A TRUEinsight™ Guide



manage

Medications and Diabetes

Understanding Insulin Therapy

HOMEdiagnostics™

A TRUEinsight™ Guide to understanding the importance of insulin for diabetes management

Once diagnosed with diabetes, you and your healthcare professional will work together to develop a treatment plan to help achieve blood glucose levels within your target range. To help you learn about and manage diabetes, your practitioner may recommend a diabetes self-management training program – available at local hospitals and covered by Medicare and most insurance plans.

These programs are designed to provide you with the knowledge and skills to understand key aspects of your treatment plan, including healthy meal planning, physical activity, blood glucose monitoring and medication therapy. Other topics include how to manage high and low blood glucose levels, preventing complications, taking care of diabetes when you are sick, and other topics relating to living with diabetes. This TRUEinsight™ Guide focuses on understanding the goals of insulin therapy and the types of insulin on the market. You'll also learn about insulin delivery options and the importance of blood glucose monitoring to determine if your diabetes management plan is effective in achieving your target blood glucose goals.

The Goal Of Insulin Therapy

In normal metabolism, insulin is produced by the pancreas and released when glucose levels are rising, such as after a meal. Insulin works to lower blood glucose levels by transporting the glucose from the blood into the body cells for energy. People with type 1 diabetes do not produce any insulin, so they are required to administer insulin to regulate blood glucose levels.

People with type 2 diabetes taking oral medications may require insulin, to help them achieve their target blood glucose goals, at some point in the course of their diabetes. The goal of insulin therapy is to control blood glucose levels and prevent complications of diabetes, including nerve damage, kidney damage, vision loss and cardiovascular disease.

Types of insulin*

Insulin is available in many different types, and each type of insulin works differently in the body. Insulins vary depending on how fast they start working after being injected, the time it takes for them to peak in the body and the length of time they last.



Short-Acting Insulin

Regular insulin is considered a "short-acting" insulin. It begins to work 30 minutes after injection, peaks in two to three hours and lasts for three to six hours.

Intermediate-Acting Insulin

An "intermediate-acting" insulin begins to work later than a short-acting insulin but works for a longer time. For example, an intermediate-acting insulin, NPH, takes two to four hours to begin working, peaks in four to 12 hours and can last for 12 to 18 hours.

Long-Acting Insulin

"Long-acting" insulin, which begins working in one to two hours, continuously works in the body and lasts for approximately 24 hours. Insulin glargine and insulin detemir are designed to be injected any time during the day, as long as they are injected at the same time every day.



Rapid-Acting Insulin

"Rapid-acting" insulin – insulin lispro or insulin aspart – begins to work in approximately 15 minutes after injection, works the hardest in about one to two hours and lasts for three to four hours. Because rapid-acting insulins begin to work approximately 15 minutes after injection, it is important to have your meal ready to eat before injecting insulin.

The type of insulin and dosage of insulin a person takes depends on specific characteristics of his/her disease. Each type of insulin works differently from person to person – depending on your lifestyle, how well you follow your meal plan, your physical activity program and your overall health status. It is important to work with a diabetes healthcare professional to determine the type and dosage of insulin required to help you achieve your target blood glucose goals.

Premixed Insulin

Premixed insulin is available to make it easier for people to inject two different types of insulin without having to mix it themselves. Premixed insulins are often packaged in a pen-type device that makes it easy to measure and deliver an insulin dose.

Premixed insulin may be a combination of regular and NPH insulin, called 70/30. This means that the mixture contains 70% NPH intermediate-acting insulin and 30% of regular or short-acting insulin. There may be other combinations of different types of insulin.

The table below summarizes different types of some commonly used insulins, highlighting when the insulin starts working, when the insulin works the hardest and how long the insulin lasts. Remember, each person differently responds to insulin; therefore, these times may vary depending on the characteristics of the disease.

Insulin Chart

Name Of Insulin	Type	Insulin Begins To Work In (Onset)	Insulin Is Working The Hardest (Peak Action)	Insulin Lasts For (Duration)
Regular Insulin (R)	Short Acting	30 Minutes	2-3 Hours	3-6 Hours
NPH Insulin (N)	Intermediate Acting	2-4 Hours	4-12 Hours	12-18 Hours
70% NPH and 30% Regular (70/30)*	Mixture of Intermediate and Short Acting	30 Minutes-1 Hour	2-12 Hours	NPH 12-18 Hours Regular 3-6 Hours
Insulin Glargine (LANTUS®) Insulin Detemir (Levemir®)	Long Acting	1-2 Hours	Continuous Action (No Peak)	24 Hours
Insulin Lispro (Humalog®) Insulin Aspart (NovoLog®) Insulin Glulisine (Apidra®)	Rapid Acting	~15 Minutes	1-2 Hours	3-4 Hours

* Information sourced through ADA's *Resource Guide 2008*

My Insulin Regimen

Name of Insulin	Type	Dosage	Time of Day

Insulin delivery options

All insulin is measured in units and drawn up into a syringe for injection into the subcutaneous area of the skin on the abdomen, thighs, or upper arms. Some people take multiple daily injections of insulin using a fine-needle syringe. Other insulin delivery devices include insulin pens or insulin pumps. An insulin pen device offers the convenience of a prefilled insulin syringe with a dial that allows the user to dial up the correct units of insulin to inject.



Some insulin pens are designed to require a specific type of insulin, others will use any type or mixture of insulin.

Insulin pumps

Some people with type 1 diabetes are candidates to use a pump device to deliver insulin. The device is about the size of a beeper and delivers insulin via a plastic cannula that is inserted directly under the skin. The pump is programmed to deliver small amounts of insulin throughout the day, and can also be programmed to give additional insulin based on the number of carbohydrates consumed during a meal and to correct a high pre-meal blood glucose level.

Benefits of pumps

The benefits of wearing an insulin pump include the ability to determine insulin dosage based on food choices and the elimination of multiple insulin injections throughout the day.

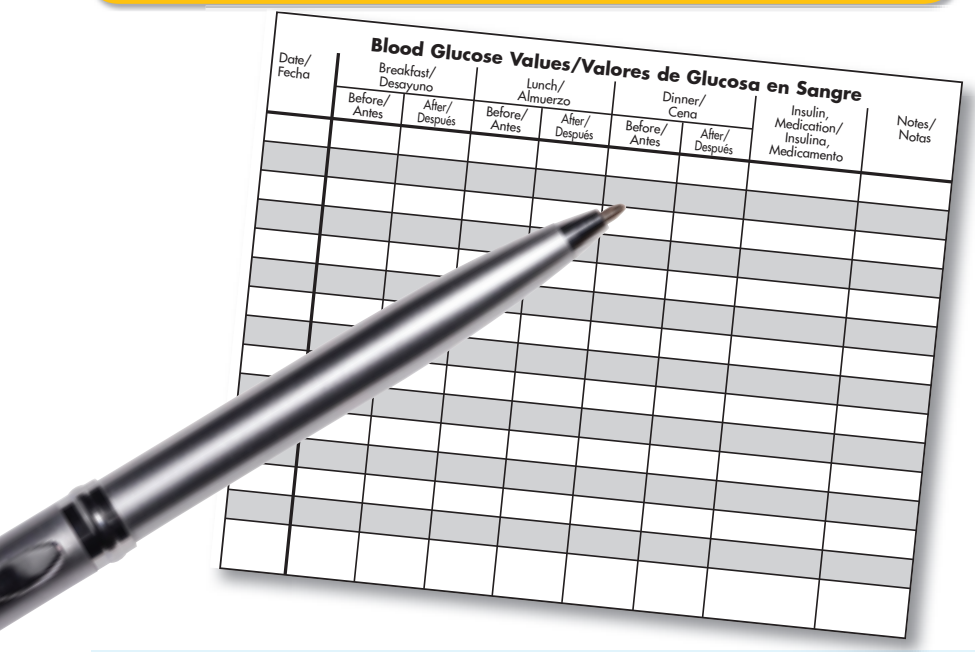


The insulin pump is not an option for everyone with diabetes. You and your diabetes healthcare professional will work together to determine what is the most appropriate insulin delivery option for you. Your diabetes management training will include learning how to draw up and inject insulin, and/or learning how to properly wear and maintain an insulin pump.

The importance of blood glucose monitoring and insulin therapy

Whether you use a needle and syringe or other insulin delivery option, monitoring your blood glucose levels is critical in understanding if your insulin therapy is effective in controlling your blood glucose levels. Frequently checking your blood glucose levels and writing down the results in your log book can help you to identify patterns and trends of too high or too low blood glucose levels.

The American Diabetes Association recommends that people using insulin should test blood glucose levels three or more times a day.



You should test your blood glucose levels more frequently when:

- Your glucose levels are out of your target range
- Your diabetes management plan has changed
- You are ill and/or not feeling well
- You are under a lot of stress

More frequent testing

People who are using an insulin pump may require more frequent blood glucose testing. It is also a good practice to check your blood glucose levels more frequently when your diabetes treatment plan is changing or you are ill.

The goal of insulin therapy is to normalize blood glucose levels to prevent the complications of diabetes. If your blood glucose levels are in your target range, then your diabetes management plan is working.

If you are having difficulty achieving your target blood glucose goals, then meet with your diabetes healthcare professional to review your blood glucose results so that you can work together to actively develop a plan to help you achieve blood glucose results near or within your target range.



For more information
about diabetes visit
www.homediagnostics.com



Contact your insurance company or local diabetes association to find out if you qualify to receive diabetes self-management education. Remember, the more you learn about diabetes, the better you will be able to understand and manage your daily self-care program.

Below are some references for additional information about diabetes.

American Association of Diabetes Educators
800-TEAM-UP-4
www.aadenet.org

American Diabetes Association
800-342-2383
www.diabetes.org

National Institute of Diabetes and Digestive and Kidney Diseases, National Diabetes Information Clearinghouse
800-860-8747
www.niddk.nih.gov

Juvenile Diabetes Research Foundation International
1-800-533-2873
www.jdrf.org

Home Diagnostics, Inc.
www.homediagnostics.com

Information contained in this brochure was sourced through:
American Diabetes Association, Resource Guide 2008; Diabetes Forecast, January 2008, pg. RG 11-14.
American Diabetes Association Standards of Medical Care in Diabetes, Diabetes Care, January 2008, pgs. S2-S54.
Life With Diabetes: A Series of Teaching Outlines, 2nd edition by the Michigan Diabetes Research and Training Center; lead authors Martha M. Funnell, M.S., R.N., C.D.E.; Marilyn S. Arnold, M.S., R.D., C.D.E.; Patricia A. Barr, B.S.; Andrea Lasichak, M.S., R.D., C.D.E.; 2000 by American Diabetes Association.

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