrigerated before opening, store them in separate areas, not together. But keep in mind, relying only on where the insulin is stored to verify that you have the correct insulin in hand is risky. Thus, each

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short-acting insulin to cover their meals, and the intermediate- or long-acting insulin once or twice a day to keep the blood sugar steady between meals and overnight. When taking more than one type of insulin at home, there is always a risk of mixing up the rapid- or short-acting insulin with the intermediate- or long-acting insulin. Not only do these insulins begin working and remain active in the body at different times, as described earlier, they are often given in very different doses. Mixing up the insulin types and injecting a rapid- or short-acting insulin at the dose prescribed for an intermediate- or long-acting insulin often results in dangerously low blood sugar levels.

An example of a mistake

A pharmacist recently told us about an insulin mix-up that her mother-in-law experienced. Her mother-in-law could not see well, so she used insulin pens to give herself injections of both a rapid-acting (**insulin lispro**) and long-acting (**insulin glargine**) insulin at home. With her poor eyesight, the pen's dosing dial was easier to read than the markings on an insulin syringe. She gave herself the rapid-acting insulin 3 times a day with meals and the long-acting insulin once before bedtime. Once the pens were opened, she stored them both in the same drawer. Both pens were similar in shape. With her poor eyesight, she had trouble telling the two pens apart on two occasions. Both times, she accidentally gave herself 50 units of the rapid-acting insulin instead of the long-acting insulin at night. While 50 units was the correct dose for her long-acting insulin, it was a very large dose of the rapid-acting insulin given all at once.

On both occasions, the pharmacist's mother-in-law recognized her mistake and stayed up until early in the morning drinking juice and checking her blood sugar levels frequently. The pharmacist happened to be visiting the last time it happened. Despite blood sugar levels within normal limits for the first few hours, it was found that her mother-in-law woke up at 4 a.m. because her blood sugar level was very low. A very low blood sugar, called hypoglycemia, is the second most common reason people wind up in the emergency department due to a bad side effect from a medicine. A very low blood sugar during sleep may not be detected and has occasionally led to death when left untreated.

🔍 **Here's what you can do:** To help prevent mix-ups between the different types of insulin that may be used in the home, consider the recommendations in the **Check it out!** column that begins in the right-hand column on page 1. Most of the recommendations focus on storing the various insulin products separately, and making them look and feel different by touch given that poor eyesight is a common complication with diabetes.

Many years ago, different types of insulin came in vials of different shapes, with either a round, square, or hexagonal neck, depending on the type of insulin. This helped consumers with poor vision differentiate the products. Today, most vials have round or elongated necks. Insulin pens are also similarly shaped. And while reading the label on each insulin product every time is important, consumers who have poor eyesight may have difficulty clearly seeing the labels, or even stickers that have been applied. Thus, making the pens or vials feel different and storing them separately can help prevent errors.

Rise in calls made to poison control centers due to laundry detergent pods

Laundry detergent packets/pods were introduced in the US in 2012. Since then, Poison Control Centers have reported an increase in the number of calls for help after young children and adults with dementia have been exposed to the

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type of insulin should be stored in a separate container labeled with one or more of the following:

- The name of the insulin (**insulin aspart** [**Novolog**] and **insulin glargine** [**Toujeo**] for example)
- The type of insulin (rapid-acting or long-acting, for example)
- When the insulin is usually taken (mealtime or bedtime, for example)

Insulin pens and vials should be stored at room temperature once opened. It is more comfortable if the insulin injected is at room temperature. Once a pen or vial is opened, consider keeping an intermediate- or long-acting insulin in the bedroom, and the rapid- or short-acting insulin (mealtime insulin) in the kitchen or dining room. Again, do not rely solely on location to verify that you have the correct insulin in hand.



SAFETY TIP

■ **Interesting free video on YouTube.** You may be interested in an international video on medication safety freely available on YouTube. The video, called "Ask," focuses on how to become more involved in your own health care or the health care of your family member.

Based on an actual medication error, the story follows the family of a patient who started taking one of his father's medicines twice a day for 3 weeks. He thought the medicine was for pain. But the medicine was **methotrexate**, which is used to treat arthritis (joint pain) or psoriasis (a skin condition). Only one to three doses (12 hours apart) should be taken each week. **Methotrexate** is also used to treat some types of cancers and, in such cases, may be taken every day for a week at a time. But if **methotrexate** is taken every day for more than a week at a time, it could cause serious harm, including death.

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contents of these pods. These brightly colored pods are small, easy to handle, and may be confused with candy or other treats. *CNN* recently reported (www.ismp.org/sc?id=3088) another “spike” in calls to Poison Control due to an online challenge that involves teenagers. Part of the “challenge” encourages teens to bite into a laundry pod and post a video! Some may think the “challenge” is just funny, but it can cause serious health problems.

Laundry detergent pods can cause more harm than laundry liquids or powders because they often contain highly concentrated liquid instead of granules. A person can be harmed from laundry pods after eating them, touching them, breathing in the chemicals, or getting their contents into their eyes. This can result in serious chemical burns, breathing difficulties, heart failure, and death. In June 2017, an article published in *Consumer Reports* (www.ismp.org/sc?id=3089) alarmingly reported that 8 people have died since 2012, including 2 children and 6 adults with dementia.

▶ **Here’s what you can do:** If you have children under the age of 6 living in your home, try to use traditional laundry and dish detergent. Keep all laundry and dish detergent (pods and traditional), and other cleaning products up and away and out of reach of children and adults with dementia. Teach children about the dangers with these products. Talk to your teenagers about the “challenge” and the serious outcomes that may result. Teach caregivers, relatives, and others who care for your children or adults with dementia about the dangers of laundry and dish detergent pods. If you suspect someone has eaten, touched, or put these products in his or her mouth or eyes, call Poison Control (1-800-222-1222) immediately. Seek medical help by taking the person to the nearest hospital emergency department.

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The “Ask” video highlights the importance of making sure you understand how to take your medicine correctly to prevent potentially harmful errors. The video introduces the “5 Questions to Ask About Your Medications,” which were developed by the Canadian Pharmacists Association, the Canadian Society for Hospital Pharmacists, and the Institute for Safe Medication Practices Canada. The questions are listed below and available at: www.ismp.org/sc?id=3090.

1	CHANGES? Have any medications been added, stopped, or changed, and why?
2	CONTINUE? What medications do I need to keep taking, and why?
3	PROPER USE? How do I take my medications, and for how long?
4	MONITOR? How will I know if my medication is working, and what side effects do I watch for?
5	FOLLOW-UP? Do I need any tests and when do I book my next visit?

The video was produced at the Cleveland Clinic Abu Dhabi, in the United Arab Emirates, with English subtitles. It can be viewed at: www.ismp.org/sc?id=3091.

To subscribe: www.ismp.org/sc?id=385

Advice from FDA

Are generic medicines the same as brand-name medicines?

Generic medicines receive approval from the US Food and Drug Administration (FDA) after going through a rigorous review process. In fact, generic and brand-name medicines have the same:

- Active ingredients
- Effectiveness
- Quality
- Safety
- Strength
- Benefits

There are two notable differences. First, generic medicines may look different than their brand-name counterpart, but they are still safe and effective. Next, they often cost a lot less than brand-name medicines because studies that were required for the original brand-name medicine do not need to be repeated for the generic medicine.

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