What You Need To Know About Diabetes

Diabetes and Endocrinology Center

SONE HEALTH

Trinity Health
Of New England

Contents

Your body changes much of the food you eat into a sugar called glucose. Your blood then carries the glucose to all the cells in your body where it is either used for energy or stored to use later when you need extra energy. The cells use the glucose for energy with the help of a hormone called insulin. Insulin is made by the pancreas, which is an organ in your body.

Diabetes is a condition where your body is not able to properly use the sugar (glucose) from the food you eat. Your body's cells need glucose for energy; glucose comes from the carbohydrates you eat. Insulin must be present for glucose to get into the cell to be used as fuel. When you have diabetes your body either does not produce any or enough insulin or the cells do not recognize the insulin. Without insulin the glucose stays in your bloodstream and causes high blood sugars (high blood glucose).

Diabetes

Type 1 diabetes

With type 1 diabetes, the body does not make any insulin at all. Individuals with type 1 diabetes need to take insulin injections to survive. This form of diabetes which was called juvenile-onset or insulin dependent diabetes usually develops in children or young adults, but it can occur at any age. Type 1 diabetes is an autoimmune disease.

Type 2 diabetes

With type 2 diabetes, the body produces insulin but it is either not enough or not very effective to convert blood sugar into energy. This form of diabetes usually occurs in overweight individuals, and in those that have a family history of diabetes. It is usually diagnosed in people over the age of 40, though it is increasingly occurring in younger people and adolescents.

Gestational diabetes

A type of diabetes that develops in pregnancy. Treatment starts with diet and exercise, but can include medications and insulin. It is important to continue to screen for diabetes after the pregnancy, because you are at a greater risk for developing type 2 diabetes later in life.

High Blood Sugar Can Lead To Many Health Problems.

It can affect your heart, kidneys, eyes, feet, digestion, and sexual function. The good news ... even if you develop these problems they can often be treated or prevented from getting worse!

Do I need to check my blood sugars?

Your provider (MD, DO, APRN, PA) will tell you how many times to check daily.

Usually, if you are taking pills or just one injection of insulin per day you will be asked to check your blood sugar twice a day.

If you take several injections of insulin, are on an insulin pump or are pregnant you may be asked to check four or more times a day.

The best times to check are:

- fasting and before meals
- two hours after a meal
- at bedtime

There may be times that you may need to check your blood sugar more often than usual. This is when you are sick, pregnant, changing or adding medications, or have been experiencing high or low readings.

What should my readings be?

- Before A Meal: 80-130 mg/dL
- 2 Hours After A Meal: 100-180 mg/dL

These target ranges may be different for each person. **Ask your provider for YOUR specific target ranges. The only way to know if your diabetes treatment is working is by checking your blood sugar level.**

Checking Your Blood Sugars At Home

Monitoring blood sugars at home

- To check your blood sugars at home you will need a glucose meter along with testing strips and lancets and alcohol swabs.
- Start by washing your hands with soap and water.
- Turn on the glucose meter by placing the test strip into the meter.
- Choose a finger and prick using your lancing device.
- Pick a different finger each time and don't prick at the tip or on the pad of the finger; these areas can become sore.
- Massage your finger in an upward stroke to bring a drop of blood to the surface.
- Put the drop of blood onto the test strip.
- The glucose meter will provide a reading of your blood sugar.

Keeping track of your blood sugars

- It will help both you and your provider if you write down your blood sugar level every time you test. Ask your nurse for a log booklet if you need one. If you have a new meter, you may find a log booklet inside the box or the meter case.
- Show your log booklet to your provider at all office visits!
- Questions on your meter? Call the 1-800 phone number on the back of your meter for technical assistance.

Week of

Blood Sugar	Breakfast	After Breakfast	Lunch	After Lunch	Dinner	After Dinner	Bedtime	Night
Monday								
Tuesday								
Wednesday								
Thursday								
Friday								
Saturday								
Sunday								

Call your provider if your blood sugar is consistently greater than 180 mg/dL or you have any unexplained readings less than 70 mg/dL.

Your treatment plan may need adjusting!

Diabetes and Technology

There are several types of devices that can help you manage your diabetes. These include continuous glucose monitoring systems (CGMs), flash sensors, and insulin pumps.

Continuous Glucose Monitoring System (CGMs)

CGMs help you track patterns in your blood glucose and sound alarms if blood glucose levels are out of range. There are several different types of CGMs: implantable, insertable, those requiring calibration and those that do not. Many can give readings via your cellphone or even communicate with your insulin pump. CGMs have now been approved by the FDA to replace finger-stick blood sugar monitoring in certain circumstances. A CGM sensor typically lasts from 7-90 days.

Flash Sensors

Flash sensors are similar to CGMs but they give you a snap shot of your blood sugars looking back several hours. These devices allow you to check your blood sugar by swiping a receiver or your mobile phone over the sensor.

Insulin Pumps

Insulin pumps can help manage your diabetes by mimicking the action of a healthy pancreas. Some insulin pumps have software that allows them to make changes in insulin administration based on CGM data — these are called closed-loop or semi-closed-loop systems. Insulin pumps connect to your body via small cannulas that are inserted or changed every three days and deliver insulin continuously into your subcutaneous (fatty) tissue. Insulin pumps can have tubing that connects the device to your body or can be tube-less and use a remote control. There are even daily insulin pumps called patch pumps that allow you to benefit from insulin pump technology without using an electronic system.

Your diabetes care provider or educator can help you figure out how you may benefit from current diabetes technology and assist you with obtaining and learning about specific devices.

Low Blood Sugar/Hypoglycemia (less than 80 mg/dL)

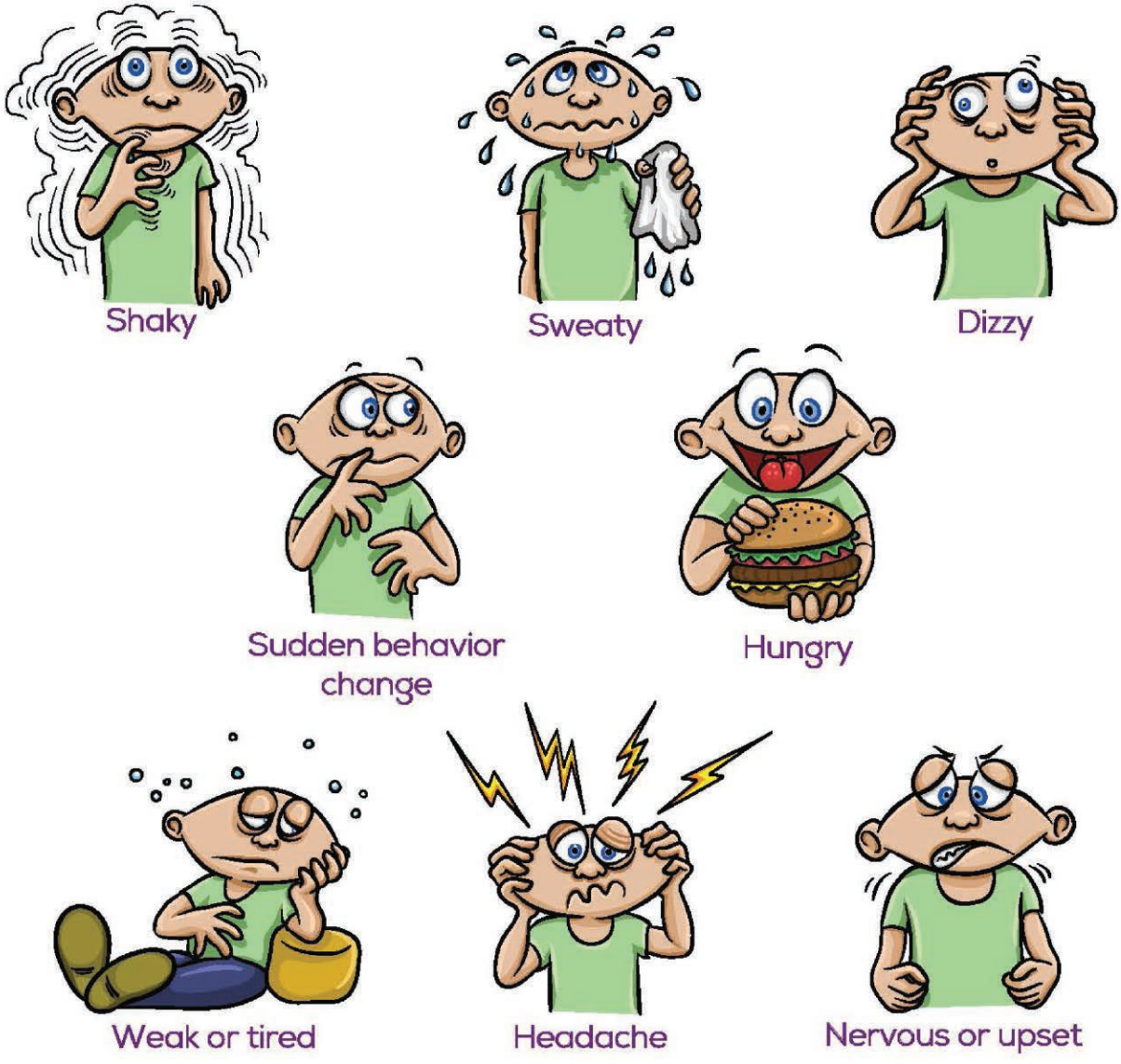
Causes

You might get low blood sugar (also called hypoglycemia) if you:

- Take certain medicines and eat too few carbohydrates, or skip or delay a meal
- Take too much insulin or diabetes pills (ask your diabetes care team if this applies to you)
- Are more active than usual

Signs and Symptoms

Here's what may happen when your blood sugar is low:



What To Do If You Think You Have Low Blood Sugar

Check your blood sugar right away if you have any symptoms of low blood sugar. If you think your blood sugar is low but cannot check it at that time, treat anyway.

Treat by eating or drinking 15 grams of something high in sugar, such as:

- 4 ounces (1/2 cup) of regular fruit juice (like orange, apple, or grape juice)
- 4 ounces (1/2 cup) of regular soda (not diet)
- 3 or 4 glucose tablets
- 5 to 6 hard candies that you can chew quickly (such as mints)

Wait 15 minutes and then check your blood sugar again. If it is still low, eat or drink something high in sugar again. Once your blood sugar returns to normal, eat a meal or snack. This can help prevent another low blood sugar.

If low blood sugar is not treated, it can become severe and cause you to pass out.

If low blood sugar is a problem for you, talk to your doctor or diabetes care team.

Severe Low Blood Sugar

Severe low blood sugar is when the sugar is so low that a person is unable to help themselves and needs the assistance of others. Someone should call 911 if you become unresponsive or unable to swallow. Your family or a significant other may be taught to give glucagon.

What is glucagon?

Glucagon is a hormone that helps raise blood sugar; there are several administration methods available today including injection and nasal spray. If you are prescribed glucagon, speak to your nurse educator about training the person who would most likely be administering glucagon. (Glucagon is available by prescription.)

Do you need glucagon?

You should learn to use glucagon if you:

1. have type 1 diabetes
2. have ever had severe low blood sugars
3. have ever lost consciousness from a low blood sugar
4. have had a seizure from a low blood sugar
5. take 3 or more insulin injections a day or wear an insulin pump
6. are unable to feel symptoms of low blood sugar (hypoglycemia unawareness)

Keep tube sealed until ready to use.

High Blood Sugar/Hyperglycemia (more than 250 mg/dL)

Causes

High blood sugar (also called hyperglycemia) is when there is too much sugar in your blood. Over time, it can cause serious health problems. High blood sugar can happen if you:

- Skip a dose of insulin or diabetes pills
- Eat more than usual
- Are less active than usual
- Are under stress or sick

Signs and Symptoms

Here's what may happen when your blood sugar is high:

Very thirsty

Needing to pass urine more than usual

Hungry

Sleepy

Blurry vision

Infections or injuries heal more slowly than usual

What to do about high blood sugar:

The best way to avoid high blood sugar is to follow your diabetes care plan. Call your diabetes care team if your blood sugar has been higher than your goal for 3 days and you don't know why.

Of course, the best way to know if you have high blood sugar is to check your blood sugar regularly, as directed by your doctor.

If you have diabetes and your sugar is over 250 consistently AND you have symptoms including nausea, vomiting, stomach pain, fruity breath, or confusion, you will need to check your urine for something called ketones. Ketones appear in your urine when you don't have enough insulin working in your body. To check for them you will need to purchase ketone strips in the pharmacy. The pharmacist can explain how to use them. Treating ketones early can prevent a life-threatening complication called Diabetic Ketoacidosis (DKA) and keep you out of the hospital. Call your provider if you have any ketones.

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Diabetes and Travel

Plan ahead!

Let your care team know you will be traveling so that we can write you a travel letter that gives you permission to carry your diabetes supplies and medications with you. This letter can even include permission to carry food or beverages for the treatment of hypoglycemia. Some countries may require you to bring a copy of your prescriptions with you. It is best to plan ahead so that you can work with your team to ensure you have adequate supplies and medication for your trip. It's always a good idea to bring along more than you think you will need — this helps if you get stuck traveling, drop a vial of medication or find yourself using more supplies than anticipated.

Some medications may require adjustments if you are traveling more than three time zones — please discuss your travel plans with your diabetes team members so that we can help you plan for this.

There are several options available to keep your insulin cool during travel — work with your diabetes educator to decide which is right for you.

Be prepared

Make sure you have access to fast-acting carbohydrates to treat low blood sugar during your trip.

Certain devices should not go through x-ray machines used in many airports. You can always ask to have a manual pat-down security check to protect your devices. Do not be alarmed if your devices are checked for explosive residue; this is normal when checking electronic medical devices.

Wear your medical identification! These help identify you as a person with a medical condition and can speed up treatment if you are unable to tell someone you are having a low blood sugar. These types of bracelets and necklaces are recognized around the world.

Sick Day Rules

You need to take extra care of your diabetes when you are sick, since any illness or stress such as colds, upset stomach, flu, surgery, emotional stress, infection, or injury, can cause your blood sugar to rise out of control.

1. Always take your diabetes medication unless your health care provider tells you not to.
2. Check your sugar 4 times a day for mild sickness, every 3-4 hours for more severe sickness. When you are sick, your blood sugar can get high very quickly!
3. Be on the safe side and call your doctor right away for:
   - constant nausea or diarrhea
   - vomiting or inability to keep fluids down
   - blood sugar levels over 250 mg/dL for more than 2 readings
   - blood sugar levels less than 80 mg/dL
   - fever lasting more than 24 hours
   - abdominal (stomach) pain
   - if you are unsure what to do

Medications

Do I need medication?

Your healthcare provider will design a treatment program just for you. Your program will include:

- Following a meal plan
- Exercising regularly
- Taking medications if indicated
- Keeping appointments with your providers

Tips on taking diabetes medications

- Take only the dose prescribed and at the recommended times.
- Some medications need to be taken either before or after a meal. Check with your pharmacist or provider on the best time(s) to take your medications.
  - For example: Metformin is best taken with or right after a meal to help prevent stomach upset.
- If you miss a medication dose, check your glucose levels closely and call your provider for instructions.
- The diabetes medications you take may change over time.

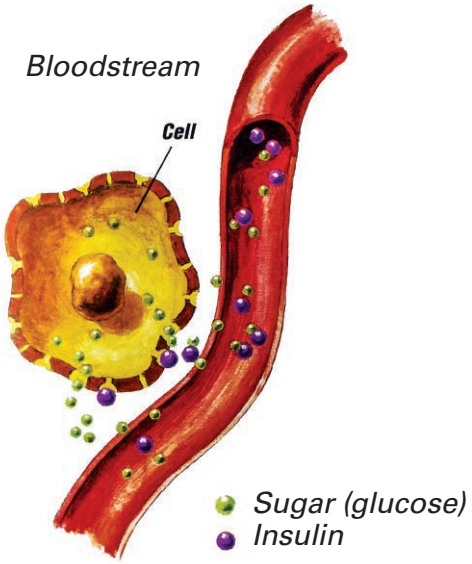
Pills

- Are used only for type 2 diabetes.
- Are **NOT** the same as insulin.
- The pills may (depending on which type you take)
  1. Keep your liver from making too much sugar, especially overnight
  2. Help your pancreas make more insulin
  3. Help your insulin move sugar into the cells, improve 'insulin resistance'.
  4. Slow the movement of food through your stomach and intestines, causing a slower rise in your blood sugar level.

What Is Insulin?

Insulin is a hormone made in your pancreas that helps bring sugar (glucose) from your blood stream into your cells, where it turns into energy.

Insulin needs to be injected and comes in either a pre-filled pen or in a bottle. The needles used to inject insulin are very short and thin.



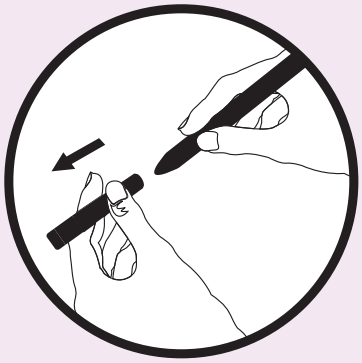
Oral Medications for Type 2 Diabetes

There are many choices today for type 2 diabetes. They all work in different ways to get at the cause of high blood sugar. Often if one is not enough to bring down the blood sugar, another can be added. These may also be used with injectable medications.

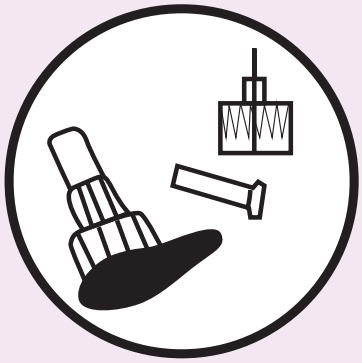
It is important that you know the name of your medicine, how to take it and possible side effects to watch for. Always carry a list of your medications and keep it up to date.

Class of Medication	How it Works	Possible Side Effects	Special Considerations
Biguanides	This class is recommended as the first drug of choice for type 2 diabetes not controlled with diet and exercise alone. This medicine decreases the amount of sugar released from your liver.	Upset stomach, gas, diarrhea, decreased appetite; these side effects tend to get better within a few weeks for most people. **Take it right after a meal to help prevent side effects.** The extended release tablet is less likely to cause stomach side effects. It does not cause weight gain and is unlikely to cause the blood sugar to drop too low. May cause vitamin B12 deficiency	If you are having an x-ray or scan that involves the injection of dye, be sure to tell your healthcare providers that you take this as it may be stopped for a short time. If you have kidney disease be sure to tell your provider as the dose may need adjustment. Your doctor should monitor your blood count to check for Vitamin B12 deficiency.
Sulfonylureas	These pills help your pancreas to make more insulin.	Hypoglycemia (low blood sugar below 80), upset stomach, possible weight gain. Increased risk of allergy if you are also allergic to sulfa antibiotics.	Immediate release glipizide should be taken ½ hour before eating for best absorption. **Always carry rapid acting sugar when you take these medicines.**
DPP 4 inhibitors	They work with natural hormones your body produces to increase the amount of insulin your pancreas makes and lower how much sugar your liver releases.	Generally well tolerated. Diarrhea, stomach upset, stuffy nose, headache, flu-like symptoms. Unlikely to cause the blood sugar to drop too low. Does not cause weight gain. Dose may need adjustment with kidney problems.	In rare cases, severe joint pain can happen. Stop the medication and contact your provider. If you have a history of pancreatitis, congestive heart failure, or kidney disease be sure to tell your provider.
SGLT2 Inhibitors	These medications help excess glucose in your blood be eliminated by your kidneys.	Increased urination, low blood pressure, dizziness, genital infections, urinary tract infections, weight loss. In rare cases can cause ketoacidosis.	Drink plenty of fluids while taking this medication. Let your doctor know if you are feeling dizzy. Dose may need reduction with kidney problems.
TZDs	These medicines help reduce insulin resistance allowing insulin to do its job more effectively. May take several weeks to start working.	Weight gain, fluid retention, increased risk of bone fractures. These medications do not cause hypoglycemia.	These medications are not used if you have a history of congestive heart failure. Notify your provider if you notice any swelling in your legs/ankles, shortness of breath.
Meglitinides	These medications cause a quick release of insulin from your pancreas and then wear off within 4 hours.	Hypoglycemia and weight gain	Take about ½ hour before each meal. Carry a rapid acting source of sugar with you when out of your home. Skip pill if you skip a meal.
Alpha glucosidase Inhibitors	These medications delay the absorption of carbohydrates in your intestines.	Gas, diarrhea, bloated feeling.	**Take with the first bite of each meal.** Do not cause hypoglycemia alone but if you also take another medication that can cause hypoglycemia, **always treat it with glucose tablets.**

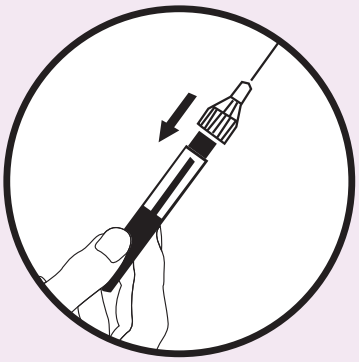
How To Use a Pre-filled Pen



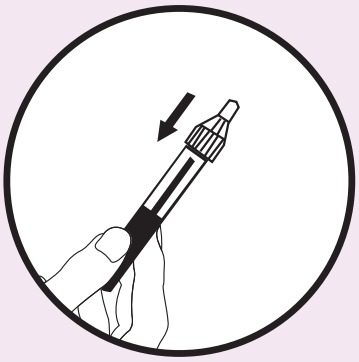
Remove the pen cap.



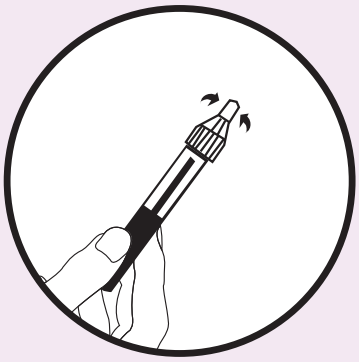
Take out new pen needle.



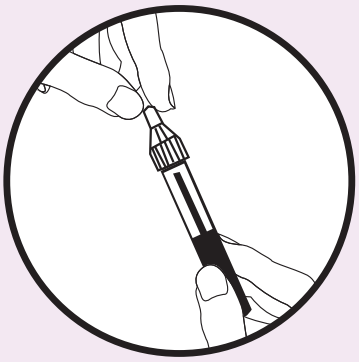
Position the needle along the axis of the pen.



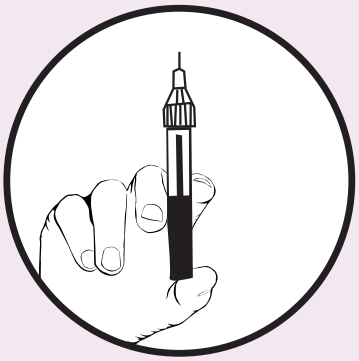
Pierce the center of the cartridge.



Screw on needle.

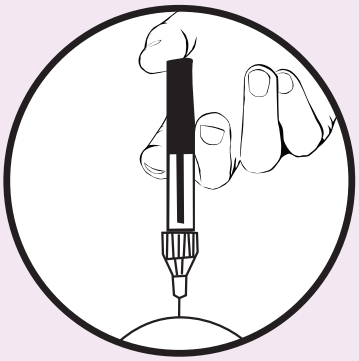


Pull off the outer and inner shield.



Follow the pen manufacturer's directions to prepare or prime your particular pen.

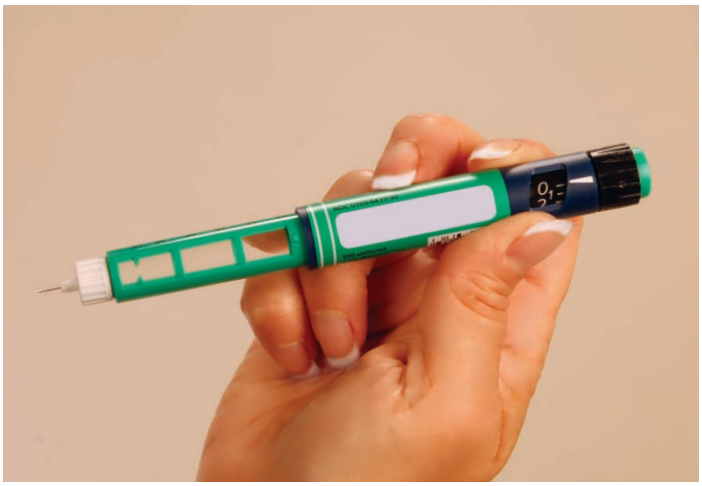
Wipe injection site with alcohol swab. Select insulin dose.



Perform the injection using the recommended technique.

Choose the injection site

1. Stomach (at least 2 inches or more from belly button, scars and moles).
2. Middle or outer part of thigh, at least 4 inches above knee and at least 4 inches down from top of leg.
3. The back of the arm may be used, but it is not a preferred site, as it is difficult to get to the right spot when injecting yourself.
4. Pinch up skin if needed (if you are very thin)
5. Push needle into skin (at 90 degree angle)
6. Press dose button down firmly until it stops.
7. Hold pen in skin for 10 seconds. Remove pen needle from skin.
8. Press down on injection site firmly with tissue or alcohol wipe to prevent bruises.
9. Place large cap on needle; turn counterclockwise to remove the needle.
10. It is very important to rotate your injection sites so that you don't overuse any one site. Your nurse educator will discuss this with you.



How do I store my insulin?

Insulin vials and pre-drawn syringes need to be stored in the refrigerator.

Insulin pens, before they are opened, also need to be stored in the refrigerator.

Insulin pens and vials, once opened, can be stored at room temperature for 28 days, however this can vary by brand.

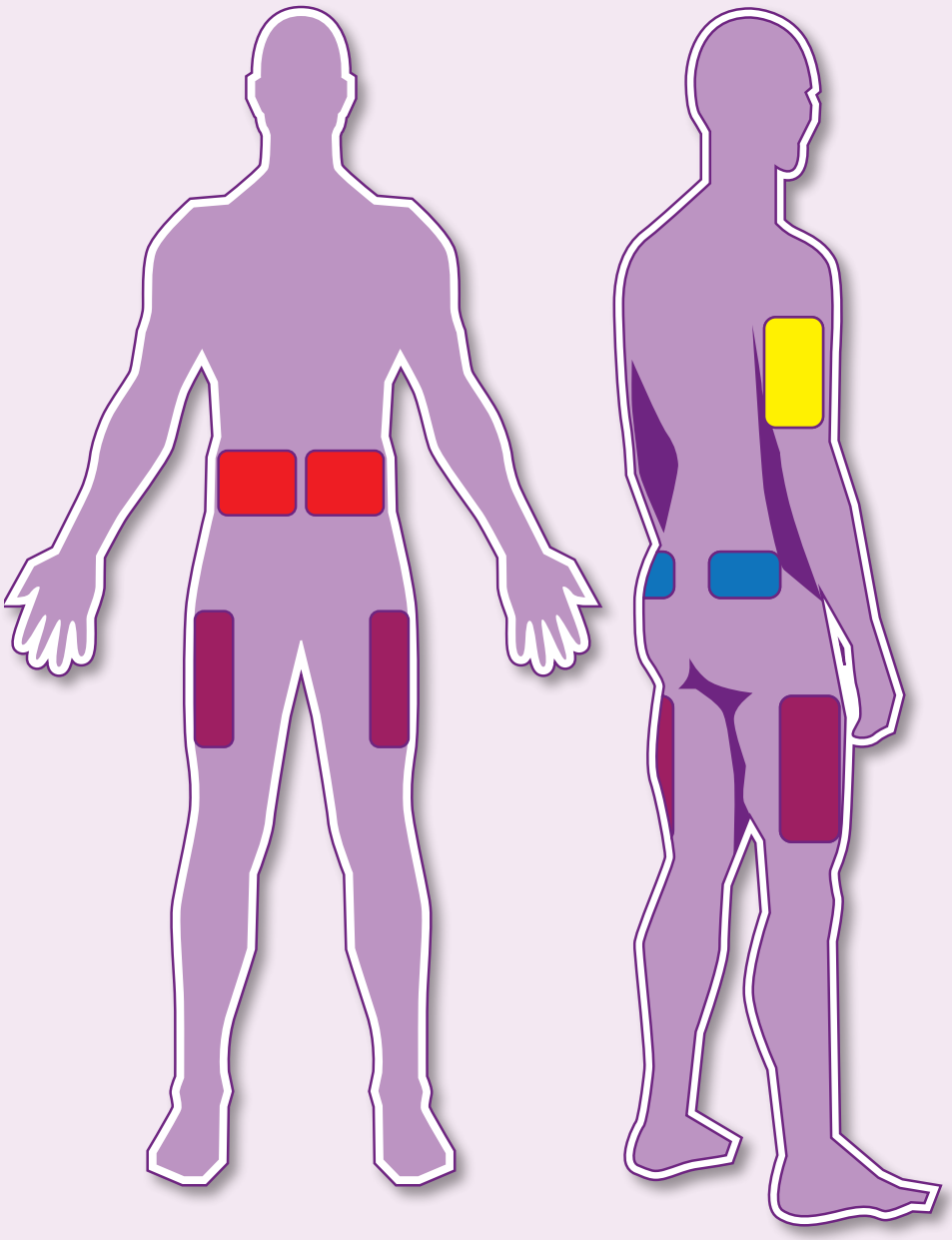
Disposal of insulin syringes and pen needles

To maintain healthy injection sites, use the syringes and the pen needles only once.

After use, dispose of the needle by placing used syringe or pen needle into a sharps container or a thick plastic, puncture-resistant container; when the container is full, secure the top to the container, label it "sharps" and place directly into trash (CT law). Needles should be disposed of responsibly without risk to others. Check with your local or state board of health.

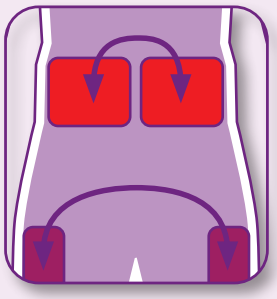
DO NOT dispose of needles directly into the regular trash or recycling.

Injection Site Rotation

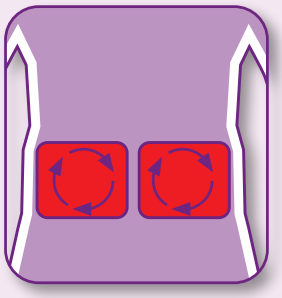


How to rotate sites:

Each new injection should be about a finger's width away from the last injection.



Change sites



Rotate within sites

Injection sites:

Upper Arm

Thigh

Abdomen

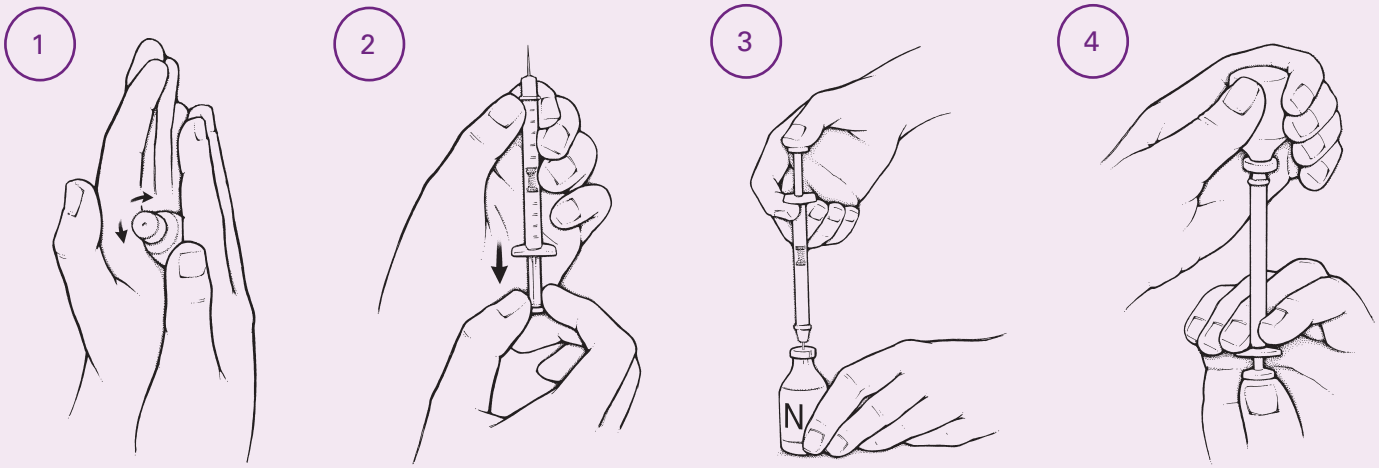
Buttocks

Drawing up insulin into a syringe

You will need: a syringe, insulin bottle & alcohol wipe

Wash your hands with soap and water and wipe the top of bottle with an alcohol wipe.

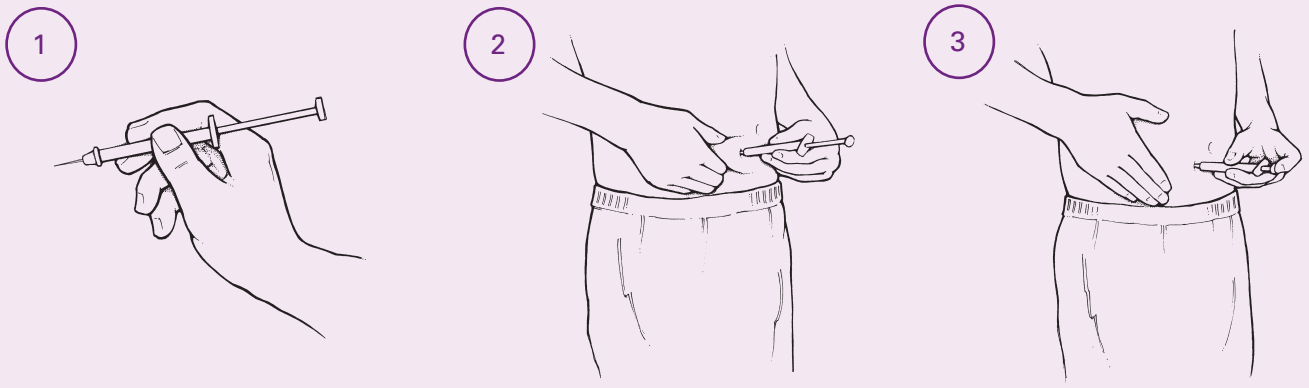
1. If using a cloudy insulin gently roll the bottle of insulin between the palms of your hands until mixed (no rolling is needed if using a clear insulin)
2. Take cap off needle and plunger. Pull plunger down to the number of units you were instructed to take.
3. With bottle on table, put needle into bottle. Push plunger down to push air into bottle.
4. Turn bottle upside down to draw the number of units you need.



Check for air bubbles. If air bubbles are seen in syringe, push insulin back into bottle and repeat steps 3 & 4.

Injecting

1. Hold syringe like a pencil.
2. Pinch up skin and inject straight into skin (at a 90 degree angle).
3. Let go of pinch and inject.
4. Press down on injection site firmly with tissue or alcohol wipe to prevent bruising.



It is very important to rotate injection sites so that you don't overuse any one site. Your nurse educator will discuss this with you.

How Your Insulin Works

Definitions to review

Onset of action: It is the length of time before the insulin reaches the blood stream and is active

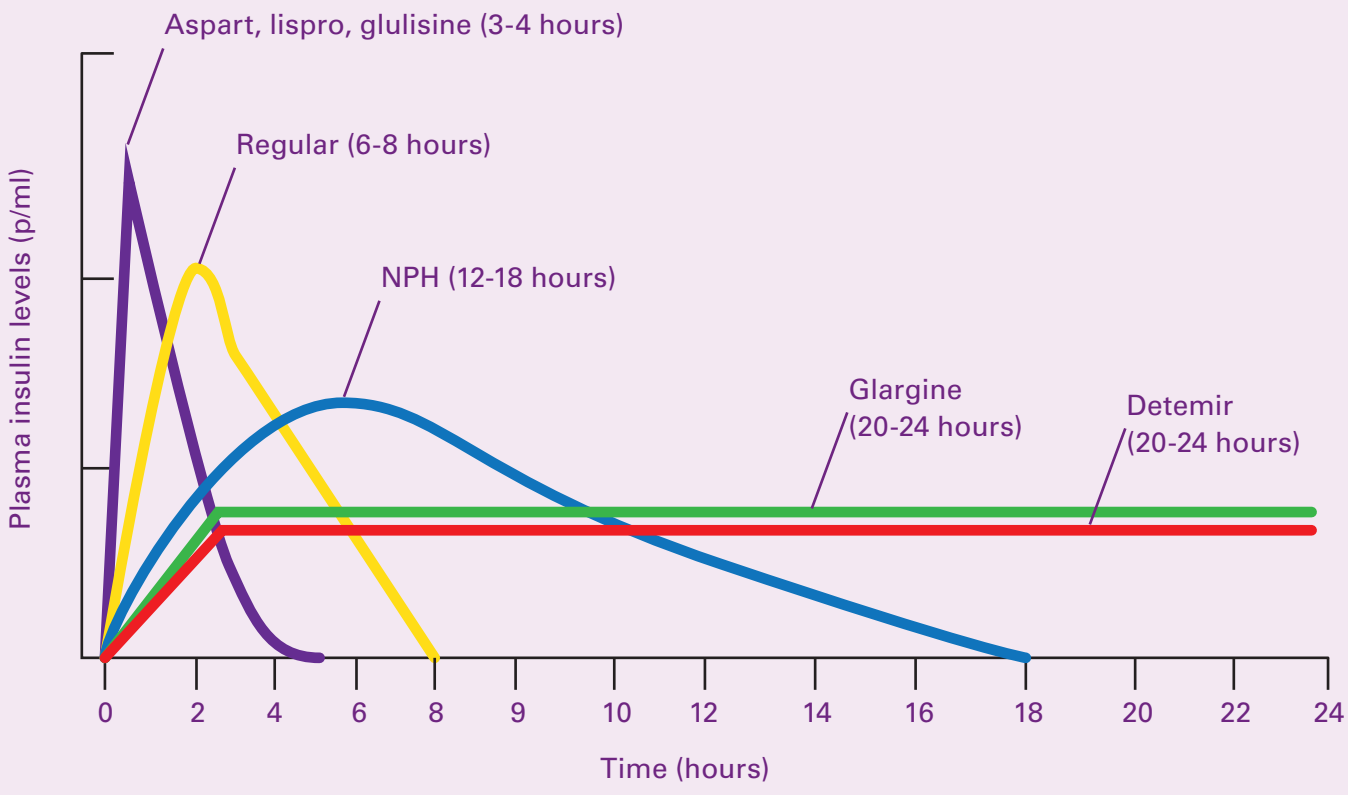
Peak of action: It is the time at which the insulin is at its maximum strength and helps lower the blood sugar

Duration: It is the time the insulin lasts in your body and continues to remain active

Basal: Steady, long acting insulin that works throughout the day and night

Bolus: Short acting insulin that works to bring blood sugars down after meals

Insulin Pumps: An insulin pump is a device that replaces the need for periodic injections. It delivers a small amount of insulin continuously throughout the day and night. There are different kinds of insulin pumps. The pump programs the delivery of insulin based on your individual needs. For more information on insulin pumps speak to your provider or diabetes educator.



Activity profile of various insulins. The duration of insulin action is given in brackets.

Insulins					
Type	Generic names	Administration	Onset	Peak	Duration
Ultra Rapid acting	Aspart	2 minutes before to 20 minutes after starting a meal.	10-30 minutes — works more effectively in first 30 minutes	1-3 hours	3-5 hours
Rapid acting U-100 or U-200	Lispro, Glulisine, Aspart	15-20 minutes before meal	10-30 minutes	30 minutes to 3 hours, depending on brand	3-5 hours
Regular U-100 or U-500	Regular	30 minutes before meal	30 minutes	1.5-4	5-8 hours; U-500 can last up to 24 hours
Intermediate	Isophane NPH	30 minutes before meal	1-2 hours	2-12 hours	14-24 hours
Basal U-100 or U-300	Glargine, Detemir, Degludec	Daily at a consistent time	1-6 hours	Some have no peak; otherwise 5-12 hours	16-42 hours
Mixed	70/30, 75/25, 80/20	Twice daily at regular times (generally with breakfast and dinner)	10-30 minutes for rapid mixed; 30-90 minutes for intermediate mixed	0.5-3 hours for rapid mixed; 1.5-12 hours for intermediate mixed	14-24 hours
Inhaled	Human insulin inhalation	With meal	Immediate — 15 minutes	12-30 minutes	3 hours

Other Injectable Medications				
Type	Generic Names	Method of Action	Frequency of Administration	Benefits/Side Effects
GLP-1	Dulaglutide, Exenatide, Liraglutide, Semaglutide	Slows food moving through stomach, increases insulin secretion from pancreas, works on liver, makes you feel full	Can be given weekly or daily	Benefits: Modest weight loss, decreased hunger, improved blood sugar, protects heart Common side effects: nausea, headache, low blood sugar Rare side effects: pancreatitis Contraindication: family history of medullary thyroid cancer
Amylin	Pramlintide	Slows food moving through stomach, makes you feel full, works on liver	Taken with meals	Benefits: decreases blood sugar, modest weight loss, decreased hunger Common side effects: nausea, vomiting, stomach pain, headache, LOW BLOOD SUGAR
Combination	Basal insulin + GLP-1	GLP1 portion — makes you feel full, slows food moving through stomach, Insulin reduces blood sugar	Taken once daily	Same side effects as GLP1 medications + hypoglycemia can occur from the insulin

Emergency Injections		
Glucagon	Glucagon	Used in event of acute hypoglycemic reaction where patient is unable to eat or drink fast-acting carbohydrate safely. Glucagon can be injected into muscle or fat (thigh or butt) and can be injected through clothing, or it can be administered in the nose with a nasal powder.

REFERENCES
ADA guide to Diabetes Medications www.DiabetesForecast.org
Insulin Guide www.Diabetes-Health.com
NovoNordisk Learn about how GLP-1 and insulin affect your blood sugar levels
Prescribing Information www.symlin.com
Fiasp Onset of Action www.fiasppro.com

Relationship Between Food and Blood Sugar

Learning how to manage your diabetes with healthy eating is important. The right amount of foods can help you keep a healthy weight and maintain your blood sugar at a steady state. You will learn that the kind of food, the quantity of food and when you eat are all important factors in controlling your blood sugar.

Carbohydrates

Glucose or blood sugar is the main source of fuel for your body. We get this sugar from the foods we eat, mostly from carbohydrates. Carbohydrates are found in many healthy foods: bread, grains, cereals, pasta, rice, starchy vegetables (potatoes, corn, peas, beans), fruit, milk and yogurt. Other sources of carbohydrates include sweets (cookies, ice cream, syrup, jams) fruit juice and sweetened drinks.

Protein-rich foods

Protein-rich foods include most animal foods (meat, poultry, fish, eggs, dairy products) as well as nuts and beans. Protein-rich foods may have little impact on blood sugar except when consumed in large portions.

How many servings of carbohydrates should I eat?

GENERAL GUIDELINES

Men: 3-4 servings per meal (45-60 grams)

Women: 2-3 servings per meal (30-45 grams)

Snack — If needed, 1-2 servings (15-30 grams)

Follow up with a registered dietitian for your personalized recommendations.

Getting Information From Food Labels

1. Find the serving size at the top of the label
2. Decide how much you will eat
3. Find the total carbohydrates per serving
4. **1 carbohydrate serving is 15 grams**
5. Dietary fiber and sugar are part of the total carbohydrate

Nutrition Facts

8 servings per container

Serving size **2/3 cup (55g)**

Amount per serving

Calories **230**

	% Daily Value*
Total Fat 8g	**10%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 160mg	**7%**
Total Carbohydrate 37g	**13%**
Dietary Fiber 4g	**14%**
Total Sugars 12g	
Includes 10g Added Sugars	**20%**
Protein 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 235mg	6%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Serving Size

This tells you how much of the food makes up one serving. If you eat more than one serving, all the other values will increase.

Fat

This is the total amount of fat in each serving. Limit saturated fats and avoid trans fats. Both are bad for your health.

Total Carbohydrate

This tells you how many grams of carbohydrates are in one serving. If you do carb counting, this number helps you fit the food into your meal plan.

Food Choice List

Carbohydrate Choices — 15 grams carbohydrate per serving			
BREADS, GRAINS & CEREALS	**BEANS***	**STARCHY VEGETABLES**	**FRUIT**
1 slice bread (1 oz) 2 slices low-calorie bread 1 pancake 4" across ½ hamburger bun ¼ large bagel (1 oz) 6" tortilla, pita or Chapati bread ½ English Muffin ½ cup cooked cereal ¾ cup corn flakes, Cheerios or Special K 1/3 cup cooked rice or pasta 1 cup soup	½ cup beans, peas (garbanzo, pinto, kidney, white, black-eyed peas) ½ cup lentils 1/3 cup baked beans ½ cup refried beans 1/3 cup hummus 2 Tbsp dahl *also counts as 1 lean meat choice	½ cup corn ½ lg corn on the cob ½ cup peas 1 cup winter squash 3 oz baked potato 2 oz boiled potato ½ cup mashed potato or sweet potato 1 cup mixed frozen with corn, peas or pasta ½ green banana or plantain	4 oz piece of fruit (apple, pear, etc.) 6 oz fresh peach 6.5 oz orange 1 cup melon 1-¼ cup watermelon 1-¼ cup strawberries 1 cup raspberries ¾ cup black or blueberries ½ large grapefruit ½ cup pineapple 17 grapes 4 oz banana (1/2 large) 12 cherries 1 kiwi (3.5 oz) 2 small tangerines 2 Tbsp dried fruit 3 dates ½ cup juice (4 oz) ½ cup canned in light syrup, water or juice
CRACKERS/SNACKS	**MILK**	**DESSERT/SWEETS**	
3 cups air-popped popcorn 18-20 mini pretzels 5-8 pretzel twists 2-5 whole grain crackers 3 graham cracker squares 2 rice cakes, 4" across 9-13 potato chips or tortilla chips	1 cup milk (fat free, 1%, 2%, whole, lactose-free) 6 oz light yogurt 6 oz plain yogurt ½ cup evaporated skim milk 1/3 cup dry fat-free milk ½ cup chocolate milk	2 small cookies ½ cup ice cream ¼ cup sorbet 1 frozen fruit bar ½ cup sugar-free pudding 2" unfrosted cake 1 ¼" square brownie 1 oz angel food cake 1 Tbsp jam/jelly 1 Tbsp sugar/honey 5 chocolate "kisses"	

FREE FOODS: herbs, spices, diet drinks, unsweetened coffee, 1 Tbsp catsup, prepared mustard, sugar-free jello or gum, 1 Tbsp fat-free cream cheese, mayonnaise or salad dressing, ¼ cup salsa, sugar substitutes, lemon juice, nonfat cooking spray, 2 Tbsp sugar free syrup

Fats

Healthy fats include mono- and poly-unsaturated fats such as nuts, seeds and plant-based oils (olive oil, canola oil). Saturated fats, such as butter, lard, creamy dressings, cheese, bacon and sausage, are NOT healthy. These fats increase your risk for heart disease by clogging the arteries. Additionally, if you eat a meal plan high in saturated fat, glucose absorption can be delayed, which means your blood sugar will stay higher for longer than you expect. Trans fats are man-made during the cooking process (typically when frying foods). These fats are just as bad for your heart as the saturated fats. To decrease your risk of heart disease, avoid fried foods, trans and saturated fats.

Protein — 0 gram carb, 7 grams protein			
VERY LEAN (35 calories per oz)	LEAN (55 calories per oz)	MEDIUM FAT (75 calories per oz)	HIGH FAT (100 calories per oz)
1 oz chicken/turkey (breast, no skin)	1 oz chicken/turkey (dark meat, no skin)	1 oz chicken (dark with skin)	1 oz cheese (American, Swiss, Cheddar)
1 oz white fish	1 oz lean beef	1 oz beef or pork (most products)	1 hot dog
1 oz tuna (in water)	1 oz lean pork (tenderloin, ham, Canadian bacon)	1 oz veal	1 oz sausage
¼ cup egg substitute	1 oz fish (salmon, swordfish, tuna in oil, drained)	1 oz feta, string cheese, mozzarella, or reduced fat/light or 2% milk cheese	1 oz bologna
2 egg whites		1 egg	1 Tbsp. peanut butter
¼ cup non-fat/low fat cottage cheese		4 oz (½ cup) tofu	¼ cup nuts

Fat — 0 grams carb, 5 grams fat		
MONOUNSATURATED (Heart-Healthy)	POLYUNSATURATED (Heart-Healthy)	SATURATED (NOT Heart-Healthy)
1 tsp canola/olive/peanut oil	1 tsp reg tub or squeeze margarine (without trans fat)	1 tsp stick butter
1-½ tsp peanut butter	1 Tbsp light margarine	2 tsp whipped butter
6 almonds/cashews	1 tsp corn/safflower/soybean oil	2 Tbsp sour cream
10 peanuts	1 tsp regular mayonnaise	1 Tbsp heavy cream
2 Tbsp avocado	1 Tbsp light mayonnaise	2 Tbsp half and half
8 black olives	1 Tbsp regular salad dressing	1 Tbsp cream cheese
	1 Tbsp sunflower/pumpkin seeds	1 slice bacon
	2 tsp tahini (sesame paste)	

Non-Starchy Vegetables — 5 grams carbohydrate per serving
1 cup raw vegetables or ½ cup cooked vegetables
Examples: lettuce, tomatoes, green beans, carrots, onions, broccoli, cauliflower, spinach, cucumbers, peppers, sprouts, asparagus, artichokes, beets, Brussels sprouts, collard greens, kale, celery, cabbage, Swiss chard, zucchini, summer squash, eggplant, jicama, mushrooms, radishes, mustard greens, water chestnuts

Non-Starchy Vegetables

There are many wonderful vegetables to include in your meal plan: lettuce, broccoli, cauliflower, tomatoes, green beans, spinach, eggplant, summer squash, cucumber and mushroom, to name a few. These vegetables are rich in vitamins, minerals and fiber, which help to prevent constipation, strengthen your immune system, and fill your belly without excessive calories. These vegetables also have little impact on your blood sugar.

PLEASE NOTE: if you follow a meal plan higher in fiber, protein or fat, you may need to adjust your insulin dose for these nutrients.

Diabetes and Cardiovascular Disease

Diabetes is an independent risk factor for heart disease and heart disease is the leading cause of illness and death in people with diabetes. People living with diabetes have a 2- to 4-fold increased risk of heart disease.

To reduce your risk, make the following daily healthy choices:

- Limit saturated fat intake to <10% total calories per day.
- Avoid butter, cream, creamy salad dressings, cheese, and high-fat protein foods (including bacon, sausage, highly marbled beef and pork, and hot dogs).
- If choosing creamy dressings, sour cream, cream cheese, mayonnaise, choose low-fat versions of your favorite brands.
- Avoid fried foods / fast foods.
- Instead, choose healthy fats like nuts, seeds, nut butters, olive and canola oil, and avocado.
- If you have high blood pressure, keep your blood pressure to the target level set by your doctor, typically <130/80.
- Don't forget to stay hydrated! Most adults really do need eight 8-ounce glasses of water every day (64 oz. sugar-free, calorie-free fluids).

Weight Management

There are many diets and alternative meals plans that can assist you in losing weight. Most of these plans aim to reduce total calories by focusing on minimizing or eliminating a particular nutrient or food group, which may put you at risk for a nutrient deficiency. Although many diets have been studied, there is no particular meal plan that far outweighs all the others with regard to weight loss.

However, one particular meal plan DOES offer superior nutrition quality and is known to reduce heart disease risk — in particular, lowering the bad "LDL" cholesterol. That is the Mediterranean diet. Research also shows an association of the Mediterranean diet to lower rates of cancer, Parkinson's and Alzheimer's diseases.

This diet, which comes from the region around the Mediterranean sea, including Greece, Croatia and Italy, is a heart-healthy meal plan that emphasizes a plant-based eating approach loaded with fruits and vegetables, healthy fats such as olive oil and fish, seafood, whole grains, nuts and legumes.

What are you limiting? Red meat, sugary foods, dairy (although small amounts of milk and cheese are allowed). The focus is on fresh foods (not processed), moderate red wine consumption (5 oz for a woman and 10 oz for a man, per day), and eating in a relaxed manner in the company of family and friends.

Food is celebrated and eaten for enjoyment, which is to say, eat your food slowly! People of the Mediterranean region believe that strong social ties are the cornerstone for health, along with a healthy diet.

Healthy eating tips

Eat a variety of foods from all the food groups.

Eat smaller portions to keep a healthy weight.

Eat about the same amount of carbohydrate at each meal, particularly if you are taking a fixed dose of meal-time insulin. This helps keep your blood sugars more stable.

Make sure you eat three meals daily. Don't skip meals. Some individuals need to have a snack between meals. Follow your meal plan guidelines. You do not have to eat different foods from the rest of your family, but you may have to eat smaller portions. See your dietitian for a meal plan that best suits your needs and personal lifestyle goals. Take steps today for a healthier tomorrow.

Exercise

Regular exercise improves your health in many ways.

1. It helps control blood sugars
2. It helps lower your weight and this will help lower insulin resistance
3. It helps lower your blood pressure
4. It helps reduce stress
5. It helps lower your bad cholesterol (LDL) and improves your good cholesterol (HDL)
6. It helps keep your heart and blood vessels healthy
7. Over time, exercise helps your body use insulin more effectively.

The best form of exercise is aerobic exercise which includes walking, jogging, biking, rowing and swimming. This kind of exercise works the large muscles and increases breathing and heart rate. It is recommended by the American Diabetes Association that you exercise 150 minutes a week. This can be done in 30 minute sessions 5 days a week.

Another form of exercise is resistance training. This includes the use of resistance machines at a gym or free weights and stretch bands at home. These exercises help improve muscle strength in the upper body, lower body and core. Resistance exercises are recommended on 2-3 non-consecutive days of the week.

See your provider before getting started. If you are just beginning to exercise, then start out slowly and gradually increase the time and intensity/pace of the exercise.

Avoiding Complications

These are steps you can take to avoid complications or delay their progression once you have them.

Eye damage (retinopathy)

- Keep blood sugar under good control and within your target range.
- Keep your blood pressure under control.
- Have your eyes examined by your eye doctor (ophthalmologist) once a year.

Kidney damage (nephropathy)

- Keep blood sugar under good control and within your target range.
- Keep your blood pressure under control.
- Have your urine tested for protein (microalbumin) loss once a year.

Nerve damage (neuropathy)

- Keep blood sugar under good control and within your target range.
- It is important you take proper care of your feet, skin and nails.
- Tell your provider if you have any symptoms of numbness, tingling, pain or loss of sensation in your feet or fingers.

Heart and blood vessel damage (cardiovascular damage)

- Keep blood sugar under good control and within your target range.
- Keep your blood pressure under control.
- If you are overweight, work towards weight loss.
- Do not smoke.
- Stay active and eat healthy.
- Call your provider if you have chest pain or difficulty breathing. If you cannot reach your provider, call 911 immediately.

Foot Care

Loss of sensation or pain in the feet is due to nerve damage that occurs in individuals with diabetes. It results in a condition called neuropathy. It is important you take proper care of your feet, skin and nails.

To avoid damage to your feet:

1. Keep blood sugar under good control and within your target range.
2. Check your feet daily and look for cuts, scrapes, blisters or sores.
3. Wash your feet daily and then dry them thoroughly, especially between your toes. Do not soak your feet.
4. Cut your nails straight across to prevent ingrown toenails.
5. Always wear shoes/comfortable foot wear that fit well. Do not go barefoot.
6. Wear loose fitting socks.
7. Have your feet checked by your provider at every visit.

Tell your provider if you have any symptoms of numbness, tingling, pain or loss of sensation in your feet or fingers

Hemoglobin A1C/ HbA1C

Even though you use your glucose meter daily to measure your blood sugar, you need to know if your treatment is working over time. There is a test called hemoglobin A1C/HbA1C. Your A1C measures your average blood sugar over the past two to three months. It is reported as a percent (i.e. 6.9%).

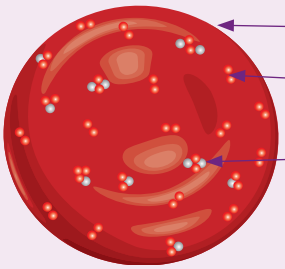
Your provider will help you figure out your target A1C. For most individuals the target is 7% or lower. Your target A1C number will depend on your age, general health, duration of diabetes and presence or absence of complications.

Knowing your A1C is important because it tells you not only about the level of control but also your risk for complications to the eyes, heart, feet and kidneys. In order to get the best diabetes care, it is recommended that you should have your A1C checked at least 2–4 times a year. If your A1C is not at goal, you need to discuss a change of treatment plan with your provider.

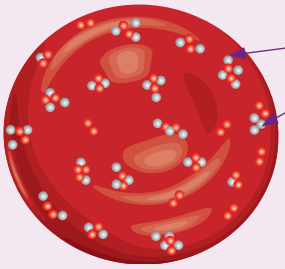
HbA1C and Matching Average Glucose Range

A1C (%)	eAG (mg/dL) = 'estimated average glucose' range
5	97
5.5	111
6	126
6.5	140
7 = Goal for most people with diabetes	154
7.5	169
8	183
8.5	197
9	212
9.5	226
10	240
10.5	255
11	269
11.5	283
12	298

The A1C Test



A normal A1C result means that a healthy amount of glucose is inside red blood cells.



A high A1C result means that too much glucose is inside red blood cells.

Know Your Numbers

Targets When You Have Diabetes		
MEASURE	**TARGET**	**YOUR RESULT**
Blood Pressure	<140/90 mmHG	
Fasting Blood Glucose Before Meals	80-130 mg/dL	
Blood Glucose 2 Hours After Meals	<180 mg/dL	
Hgb A1c	<7.0%	
Cholesterol — Total	<200 mg/dL	
HDL Cholesterol (good)	**Men:** >40 mg/dL **Women:** >50 mg/dL	
LDL Cholesterol (bad)	<100 mg/dL (some need it <70 mg/dL)	
Triglycerides	<150 mg/dL	
Body Mass Index (BMI)	**Healthy:** 18.5 - 24.9 **Overweight:** 25.0 – 29.9 **Obese:** 30.0 – 39.9 **Morbidly Obese:** ≥40	
Waist Circumference	**Target for Women:** <35 inches **Target for Men:** <40 inches	
Waist to Hip Ratio	**Target for Women:** <0.80 **Women at risk:** >0.85 **Target for Men:** <0.90 **Men at risk:** >0.95	

Other Annual Good Healthcare Actions

HEALTH SCREEN	FREQUENCY	DATE	ANY CONCERNS?
Dilated Eye Exam	Yearly		
Complete Foot Exam	Yearly		
Dental Cleaning/Exam	Every 6 months		
Flu Vaccine	Yearly		
Pneumonia Vaccine	Once <65 yrs, Once >65 yrs		
Kidney Check — Urine test	Yearly		
Quit Smoking			

Get Support

Even though managing your diabetes is mostly up to you, you do not have to do it alone. Your healthcare team will teach you about diabetes and how to manage it. Your friends and family can also provide you with support so you are successful.

Your healthcare team includes:

A primary care provider, usually your regular doctor, who can refer you to specialists as needed; an endocrinologist, a doctor who specializes in diabetes management; a diabetes nutrition educator/registered dietitian, an expert in food and nutrition; and a diabetes nurse educator, a nurse who is certified to teach diabetes management.

Your family and friends

People who care about you will want to offer help and assistance. They can help you stay focused and provide support so you are successful in managing your life with diabetes. Think about the ways they can be helpful and do not hesitate to ask for help.

"Gain the control you need for the life you want"

In Case of Emergency

If you have ANY of these symptoms:

- Trouble breathing
- Abdominal pain
- Cannot hold fluids down for 12 hours
- Too weak to get out of bed
- Blood sugar above 450 mg/dL and/or ketones in urine

Go to the emergency department at your hospital immediately or call 911!

Notes

Resources

American Diabetes Association
www.diabetes.org

American Association of Diabetes Educators
www.diabeteseducator.org

National Diabetes Information Clearinghouse
www.niddk.nih.gov

Center for Disease Control and Prevention
www.cdc.gov

American Association of Clinical Endocrinologists
www.aace.com

The material for this book was obtained from the above resources. It is to provide information and not to replace regular medical care. It is not intended for sale.

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Published by: Diabetes and Endocrinology Center at Saint Francis Hospital

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