



Information about Insulin

INFORMATION ABOUT INSULIN

Insulin:

Insulin is a medication now used by millions of people throughout the world. If insulin is a new medication for you, we hope the following information helps you understand your treatment better. If you have been taking insulin for a while, you may still find the information helpful, since insulin treatment has changed in some ways over the years.

Insulin: What Is It?

There are many hormones produced in the body. Insulin is a **hormone** that is normally produced by the pancreas (a gland that is located behind your stomach). The cells in the pancreas that produce insulin are called the **beta cells**.

What Does Insulin Do?

Insulin allows your body to properly use the foods you eat especially carbohydrates for fuel. It helps the glucose (sugar) in your blood move into your cells so it can be used for energy. If there is not enough insulin made by the pancreas, or if the insulin is not working as it should, sugar builds up in the blood. If insulin is taken in the proper doses and combined with the correct food choices and exercise, the blood glucose should be within or close to the normal range.

Who Needs Insulin?

Many people with diabetes must take insulin. All people with **Type 1** diabetes must take insulin for their entire lives. However, people with **Type 2** diabetes may also require insulin. The other group of people who may require insulin are women who develop diabetes during pregnancy (**gestational diabetes**). These women cannot take oral agents because they would affect the baby and sometimes diet alone is not enough to keep the blood sugar under control.



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Will I Have To Take Insulin For The Rest Of My Life?

If you have **Type 1** diabetes, the answer is yes, you will. If you have **Type 2** diabetes, the answer is not so clear. For some people with Type 2 taking insulin will be necessary for the rest of their lives. Others may take it only for a period of time. Sometimes, when a person is under stress, has an infection or is having surgery, the use of insulin may be necessary. Others may need it until they lose weight. Sometimes certain medications such as steroids can make the blood glucose go up quite a bit so insulin may be necessary while these medications are being used.

Why Can't Insulin Be Taken By Mouth, In Pill Form?

Insulin is a protein and if taken by mouth, would be digested by the body. It must be given subcutaneously (under the skin, in the fatty layer) or intravenously (in a vein). In some instances, it can be given intramuscularly (into a muscle). However **you** will be giving it subcutaneously, either by injection or continuously with a pump.

How Many Different Types Of Insulin Are There?

There are quite a number of different types of insulin. They vary in **composition, strength, onset, peak, and duration** of action.

What Does That Mean?

Composition: Composition means **what the insulin is made of**. Purified pork insulin and human insulin are two types of insulin available, although pork insulin is becoming less widely used and soon may no longer be available. Human insulin is not made from the human pancreas but is identical in make-up to the insulin we produce ourselves.



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- Strength:** This describes **how many units are in each cc** of insulin. The most common type is U-100 (100 units per cc).
- Onset:** This is the **length of time** it takes for insulin to **begin working** once it is injected.
- Peak:** This is the range of time during which **insulin works best**.
- Duration:** This is **how long** insulin usually works.

INSULIN ACTION

TYPES	ONSET	PEAK	DURATION
Rapid Acting <i>Humalog (insulin lispro)</i> <i>NovoLog (insulin aspart)</i>	<i>5-15 min.</i> <i>5-10 min.</i>	<i>0.5-2 hrs.</i> <i>1-3 hrs.</i>	<i>2-4 hrs.</i> <i>3-5 hrs.</i>
Short Acting <i>(Regular, Velosulin)</i>	<i>1/2 -1 hr.</i>	<i>2-3 hrs.</i>	<i>5-8 hrs.</i>
Medium Acting <i>(NPH, Lente)</i>	<i>2-4hrs.</i>	<i>4-12hrs</i>	<i>12-18hrs.</i>
Long Acting <i>(Ultralente</i>	<i>4-6hrs</i>	<i>unpredictable</i>	<i>24+hrs</i>
 <i>Long Acting Basal Insulin Lantus (insulin glargine)</i>	 <i>1.1 hrs.</i>	 <i>none</i>	 <i>24 hrs.</i>



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The duration of action of any insulin may vary in different persons or in the same person at different times. Because of this variation, time periods indicated here should be considered general guidelines only.

MIXTURES:

1. Humulin 70/30 70% NPH & 30% Regular, already mixed together.
Novolin 70/30
2. Humulin 50/50 50% NPH & 50% Regular, already mixed together.
3. Humalog Mix 75/25 75% longer-acting insulin and 25% Humalog, rapid acting insulin already mixed together.
4. NovoLog Mix 70/30 70% longer acting insulin and 30% NovoLog, rapid acting insulin already mixed together.

Brands:

There are three different brands of insulin available in the United States: Lilly (Humulin, Humalog), NovoNordisk (Novolin, NovoLog), and Aventis (Lantus). Action and duration of Humulin and Novolin may differ somewhat. Check with your physician before switching brands of insulin. You and your health care provider will decide what type of insulin is best for you. It may take a while to find the right type and dose of insulin.



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When Should I Take My Insulin?

This varies from person to person. However, there are some important guidelines to follow:

Insulin should be taken at approximately the same time every day. However, more important than the time of day is the **relationship between taking insulin and the times for meals and snacks.**

The following are **guidelines** for meal and snack times when you take insulin:

INSULIN	MEAL	SNACK
Humalog/Lispro NovoLog/Aspart	Within 15 min. after injection	Not always necessary
Short Acting (Regular)	30-45 min after injection	2 ¹ / ₂ -3 hrs. after injection
Medium Acting (NPH, Lente)	4-5 ¹ / ₂ hrs. after injection	7-8 hrs. after injection
Long Acting	No requirement	No requirement

Remember, these are **guidelines**. You may work out a plan with your doctor or diabetes educator that allows you to change the timing from one day to the next but you should have professional guidance to do this.



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Do I Need To Check My Insulin Each Time I Draw It Up?

Each time you use your insulin you should check to make sure that you have the **right type**. If you are using long or intermediate in addition to short acting insulin, be sure you don't confuse them when drawing up your dose. You should also check the **expiration date**. Opened (vials in use) insulin vials stored in room temperature (59 F-86 F) or in the refrigerator will last 28 days. Thus, it is a good idea to write down the date on the vial when you open a new vial. Unopened insulin vials kept in the refrigerator will last until expiration date noted on vial. Insulin pens in use do not need to be refrigerated and will expire in 10-28 days. Insulin pens not in use should be kept refrigerated and will expire on the expiration date noted on the pen.

Do I Need A Prescription For Insulin? For Syringes?

A prescription is not needed for some insulin. However, you do need a prescription for Humalog (Lispro), NovoLog (Aspart), Humalog Mix 75/25, NovoLog Mix 70/30, Lantus, and prefilled insulin pens and cartridges. For the others you may want to obtain one for reimbursement reasons. You do need prescriptions for syringes and insulin pen needles. Figure out how long your prescription will last so you can refill it before you run out of insulin and syringes.

What Type Of Syringe Should I Use?

There are a number of different syringes available. The 2 brands used most often are B-D and Monoject. At this hospital, Monoject is usually used. However, outside the hospital, B-D seems to be the brand used most frequently. You may obtain B-D syringes from your diabetes educator to see if you prefer these over Monoject. Some people find the markings are easier to see on a B-D syringe.

The syringe you use must match your insulin concentration. For example, U-100 syringes **must** be used with U-100 insulin. U-100 syringes come in three (3) sizes:



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1. **30 unit low dose syringe:** (3/10cc) holds up to 30 units of U-100 insulin; each line on this syringe is equal to one (1) unit, making it easier to read.
 2. **50 unit low dose syringe:** (1/2cc) holds up to 50 units of U-100 insulin; each line on this syringe is equal to one (1) unit, making it easier to read.
 3. **100 unit syringe:** (1cc) holds up to 100 units of U-100 insulin; each line is usually equal to two (2) units of insulin. These are especially useful for people taking larger doses of insulin.
- If you do find a low dose syringe is a better choice for you, be sure your physician indicates the size on your syringe prescription.
 - In addition, there are now syringes available that have a short needle. These may be a good choice for people who are very thin. This must be on your prescription.
 - If you have a problem seeing the numbers or lines on the syringe, speak with your diabetes educator. There are various devices available that may be helpful to you, including a syringe magnifier.
 - Some people prefer to use a pen-like device with pre-filled cartridges or pre-filled disposable pens to take their insulin. Discuss this with your diabetes educator or doctor.

Can I Reuse My Syringes?

Re-using syringes is not recommended by the manufacturer. You risk infection, and the needle point becomes dull resulting in an uncomfortable injection. In addition, **if you mix insulin, there is a good chance you will contaminate your clear short-acting insulin with the longer acting one and thus change the action of clear, short-acting insulin.**



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Why Must I Change Injection Sites?

Using the same site for a long period of time can cause changes at the site (lipodystrophy) or changes (delay) in the absorption rates. For this reason it is necessary to rotate sites so that they are not used more frequently than once every 1-2 months.

Since absorption rates from different sites vary, it is advisable that you select one area (e.g. thigh, abdomen) and rotate sites within that area to minimize the effects of the different absorption rates. To be more specific: rotate sites on both thighs (or arms, or abdomen) but don't switch from legs to abdomen, etc. The best absorption is from the abdomen, then from the arm, then from the thigh and least, from the buttocks.

The site you select should not show evidence of dimpling or feel hard when you touch it. Sometimes people like to use these areas because the injection may be less painful. However, absorption rates in these areas are not uniform and they should not be used. In addition, you should not use areas that are near surgical scars or have spider veins. **Inspect your sites regularly. If you feel a hardened area or notice a firm, swollen mound, avoid these areas completely.**

Where Should I Store My Insulin?

Insulin vials in use can be stored at cool temperatures under 86 F. However, it is not recommended that opened insulin vials, whether refrigerated or kept in room temperature, be used for more than 28 days. Insulin pens in use will last between 10 to 28 days. There are 1000 units of insulin in each bottle of insulin, so if your bottle will last 28 days or more, it must be discarded. Any extra bottles you have that are not opened should be stored in the refrigerator away from the freezer until you are ready to use them. Unopened insulin vials and insulin pens stored in refrigerator will last until expiration date noted in the vial or pen. If you have always kept your insulin in the refrigerator and you are afraid to leave it out, you may continue to store it there. If refrigerated, you should take it out about ½ hour



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before your injection, so it can warm up to room temperature (injecting cold insulin can be uncomfortable). Insulin pens in use should not be stored in the refrigerator. **Insulin that has been frozen or exposed to temperatures higher than 86° F. should not be used and should be discarded.** Protect insulin from becoming too cold or too hot. Extreme temperature variations could harm insulin.

To figure out how long your insulin will last use the following formula:

- 1000 divided by your total daily dose = number of days bottle will last.
- 300 divided by your total daily dose = number of days pen will last.

Will I Be Able To Travel Now That I Am Taking Insulin?

Yes, you certainly will as long as you plan ahead. The following are some important points to remember:

1. Be sure you have your insulin and other supplies in your hand or carry-on luggage. Checked luggage doesn't always arrive at its destination and you don't want to be separated from your supplies. In addition, storage in the baggage compartment of an airplane may cause insulin to freeze.
2. Be sure you have extra insulin, syringes, etc. packed in case of unplanned delays. If you are in another country, your usual insulin, syringes, etc. may not be available.
3. Be sure you have a bottle of clear, short-acting/rapid acting insulin with you, even if you don't usually use it. If you become ill while traveling, you may need it.
4. Be sure you have snacks packed and available in case of travel or meal delays.



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5. Always wear a Medic-Alert bracelet or necklace, in case of emergency.
6. If you will be crossing time zones, speak with your doctor in advance so he/she can help you adjust your dose and injection times. This is often necessary for time zone changes greater than 4 hours.
7. Ask your pharmacist to place one of his pharmacy's preprinted labels on a box of insulin you receive. This label should include your name and the type of insulin with the manufacture's label attached, if requested by security at the airport. This will serve as proof that you have diabetes and need to bring insulin syringes on board your flight.

How Do I Dispose Of My Syringes?

We recommend that you place used syringes in a strong container such as an empty detergent bottle or coffee can. Add a solution of one part bleach and 10 parts water. When the bottle or can is full, tape the lid closed, label "Medical Waste, Don't Recycle" and discard. Do not discard syringes in containers that will be recycled. "Sharps Containers" are also available for purchase at your pharmacy. The NYU Medical Center - FPO pharmacy will accept used syringes and lancets **if they are in a sharps box**. Many states have laws on how to dispose of diabetes products. Talk to your pharmacist or local waste authority about how to correctly dispose syringes and lancets.