



A GUIDE TO MANAGING

---

# Diabetes





# What's Inside

---

Getting Started.....	5
Things to Know.....	6
Diabetes Overview.....	7
Managing Your Diabetes.....	11
Nutrition.....	14
Activity.....	18
Medications.....	21
Injecting Insulin.....	28
Hyperglycemia.....	30
Hypoglycemia.....	31
Type 1 Diabetes.....	33
Sick-Day Rules.....	34
Daily Living Tips.....	37
Lifestyle.....	38
Follow-Up Care.....	40
My Diabetes Care Plan.....	42
Notes.....	43
Resources.....	44
Terms to Know.....	46
Blood Glucose Monitoring Log.....	50

## TIGR TV Free Inpatient Education Videos

Use your hospital room telephone to dial, then follow the voice prompts. If you experience difficulties, ask a staff member to assist you.

**Memorial Campus** 38460  
**St. Joseph Campus** 34060

- 174** Being Prepared for Sick-Days and Emergencies
- 239** Diabetes and Nutrition: Eating for Health
- 159** Diabetes and Women
- 242** Great Living Starts Here: Diabetes and Diet
- 166** It Takes a Family: African Americans
- 167** Keeping the Future Alive: American Indians
- 374** Monitoring Your Blood Glucose: Key Concepts
- 240** Taking Insulin
- 176** Type 2 Diabetes and Exercise
- 241** What Is Diabetes? Type 2





Greetings from the Diabetes Center at Mission Health! Our team is here to help you understand how diabetes affects you and actions you can take to live well.

This guide offers basic information about diabetes, healthy nutrition, activity, and self-care techniques. As you read this guide and build your plan for how you will live with diabetes, remember:

**You can live well with diabetes.**

People with diabetes do all that people without diabetes do: they have families, build careers, and achieve personal goals. By setting your personal vision for diabetes wellness, you can live a full and complete life. The diagnosis of diabetes doesn't change who you are, it simply changes some of the decisions you make.

**You can live a long life with diabetes.**

By achieving good glucose control and making healthy choices, you can prevent complications of diabetes (such as heart attack, stroke, or kidney failure). Making the decision to manage your diabetes prevents your diabetes from managing you. By investing in yourself today, you will improve your health and protect your future.

**You are not alone.**

Just like any chronic disease, diabetes can seem overwhelming. The good news is, you have a team of diabetes experts here to help you and your family on your diabetes journey. Mission Health has diabetes educators and health coaches eager to support you and your healthcare provider. We offer diabetes education, personal goal setting, and self-care training so you can live a healthful life.

# Getting Started

## Where to Begin

You may be asking yourself, “Where do I start?” There is a lot to learn. Follow the basics of diabetes care below and live healthy with diabetes for the rest of your life. Outpatient diabetes education classes and health coaching are helpful ways to ensure a great start.

### Check Your Blood Glucose Levels



### Take Your Medications



### Eat More Colors



### Eat Less Carbs



### Get Daily Activity



### Visit Your Healthcare Team



# Things to Know

Throughout this booklet, the following icons will direct you to key information:



Important points to think about are highlighted for your diabetes management.



Look here to find reference information for helpful smartphone apps, websites, and resource contact information.



Explore your understanding of the material presented by answering these review questions.

**Before you get started, look over the "My Diabetes Care Plan" located on page 42. Think about developing this plan as you read this booklet.**

## Things to Know Before You Go



### If you have type 2 diabetes, you should know:

- Target blood glucose levels (what is too low / too high) (see page 10)
- How to monitor blood glucose levels using a glucometer (see page 11)
- How to make healthy food choices and understand how carbohydrate intake effects blood glucose levels (see pages 14 to 17)
- Sick-day rules (see pages 34 to 36)
- When to seek medical care (see page 35)
- Names of the medications prescribed to you for management of your diabetes
- The name of the healthcare provider who is going to manage your diabetes

### If you have type 2 diabetes and are prescribed insulin, you should also know:

- How to measure and interpret urine or blood ketones (see page 12)
- How to instruct others to use glucagon (see page 13)
- How to safely dispose of needles (see page 25)
- How to measure and self-inject insulin (see pages 28 and 29)
- How to recognize and treat hypoglycemia (see pages 31 and 32)
- How to determine appropriate doses of insulin

### If you have type 1 diabetes, you will need to know all of the skills listed above plus:

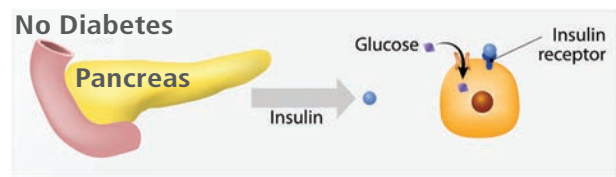
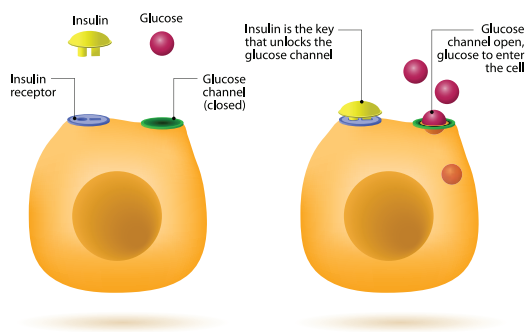
- How to begin carbohydrate counting
- How to determine an appropriate meal dose of insulin

## What Is Diabetes?

Diabetes is a condition in which the body cannot access the carbohydrate (complex sugar) in food for energy, so blood glucose levels rise. With diabetes, cells are starved for energy even if there are large amounts of glucose in the blood stream. This can cause fatigue, hunger, increased thirst, and increased urination. It is also possible that high levels of glucose could be present, yet the symptoms are too mild to recognize. Over time, high levels of blood glucose (hyperglycemia) can lead to a variety of health complications including damage to the eyes, kidneys, heart, nerves, and blood vessels. There is no cure for diabetes, but it can be treated so that people can minimize complications and live a long and healthy life.

Everyone has glucose (sugar) in their blood. The body breaks down the carbohydrate in the foods we eat into smaller units called glucose. The liver also releases stored glucose when food is not available. Insulin, a hormone released by the pancreas, helps get the glucose into the cells where it can be used for energy. Glucose cannot get into the cells without insulin. You can think of insulin as a key that unlocks the door to the cells, allowing glucose to enter.

### HOW DOES INSULIN WORK?



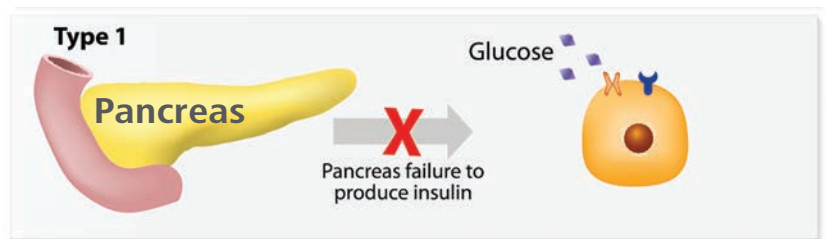
The most common types of diabetes are type 1 and type 2. Approximately 90 - 95 percent of all people with diabetes have type 2. Type 1 and type 2 have different causes and will require different treatments, so it is important to identify and understand which type of diabetes you have.

**Diabetes is diagnosed by a healthcare provider using one or more of the following blood tests to help make the diagnosis:**

- Postprandial blood glucose (blood glucose 2 hours after a meal)
- A1c (glycated hemoglobin, a blood test that measures your average blood glucose over the past 2-3 months)
- Fasting plasma glucose (FPG)
- Oral glucose tolerance test (OGTT)
- C-peptide (measures pancreatic insulin production and aids in distinguishing type 1 from type 2 diabetes)

	A1c	FPG	OGTT
Normal	<5.7%	<100 mg/dL	<140 mg/dL
Prediabetes	≥5.7 to <6.5%	≥100 to <126 mg/dL	≥140 to <200 mg/dL
Diabetes	≥6.5%	≥126 mg/dL	≥200 mg/dL

# Diabetes Overview



## Type 1 Diabetes

In people with type 1 diabetes, the body stops making insulin. Type 1 diabetes is an autoimmune disease. The cause is unknown, but a virus may contribute to the development of type 1. There is also a strong genetic link and there may be a strong family history of this disease in those with a new diagnosis. Type 1 diabetes is usually diagnosed at an early age (children, teens, or young adults), yet sometimes it develops in older adults too and this is called latent autoimmune diabetes in adults (LADA). This type of diabetes usually appears suddenly and progresses rapidly.

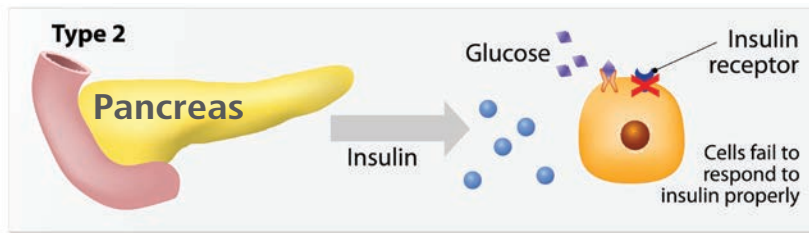
## Risk Factors

Factors that put people at increased risk for type 1 diabetes include having specific genetic markers that cause susceptibility to diabetes, viral infections, Caucasian race/ethnicity, living in a northern climate (North America), positive family history, or other existing autoimmune conditions (Grave's disease, multiple sclerosis, and pernicious anemia).

## Introduction to Treatment

If you are diagnosed with type 1 diabetes, close monitoring of blood glucose levels and daily insulin injections will be needed for the rest of your life. In the future, you may wear a small pump that delivers insulin continuously into your body but you will first begin to take insulin by injection. Skills you will need to learn about now are listed on page 6.





## Type 2 Diabetes

In people with type 2 diabetes, there are two main contributing problems, insulin resistance and insulin deficiency. When insulin resistance occurs, the pancreas continues to make insulin but the body is unable to use it because the body's cells have become resistant. Insulin resistance is often the primary factor in those first diagnosed with type 2 diabetes. The second problem, insulin deficiency, occurs when the pancreas is unable to produce enough insulin to match glucose in the blood. This problem becomes greater as the disease progresses.

## Risk Factors

Factors that put people at increased risk for type 2 diabetes include obesity, a family history of diabetes, inactivity, high blood pressure, race (African Americans, Hispanics, Native Americans, and Asians are more at risk), a history of gestational diabetes, or giving birth to a baby that weighs more than nine pounds. Type 2 is the most common type of diabetes. It usually occurs in adults over 40, but now it is being seen at a greater rate in teens and children.

## Introduction to Treatment

If you are diagnosed with type 2 diabetes, your treatment will include some combination of lifestyle modifications involving nutrition and activity as well as the addition of medications. Medication treatments for diabetes may include diabetes medications (oral, injectable, insulin) and other medications to lower risk of damage to your heart and kidneys (lipid lowering medications, blood pressure medications). Talk to your healthcare provider about a treatment plan that considers your risks and fits your specific needs. Skills you will need to learn will depend on your prescribed treatment. Page 6 includes a skills checklist to get you started.

# Diabetes Overview

A1c %	Estimated Average Glucose
5	97
5.5	111
6	126
6.5	140
7	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



## Your A1c tells you about your risk for complications of diabetes.

Lower A1c levels are associated with reduced diabetes complications.

### Do you know your numbers?

A1c: \_\_\_\_\_ %

eAG: \_\_\_\_\_ mg/dL

## A1c for Diagnosis and Setting Target Goals

The A1c blood test is used by healthcare providers to diagnose and monitor diabetes. **An A1c level tells you the average level of glucose in your blood over the past two to three months.** The chart included here aids with understanding how the A1c level directly relates to blood glucose levels. The estimated average glucose (eAG) lets you know the average level of glucose in your blood 24 hours a day, 7 days a week, for two to three months.

The American Diabetes Association suggests that an **A1c level greater than or equal to 6.5 percent indicates a person has diabetes.** Your healthcare provider may want to confirm this finding by repeating testing within one month of initially being diagnosed. Risk for complications of diabetes such as blindness, kidney disease, amputation, heart attack, and stroke is increased when the A1c level is increased.

When setting **goals** for glucose management, the American Diabetes Association suggests achieving an **A1c level below 7 percent**, which is an estimated average glucose level of 154 mg/dL. However, more or less stringent glycemic goals may be appropriate for you. Speak with your healthcare provider regarding an individualized goal that takes your age, health, cognitive function, and hypoglycemic risk factors into account.

## Glucose Level Goals

The following guideline recommendations for nonpregnant adults with diabetes are from the American Diabetes Association. When factoring in your risks, your healthcare provider may develop individualized target blood glucose levels that differ slightly from these. Have a conversation with your healthcare provider about what your levels should be in order to assist you with goal setting.

### What your blood glucose levels should be:

- **Before meals – 80 to 130 mg/dL**
- **One to two hours after starting a meal – less than 180 mg/dL**

# Managing Your Diabetes

## Blood Glucose Monitoring

Learning that you have diabetes can be overwhelming because there is a lot to learn and there are many lifestyle changes to make. The best news about diabetes is that it can be managed. You can help guide the future of your health, but it is important to start now.

## Blood Glucose Checks

It is important that you get and use a blood glucose meter. Ask your healthcare provider for a prescription for a glucose meter so that you can pick one up at the pharmacy. If you find out what meter your insurance company prefers, you may be able to get a free or discounted meter and supplies. It will be important to learn more about what supplies and medications your particular insurance covers and what information they will require from you for refills. Glucose meters can also be purchased over the counter.

You will use your blood glucose meter to check and record your blood glucose levels. It is important to check your blood glucose so that you know if it is in the target blood range you and your healthcare provider have agreed upon. Use the log in the back of this guide or the log that comes with your meter to get started on keeping a blood glucose diary. Take your meter and log with you to all healthcare provider visits.

## When to Check Your Blood Glucose

- If you are on medications by mouth, you need to check and record your blood glucose 1-2 times a day. If testing at mealtime, make sure you test **prior to eating**.
- If you are on insulin, you need to check your level 3-4 times a day. This means you will be checking **before meals and at bedtime**.
- If your blood glucose is low at bedtime, you need to eat a small bedtime snack to prevent your blood glucose from going too low during the night while you are asleep.

Ask the healthcare provider who prescribes your diabetes medications how often he or she would like you to check your blood glucose.

## Top Four Things to Know about Blood Glucose Monitoring

1. Know your blood glucose target levels.
2. Know what your blood glucose levels mean and that they will vary before and after meals.
3. Know how to treat lows and highs.
4. Know how to communicate your results with your healthcare professional.



## How to Use a Blood Glucose Meter

Different glucose meters (glucometers) work in slightly different ways. Follow the instructions that come with your glucometer or call the toll-free number listed on the back of the glucometer for assistance. These are the basic steps to using a glucometer.

1. Wash your hands with warm, soapy water. Allow them to dry prior to testing.
2. Insert a test strip into the meter test port. The meter will turn on.
3. Use the lancet device to prick the soft pad of your finger. Rotate fingers and sites on fingers.
4. Touch the edge of the test strip to the blood drop. When the meter beeps, the sample has been accepted and the test countdown will display on the screen. Place the meter on a flat surface.
5. The blood glucose result will display after a few seconds. Remove and discard the used test strip from the meter.

# Managing Your Diabetes

## Measuring Urine or Blood Ketones

Ketones present in the blood or urine indicate the body is breaking down fat in order to have energy. This occurs when there is not enough insulin produced by the pancreas or provided by injection. Ketones can indicate the development of a dangerous condition called diabetic ketoacidosis. Ketones may be measured using urine or blood. Urine ketone sticks are available without a prescription at your pharmacy. Blood ketone monitoring is more accurate, but does require a special ketone meter and test strips. The meter works similar to a glucometer, requiring only a small sample of blood to deliver a result.



### There are three steps to using a urine ketone strip:

1. Dip the test pad in freshly collected urine or place directly into urine stream and tap to remove excess urine.
2. Wait 15 seconds to read.
3. Compare test pad with color chart to determine urine ketone level at exactly 15 seconds.

## Ketone Levels

Negative - 0 mg/dL  
(Blood level below 0.6 mmol/L)

"Negative" readings are in the normal range and no action is needed.

Trace to Small - 5 to 15 mg/dL  
(Blood level 0.6 to 1.5 mmol/L)

"Trace" or "small" readings indicate the possible development of a problem that may require medical assistance. Continue to test and follow sick-day rules. Call your healthcare provider if you are having additional symptoms of DKA (listed on page 33).

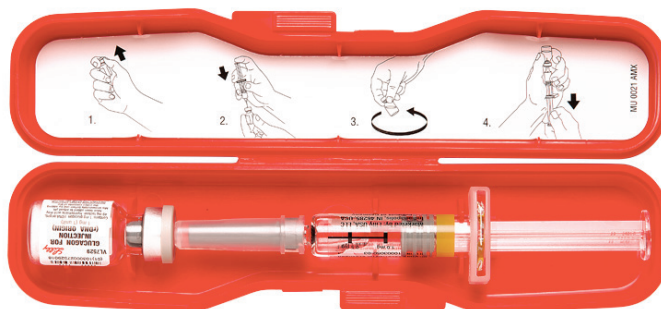
Moderate to Large - 40 to 160 mg/dL  
(Blood level above 1.5 mmol/L)

"Moderate" or "large" readings in the presence of hyperglycemia indicate a high risk of DKA. Contact your healthcare provider or go to the nearest emergency center immediately.



## Using Glucagon

Severe hypoglycemia may result in a loss of consciousness or seizure. Glucagon for injection is a synthetic form of a hormone that raises glucose levels. Glucagon requires a prescription from your healthcare provider. It is used for the emergency recovery of low blood glucose. It cannot be prepared ahead of time. Instead, it must be given immediately after it is reconstituted. You will need to train a family member or friend regarding the use of glucagon in the event you were to become unconscious.



### Instructions for Friends/Family

If you suspect that hypoglycemia is the cause of unconsciousness, do not take time to check a blood glucose level. Be aware that a common response when recovering from severe hypoglycemia is nausea and vomiting. Once the individual regains consciousness and is alert, you should give them a fast-acting source of sugar (such as fruit juice or regular soda) and check a blood glucose level.

1. Reconstitute glucagon by inserting the syringe needle into the bottle and pushing the liquid in.
2. Remove the syringe and gently shake the bottle until the liquid becomes clear.
3. Re-insert the syringe into the bottle and draw out the medicine.
4. Position the individual on their side or turn their head to the side to prevent choking in case of vomiting.
5. Give the injection into either fat or muscle tissue (abdomen, thigh, or upper arm) by holding the syringe like a pencil, inserting the needle straight into the skin, and pushing the plunger of the syringe all of the way down.
6. If the individual has not regained consciousness within 15 minutes, repeat the dose and call 911 emergency services.

# Nutrition



## Type 2 Diabetes Management with Lifestyle Modifications

After diagnosis, some people are able to gain control of their diabetes by making changes in their lifestyle.

- Reducing carbohydrate intake and kicking sugar addiction is one way for you to prevent rises in blood glucose.
- Burning more glucose and energy through increased activity is also critical.
- Reducing weight can help decrease insulin resistance and reduce your risk for other health problems.
- Reducing stress is important because stress causes the body to release hormones that cause blood glucose levels to rise.

For some people with diabetes, making and sustaining changes in these areas can be significant enough to help them gain control and reduce their average blood glucose to an appropriate level.

Nutrition Facts	
Serving Size 5 oz. (144g)	
Servings Per Container 4	
Amount Per Serving	
<b>Calories</b> 310	<b>Calories from Fat</b> 100
% Daily Value*	
<b>Total Fat</b> 15g	<b>21%</b>
Saturated Fat 2.6g	<b>17%</b>
Trans Fat 1g	
<b>Cholesterol</b> 118mg	<b>39%</b>
<b>Sodium</b> 560mg	<b>28%</b>
<b>Total Carbohydrate</b> 12g	<b>4%</b>
Dietary Fiber 1g	<b>4%</b>
Sugars 1g	
<b>Protein</b> 24g	

Servings per container 4

Each serving has 12 grams of carbohydrate

## Carbohydrate and Foods

Knowing where to begin with lifestyle changes is a key factor in taking control of your diabetes. Learning more about reading food labels, food groups, and planning meals and snacks will help you make smart choices about eating. All foods are made up of only three basic components, which are carbohydrate (starch), protein, and lipids (fat/oil). Protein and lipids have very little effect on blood glucose so you can eat those without causing your blood glucose to go up. Examples of foods high in protein include poultry, beef, seafood, soy, nuts, cheese, and eggs. Examples of foods high in healthy lipids include butter, coconut oil, olive oil, avocado, nuts, omega-3 fish oil, and flaxseed.

**Carbohydrate** is the substance in foods that is associated with diabetes. Carbohydrates (or "carbs") are broken down and become glucose (a form of sugar) when eaten. Eating foods with carbohydrate will naturally cause your blood glucose levels to rise. In order to better manage your blood glucose levels, you can limit foods high in carbohydrate. Because having diabetes means your body is not able to control your blood glucose well, eating too many carbs will cause you to need more medications and/or higher doses to control your blood glucose levels. This does not, however, mean that you need to eliminate carbohydrates altogether. Simply be aware of how certain foods can have an effect on your levels and use this knowledge to aid meal planning and nutrition.

Alcohol is a special type of carbohydrate that we won't discuss much in this section. Do know it can result in both low and high blood glucose levels (depending on the amount of alcohol you drink) and that drinking alcohol is not safe with some diabetes medications. You should ask your healthcare provider if drinking some alcohol is okay with your particular medications. There is more discussion regarding alcohol and diabetes on page 39.

## Reading Labels

To find the amount of carbohydrate in a food, use the nutrition label.

1. Look for the serving size. This tells the amount of food the label is describing. Check to see how many servings are in the container, note that many containers have more than one serving.
2. Look at the "Total Carbohydrate" line. The grams of carbohydrate may be abbreviated with a "g."
3. The "Total Carbohydrate" includes any fiber, sugars (including starches), and sugar alcohols in the food.
4. One carb choice contains 15 grams total carbohydrate. This is a good number to know so you can evaluate how a food might affect your blood glucose.

To learn more about food labels, meet with a registered dietitian.

## Foods That Contain High Amounts of Carbohydrate

### Dairy

Milk, yogurt, and ice cream



### Flour and Breads

Bagels, chips, crackers, waffles, pancakes, bread, pasta, and muffins



### Cereals and Grains

Cereal, oatmeal, grits, cream of wheat, brown rice, and white rice



### Legumes

Dried beans (pinto beans, black beans, and butter beans)



### Starchy Vegetables

Corn, peas, potatoes, and sweet potatoes



### Fruits, Fruit Juices, and Sodas



### Sweets, Desserts, and Candy



## Drink Options

- Water (#1 choice)
- Flavored water
- Infused water
- Club soda
- Seltzer water
- Sparkling water
- Diet soda
- Drinks with sugar substitutes (such as Crystal Light, Kool-aid)
- Sugar-free lemonade
- Herbal or regular tea, unsweetened (hot or iced)
- Black coffee

## Avoid

- Fruit juice
- Regular soda (such as Coke, Pepsi, Mountain Dew)
- Fruit punch
- Fruit drinks
- Sweet tea
- Energy drinks containing sugar
- Alcohol



What is an example of a high-carbohydrate food?

- Spinach
- Chicken
- Pasta
- Eggs

Answer on page 42

# Nutrition

## Advanced Carbohydrate Concepts:

- "Total Carbohydrate" includes dietary fiber, sugars, and sugar alcohols.
- Dietary fiber has little effect on blood glucose levels.
- Sugar alcohols have fewer calories than sugar and have less of an elevating effect on blood glucose. Despite their name, they do not contain alcohol.
- Net carbohydrate is the amount of carbohydrate that will impact your blood glucose levels.
- Net Carb = Total Carb - Dietary Fiber - ( $\frac{1}{2}$  x Sugar Alcohols)



## Artificial Sweeteners:

Understand that all forms of artificial sweeteners are not completely carbohydrate and calorie-free. Sugar substitute packets have ingredients such as dextrose and maltodextrin, both of which are carbohydrates, added in order to increase volume and improve texture. Food products are able to label products as "no-calorie" if there are five calories or less per serving. Be aware of this when using multiple servings (1 packet = 1 serving). If you choose to use artificial sweeteners, do more research regarding which one you feel is right for you.

## Meal Planning

When it comes to nutrition, it is important to know there is not a one-size-fits-all food plan. Generally speaking, the amount of carbohydrate consumed should be proportional to your level of activity. Other factors for consideration include age, weight, and health. **Consult your healthcare provider and a registered dietitian for specialized meal planning and recommendations that factor in your needs and health concerns.**

There is no minimum recommendation from the American Diabetes Association (ADA) regarding carbohydrate intake. The ADA does recommend that you limit carbohydrate intake to no more than 60 grams of carbohydrate per meal. Keep in mind this recommendation may only be appropriate for those who are young, at a healthy weight, and who have an active lifestyle. Depending on how physically active you are and whether or not you would benefit from weight loss, you may choose more or less carbs.

- More activity (exercise) = More tolerance for carbohydrate
- More weight to lose or uncontrolled diabetes = Less tolerance for carbohydrate

In order to limit carbohydrate and prevent high blood glucose, you should learn to identify appropriate portion sizes and know how to read nutrition labels. Your healthcare provider or registered dietitian may recommend a specific amount of carbohydrate or carb servings to guide you with meal planning. **If you take meal insulin to treat food intake, it is important to eat a consistent amount of carbohydrate with each meal.** If you significantly reduce the amount of carbohydrate you eat while using insulin or a medication that stimulates your pancreas to produce more insulin, your medication doses may require adjustment to avoid hypoglycemia (low blood glucose).

## CARBOHYDRATE SERVINGS

### Examples of 1 carb choice (15 grams of carbs):

- |  |                     |
|--|---------------------|
| ½ cup cooked cereal, oatmeal, or grits       | 1 6-inch tortilla   |
| ½ cup canned fruit with no added sugar       | ½ large banana      |
| ½ English muffin or pita bread               | 1 small fresh fruit |
| ½ cup of cooked pasta or rice                | 1 slice of bread    |
| 3 cups plain popcorn                         | ½ cup fruit juice   |
| ½ cup peas, corn, beans, or lentils          | 1 cup milk          |
| ¾ cup low-sugar or plain yogurt              |                     |
| ½ cup plain ice cream, vanilla, or chocolate |                     |





## Healthy Eating

- Strive to eat a variety of healthy foods every day. Eat more meats, healthy fats, and non-starchy vegetables.
- Fill up on non-starchy vegetables like leafy greens, carrots, broccoli, green beans, cabbage, and cucumbers.
- Read labels and monitor your serving sizes.
- Be aware of hidden sources of carbohydrate such as drinks, sauces, and gravies.
- Use webtools and applications (see side panel) to learn more about carbohydrate in foods and meal planning.
- Eat healthy low-carb snacks.
- Do not skip meals.
- Portion size matters, do not overeat.
- Learn what foods have a large effect on your blood glucose by monitoring your blood glucose levels two hours after eating.
- Avoid or limit foods that cause high blood glucose readings.

## LOW CARB SNACKS

### Low carb snacks (less than 5 grams of carbohydrate):

2 tablespoons pumpkin or sesame seeds	8 green olives
½ cup tomato or vegetable juice	5 baby carrots
1 hard-boiled egg or omelet	15 almonds
¼ cup of fresh blueberries	1 dill pickle*
1 stick of string cheese	2 saltine crackers
¼ of a whole avocado	1 cup of light popcorn
1 ounce pork rinds*	10 Goldfish crackers
½ cup sunflower seeds in shell	¼ cup walnuts
½ cup sugar-free gelatin	½ cup peanuts in shell
1 frozen sugar-free popsicle	½ cup cottage cheese
3 celery sticks + 1 tablespoon of peanut butter	
5 cherry tomatoes + 1 tablespoon ranch dressing	
1 cup cucumber slices + 1 tablespoon ranch dressing	
1 cup of salad greens + ½ cup of diced cucumber + drizzle of vinegar & oil	

### Apps:

- Diabetes Companion
- GluCoMo
- Glucose Buddy
- Vree for Diabetes
- Calorie King
- Diabetes Goal Tracker
- Figwee

### Websites:

- [www.diabetes.org](http://www.diabetes.org)
- [www.dlife.com](http://www.dlife.com)
- [www.eatright.org](http://www.eatright.org)
- [www.loseit.com](http://www.loseit.com)
- [www.myplate.gov](http://www.myplate.gov)
- [www.fooducate.com](http://www.fooducate.com)

\*Be aware some foods listed may contain high amounts of fat or sodium. Keep in mind that if your healthcare provider has instructed you to reduce salt/sodium intake, you should avoid snacks or meals high in sodium. Foods that come in boxes, cans, bags, or through a drive-thru are usually very high in salt.

# Activity



**Weight loss of at least 7 percent of body weight greatly reduces risk of diabetes disease progression.**

## How Much Activity and Exercise Do I Need?

The best activity for you is the one you will actually do! Make moving fun. To ensure success, engage in activities that are not dependent on weather conditions, fixed schedules, and/or on other people.

As long as you follow certain safety precautions, there is no wrong, only too little movement in our day-to-day lives. Following are general recommendations:

## Non-Exercise Activity Thermogenesis (NEAT)

Definition: NEAT is the energy expended for everything we do that is not sleeping, eating, or sports-like exercise.

## Cardiovascular or Aerobic Exercise (Cardio)

Definition: Uninterrupted, continuous movement that results in an increase in heart rate.

Cardio or aerobic exercise should be done 5-7 times a week for 30 minutes.

## Resistance or Strength Training

Definition: A type of physical exercise using muscular force to move against resistance. It increases skeletal muscular size, strength, and anaerobic endurance.

Resistance training should be done 2-3 times a week for all major muscle sites. Strength and resistance training often involves the use of weights, machines, or even gravity itself. This type of training often focuses on the arms, legs, chest, back, and core.

## Flexibility Training

Definition: Stretching soft tissue for the purpose of maintaining or improving the range of motion in the joints. It is as important as strength and aerobic training and is vital for one's functionality and quality of life.

Stretching should be performed as often as possible. Flexibility training often focuses on the hamstrings, quadriceps, gluteus muscles, chest, back, and shoulders.

## How to Reduce Body Fat Percent

### Non-Exercise Activity Thermogenesis (NEAT)

- Walk everywhere
- Get up from sitting every 20 minutes
- Contract muscles when sitting
- Stand during phone conversation
- Heel lifts
- Ankle rotations when sitting
- Wall push-ups
- Chair squats
- Desk stretches
- Chair twists

### Planned Exercise

#### CARDIOVASCULAR/AEROBIC EXERCISE

- Walking
- Biking
- Swimming
- Jogging
- Dancing
- Zumba



#### STRENGTH/RESISTANCE TRAINING

- Weight training with dumbbells
- Weight training with machines
- Push-ups
- Squats



#### FLEXIBILITY TRAINING

- Simple stretch moves
- Yoga
- Tai chi
- Pilates



# Activity



Exercise and weight loss can help me by \_\_\_\_\_ insulin resistance.

- Raise
- Lower

Answer on page 42

## Activity as a Lifestyle

### Regular exercise helps:

- Lower blood glucose
- Improve lipids
  - lowers "bad" LDL cholesterol,
  - raises "good" HDL cholesterol
- Lower blood pressure
- Your body use insulin better
- Maintain a healthy weight
- Relieve stress
- Keep your joints flexible
- Increase energy levels
- Lower your risk of heart disease and stroke

### Activity guidelines for getting started:

- Walking is a great place to start. Start slowly and build up your endurance.
- Try to exercise 150 minutes per week.
- Wear closed-toe shoes that fit well. Don't wear sandals or flip-flops.
- Check your blood glucose before and after exercising. Carry some form of glucose with you, such as glucose tablets or hard candy.
- Exercise can lower blood glucose. If you are on medicine to lower your blood glucose, you may need to eat a carbohydrate snack before you begin exercise. If you are planning on exercising for an hour or more, you may need to repeat the snack.
- Select active non-food related rewards, such as outings with family or friends.
- Move every 20 minutes when engaged in sedentary (low energy) activities by standing and stretching.

### Tips for increasing activity:

- Take the stairs instead of an elevator.
- Take a walk alone or with family, friends, or a pet.
- Walk instead of watching TV.
- Park farther away from the store and walk the extra distance.
- Stand while talking on the phone.
- Increase walking pace to a brisk walk when possible.
- Get outside and do yard work.
- Walk during work breaks.
- Dance to music.



# Medications

## Using Medications to Reduce Your Risk

### Type 1 diabetes and type 2 diabetes are different diseases.

If you have **type 1 diabetes**, your body cannot make insulin. Without insulin, blood glucose levels rise very quickly. Your healthcare provider will prescribe insulin to supplement what your body needs. This will both lower your blood glucose level and keep you healthy for the long-term. Insulin should be given by injection into the fatty tissue under your skin. There is a lot to learn when starting insulin, but your healthcare provider, nurses, and pharmacists will help you.

People with **type 2 diabetes** can still make insulin, but it becomes harder for their bodies to use it. We call that insulin resistance, and over time it causes blood glucose levels to rise into the prediabetes and diabetes range and raises the risk of complications from the disease. Using medicines to help manage type 2 diabetes helps reduce that risk long-term. Medicines can also help you feel better now. Because diabetes affects different parts of our bodies, your healthcare provider may prescribe one or several medicines that work in different ways to help keep you healthy.

All medicines have possible side effects that are usually mild and gradually get better. Your healthcare provider and pharmacist will help you understand what to expect and when to seek help. Unfortunately, uncontrolled diabetes also has complications including eye disease, kidney disease, nerve damage, heart attacks, and strokes. **Usually the small risk of side effects from medicines is worth the risk to prevent the severe and long-lasting complications from your diabetes.**

In both type 1 and type 2 diabetes, medicines work alongside your continued efforts at eating healthy and staying active. Your healthcare provider and pharmacist want to help you understand your medicines and to assure that you can take them safely. Ask them any questions you have. After all, you are the most important member of your healthcare team!

Whatever medication your healthcare provider decides for you, it is important that you take it as prescribed and do not miss scheduled appointments with your healthcare provider. You can successfully manage your diabetes, but you should work together with your healthcare provider, registered dietitian, pharmacist, and diabetes educator. Managing your diabetes can decrease the risk of long-term problems.



### Type 2 Diabetes Management Including Oral and/or Injectable Medications

Many people are not able to gain control of their diabetes despite having made lifestyle changes. In order to reduce your risk of damage to your heart, vision, kidneys, and circulatory system, it is important that you are able to maintain appropriate blood glucose levels. When lifestyle changes do not improve your diabetes control, or if your baseline blood glucose average was extremely high, it is appropriate to add medications. There are several forms of medications, including pills and injectables. In addition to medications that reduce your blood glucose levels, your healthcare provider may prescribe medications to help protect your heart and kidneys from damage associated with diabetes. Even when taking medications, it is important to continue to focus on improving your nutrition and activity.



**People with type 1 diabetes must take \_\_\_\_\_ every day to control their blood glucose.**






- Oral medications
- Insulin
- Vitamins
- Glucose






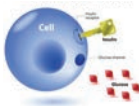
Answer on page 42

# Medications

## Medications Used to Manage Diabetes

People with type 2 diabetes may use oral medications, injectable medications, and/or insulin to manage their diabetes. These medications may be used alone or in combination with one another. The following chart is not a comprehensive list of every medication on the market, but provides an overview of some of the most commonly prescribed medications. When weighing the risks and benefits of taking medications, also consider the risks of not taking action. Poorly controlled diabetes is associated with heart disease, stroke, damage to the retina (vision loss), kidney disease, and blood vessel disease. Use of some medications is associated with reduced risk of heart disease and protection of pancreatic beta cells. Using a combination of medications is known to further reduce A1c levels.

Name (brand name)	Where it works	Medication class / how it works	Considerations
Metformin (Glucophage, Glucophage XR, Fortamet, Glumetza, Riomet)	 Liver   Muscle	<b>Biguanide</b> Decreases amount of glucose released by the liver and makes muscle cells more sensitive to insulin	<b>Preferred medication to begin at diagnosis:</b> Your provider will generally start with this medication, then add others as appropriate. <b>Additional benefits:</b> A1c reduction of 1-2%, heart disease protection; not associated with hypoglycemia <b>Concerns:</b> Initial nausea, indigestion, and/or diarrhea (lessened if taken with food); lactic acidosis with compromised liver function; not indicated in chronic kidney disease <b>Dosing:</b> Every 24 hours or twice daily <b>Cost estimate:</b> Low
Pioglitazone (Actos)	 Muscle   Liver	<b>Thiazolidinedione (TZD)</b> Makes muscle cells more sensitive to insulin and decreases amount of glucose released by the liver	<b>Additional benefits:</b> Heart disease protection, protects insulin producing cells in the pancreas, not associated with hypoglycemia, improves lipids with increased HDL-C and decreased triglycerides <b>Concerns:</b> Fluid retention/edema/heart failure, bone fracture, weight gain <b>Dosing:</b> Every 24 hours <b>Cost estimate:</b> Low
Canagliflozin (Invokana) Dapagliflozin (Farxiga) Empagliflozin (Jardiance)	 Kidneys	<b>Sodium-glucose cotransporter-2 (SGLT-2) inhibitor</b> Helps kidneys allow more glucose into the urine	<b>Additional benefits:</b> Weight reduction, decrease in blood pressure, not associated with hypoglycemia <b>Concerns:</b> Risk of urinary tract and yeast infections; increased urination; dehydration, hypotension, and/or dizziness; increase in LDL-C lipid; increased creatinine <b>Dosing:</b> Every 24 hours <b>Cost estimate:</b> High

Name (brand name)	Where it works	Medication class / how it works	Considerations
<p>Glimepiride (Amaryl)                      Glipizide (Glucotrol, Glucotrol XL)                      Glyburide (Diabeta, Micronase, Glynase)</p>	 Pancreas	<p><b>Sulfonylurea</b>                      Increases insulin production by the pancreas</p>	<p><b>Additional benefits:</b> Decreased risk of microvascular disease  <b>Concerns:</b> Risk of hypoglycemia; initial nausea, rash, and/or diarrhea; lactic acidosis with compromised liver function; weight gain  <b>Dosing:</b> Every 24 hours or twice daily with food  <b>Cost estimate:</b> Low</p>
<p>Alogliptin (Nesina)                      Linagliptin (Tradjenta)                      Saxagliptin (Onglyza)                      Sitagliptin (Januvia)</p>	 Pancreas   Liver	<p><b>Dipeptidyl peptidase IV (DPP-4) inhibitor</b>                      Decreases liver glucose release and increases insulin production by the pancreas</p>	<p><b>Additional benefits:</b> Protects insulin producing cells in the pancreas, not associated with hypoglycemia  <b>Concerns:</b> Sinus congestion, headaches, pancreatitis, immune-mediated dermatological effects (skin itching)  <b>Dosing:</b> Every 24 hours  <b>Cost estimate:</b> High</p>
<p>Albiglutide (Tanzeum)                      Exanatide (Byetta)                      Exanatide ER (Bydureon)                      Liraglutide (Victoza)</p>	 Pancreas   Small Intestine	<p><b>Incretin mimetic / GLP-1 receptor agonists</b>                      Increases insulin production, decreases glucagon production, slows gastric emptying</p>	<p><b>Additional benefits:</b> Protects insulin producing cells in the pancreas, increases feeling of fullness after eating, weight reduction, heart disease protection, lowers post-meal blood glucose levels, not associated with hypoglycemia  <b>Concerns:</b> Nausea/vomiting/diarrhea, increased heart rate, requires injection  <b>Dosing:</b> Injectable, given every 24 hours or twice daily (ER is dosed weekly)  <b>Cost estimate:</b> High</p>
<p>Insulin (see insulin chart for types)</p>	 Cells	<p><b>Insulin (hormone - human / analog)</b>                      Decreases glucose levels by providing hormone needed for glucose uptake by cells in the body</p>	<p><b>Additional benefits:</b> effective control of blood glucose with unlimited efficacy, decreased risk for microvascular disease  <b>Concerns:</b> Risk of hypoglycemia, requires frequent monitoring of glucose, requires injection, weight gain  <b>Dosing:</b> Once to four times daily, depending on regimen  <b>Cost estimate:</b> Variable (dependent on type/brand/dose)</p>

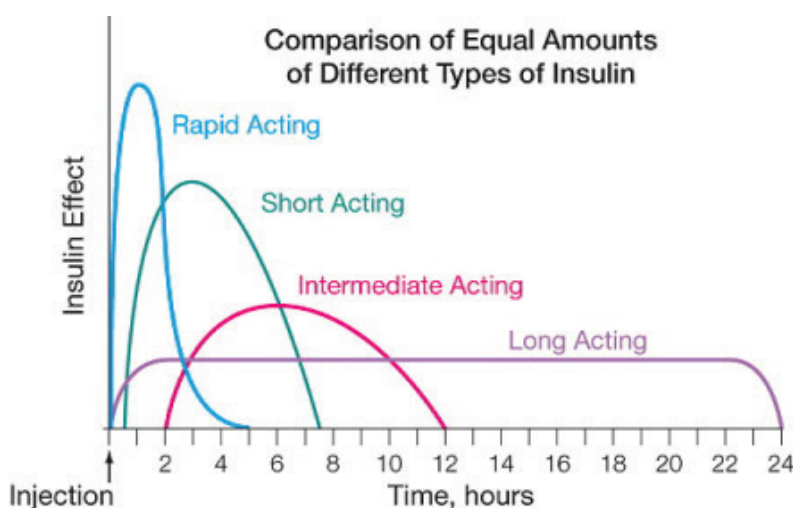
\*Information provided is time sensitive and does not include all medications on the current market.

# Medications

## Insulin

**Insulin is a hormone that allows glucose to enter the cells of the body for energy.** Insulin is also a fat storage hormone, triggering the body to store energy for later use in the form of fat. At the same time, it lowers the amount of glucose in the blood. Insulin is required for people who have type 1 diabetes. Some people with type 2 diabetes may need to take insulin along with their other diabetes medications.

Insulin cannot be taken in pill form. It is injected into the fatty tissue beneath the skin. Some newer non-generic types of insulin may be inhaled into the lungs. Inhaled insulin will not be discussed further in this book. Your healthcare provider will decide which insulin is best for you and how much is needed. The amount is different for every person and may need to be adjusted often at first. It is common for people with diabetes to take a combination of rapid-acting insulin before each meal along with a long-acting insulin every morning or evening.



Type of Insulin (dose dependent)	Brand Name	Generic Name	When to Use	Starts Working	How Long It Lasts
Rapid-acting	Humalog <sup>®</sup> Novolog <sup>®</sup> Apidra <sup>®</sup>	Lispro Aspart Glulisine	Just before eating	5-15 minutes	3-5 hours
Short-acting	Humulin R <sup>®</sup> Novolin R <sup>®</sup>	Regular	30 minutes before eating	30-60 minutes	6-8 hours
Intermediate-acting	Humulin N <sup>®</sup> Novolin N <sup>®</sup>	NPH (isophane)	Twice a day: morning and bedtime	2-4 hours	10-16 hours
Long-acting	Lantus <sup>®</sup>	Glargine	Once a day: usually at bedtime	1-2 hours	24 hours
Long-acting	Levemir <sup>®</sup>	Detemir	Once or twice a day: morning and/or bedtime	1-2 hours	12-20 hours (Dose dependent)
Long-acting	Tresiba <sup>®</sup>	Degludec	Once a day	30-90 minutes	Greater than 24 hours



## Insulin Injection Site Selection and Rotation

Insulin must be injected into the fat (subcutaneous) tissue layer. Do not inject into the same site repeatedly because this could cause an overgrowth of fat deposits to develop in that area.

1. Choose an appropriate zone for the injection on the thighs, buttocks, abdomen, or back of the upper arms. If using the abdomen, make sure to avoid the area around the belly button (umbilicus).
2. Select the site in the chosen injection zone and space the injection at least one finger width away from your last injection.
3. Rotate the injections within the zone in an order (circular or zigzag pattern) until pattern is complete.
4. Select the next zone and site on the opposite side of the body to avoid frequent repeat site injections.

## Things to Know about Insulin

### Storing insulin:

- Store unopened insulin in a refrigerator. **Do not freeze it.**
- Avoid storing insulin in direct sunlight or exposing it to heat.
- After opening insulin in a vial you may store it at room temperature (40 F - 80 F) for 30 days (42 days for Levemir).
- Discard insulin pen 10-42 days after opening, depending on type of insulin. Read manufacturer's insert to know expiration.

### Always inspect the insulin before using it:

- Do not use if it has changed colors.
- Do not use if there is any clumping.
- Check the expiration date and do not use if it has expired.
- Discard insulin if exposed to extreme heat or cold (such as in the car).
- Insulin can be given with a vial and syringe or a pre-filled insulin pen device.

## What to Do with Your Dirty Needles

Do not put dirty lancets or needles in the regular trash. Put them in a hard plastic container, such as an empty bleach or liquid laundry detergent bottle. Label the container as "SHARPS" and tape the lid shut once the container is full. Do not use thin plastic containers, such as milk jugs or soda bottles, because the needle can poke through and possibly stick someone.

Contact your local health department to find out where you can dispose of the container. Buncombe County residents may drop off sharps at the Buncombe County Transfer Station located at 190 Hominy Creek Road. Contact them at 828-250-6205 for station hours and details.

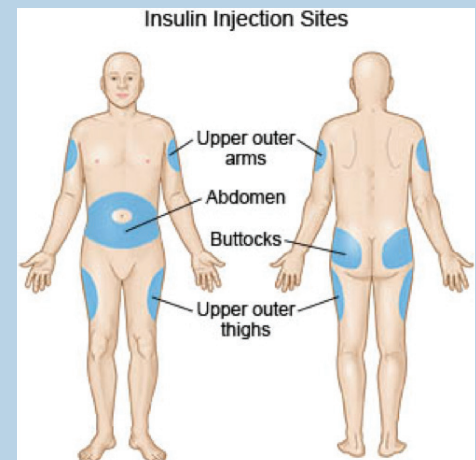


Image courtesy of drugs.com



# Medications



## Type 2 Diabetes Management Including Insulin

Some people with diabetes are unable to control their diabetes with lifestyle modifications in combination with oral and/or non-insulin injectable medications. When this occurs or when blood glucose levels are chronically high, it becomes necessary to supplement the body's resistance to or decreased production of insulin with injected insulin. There are many different treatment options when using insulin to control blood glucose levels. Your healthcare provider may prescribe one or more of these treatment methods, depending on your needs.

There are many different treatment options when using insulin to control blood glucose levels. Your healthcare provider may prescribe one or more of these basal, meal, and correction treatment methods, depending on your needs.



Insulin is a hormone that allows \_\_\_\_\_ to enter the cells for energy.

- Blood
- Glucose
- Vitamins
- Fat

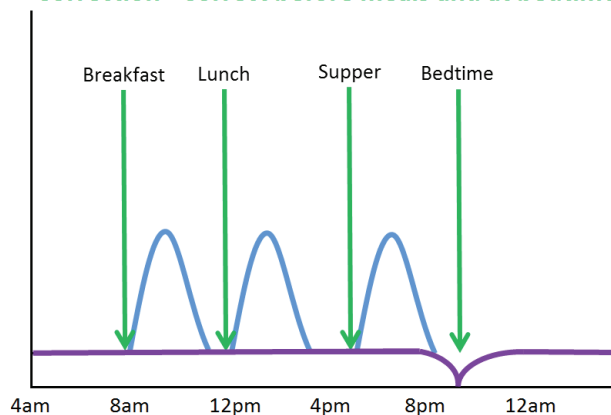
Answer on page 42

## Basal-Meal-Correction Testing and Administration

**Basal** - Treat basic insulin needs through the day and night

**Meal** - Treat carbohydrate eaten in meals

**Correction** - Correct before meals and at bedtime



## Insulin Dose and Regimen

There is no standard dose of insulin. Doses and regimens vary according to the individual. Insulin is needed when your body does not make enough insulin of its own. Your dose will be the amount of insulin needed to keep your blood glucose in good control. Your regimen may be similar to the one pictured here, contain only some of the components mentioned, or include additional injections such as twice a day basal insulin. Work with your healthcare provider to find the right dosing regimen to meet your needs.


- **Basal insulin** treatments are used to provide for the body's constant basic need for energy. Even when not eating, the liver ensures energy is available by releasing glucose. Basal insulin prevents high blood glucose by keeping levels steady over the course of 24 hours (dosing frequency will depend on the type and amount of insulin used).
- **Meal insulin** treatments are used to treat the carbohydrate eaten in a meal. This dose will prevent the carbohydrate in the foods you eat from causing your blood glucose levels to spike and remain high. Typically, this dose is given just prior to eating each meal. The dose should be equivalent to the amount of carbohydrate you eat, so eating consistently is important.
- **Correction insulin** treatments are used to correct an already elevated blood glucose reading. You will test your blood glucose and treat according to your custom correction scale. This treatment method is designed to lower your elevated blood glucose to a normal level.

This **sample insulin schedule** demonstrates what the regimen of a person on basal-meal-correction therapy might look like. Study the diagram and answer the questions below it for practice determining appropriate treatment doses.

### Insulin Schedule (for example only)

**Novolog (insulin aspart)**  
**Meal/Bolus** (short or rapid-acting insulin):

Units with Breakfast	Units with Lunch	Units with Supper
5 units	5 units	5 units




**Novolog (insulin aspart)**  
**Correction** (short or rapid-acting insulin):

Blood Glucose	Units at Breakfast, Lunch, Supper, and Bedtime
Less than 70	Treat low blood sugar and recheck
70 - 150	0 units
151 - 200	2 units
201 - 250	4 units
251 - 300	6 units
301 - 350	8 units
351 - 400	11 units
Greater than 400	13 units and call provider

**Lantus (insulin glargine)**  
**Basal** (long-acting insulin):

Units in pm
15 units



**BEFORE BREAKFAST:** This person's blood glucose level is **64**. She should treat her low blood glucose with 15 grams of carbs such as \_\_\_\_\_. She then should recheck her level in 15 minutes and treat her breakfast meal with \_\_\_\_\_ units of Novolog rapid-acting insulin.

**BEFORE LUNCH:** Her level is **254**. She should take 5 units of Novolog rapid-acting insulin to treat her lunch meal PLUS \_\_\_\_\_ units of Novolog rapid-acting insulin to correct her high blood glucose level. Her total dose will be \_\_\_\_\_ units of Novolog rapid-acting insulin.

**BEFORE SUPPER:** Her blood glucose level is **132**. She should take \_\_\_\_\_ units to treat her supper meal and does not have to use correction insulin because her level is **low/normal/high**.

**BEFORE BEDTIME:** Her blood glucose level is **160**. She will need to use two types of insulin at this time and knows they can not be mixed in a syringe. She will use \_\_\_\_\_ units of Novolog rapid-acting insulin to correct her elevated blood glucose. For her daily basal treatment, she will use \_\_\_\_\_ units of Lantus long-acting insulin.

Answers: orange juice or glucose tablets, 5, 6, 11, 5, normal, 2, 15

# Injecting Insulin

## Injecting Insulin with a Syringe



1. After testing blood glucose and determining dose, gather insulin, syringe, and alcohol. Read the label to ensure you are using the correct insulin and that it is not expired or discolored.



2. Wipe the top of the vial with an alcohol swab. Use alcohol to also clean your skin at the desired injection site. If using NPH (cloudy) insulin, gently roll the pen prior to use.



3. Take caps off of the needle and plunger on the syringe. Pull the plunger down to the correct mark on the syringe, filling the syringe with an amount of air equal to the unit dose.



4. Insert needle into the bottle. Push plunger down to push the air into the bottle. Injecting air into the bottle will prevent vacuum pressure from building and make insulin easier to draw out.



5. Turn the vial upside down.



6. Pull the plunger down to draw insulin into the syringe. You may fill the syringe with a greater volume than your actual dose.



7. Push insulin back into the vial, aligning the plunger with desired number of units for dose. Check for air bubbles. If air is present, push insulin back into the vial and repeat drawing insulin. Confirm your dose.



8. Hold the syringe like a pencil. Pinch up skin with two fingers, insert the needle into the skin, and inject the insulin by pushing the plunger down. Let go of skin and remove needle. Dispose of the syringe safely.

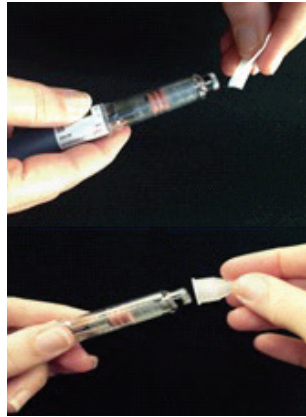


# Injecting Insulin

## Injecting Insulin with a Pen



1. After testing blood glucose and determining dose, gather insulin pen, pen needle, and alcohol. Read the label to ensure you are using the correct insulin and that it is not expired or discolored.



2. Remove the pen cap. Wipe the rubber stopper at the top of the pen vial with an alcohol swab. Tear off the paper tab from the needle. Attach the needle onto the pen, turning clockwise.



3. Take off the outer cap and the inner shield of the pen needle. Prime the pen by turning the pen dial until a "2" is visible in the dose window. Hold the pen with the needle facing up. Push dose button in completely.



4. Look for a drop of insulin at the tip of the needle. The needle is now primed and the dose window should now display a "0." If no drop is seen, repeat step 3.

**Dial dose  
on pen  
dial.  
?? units**

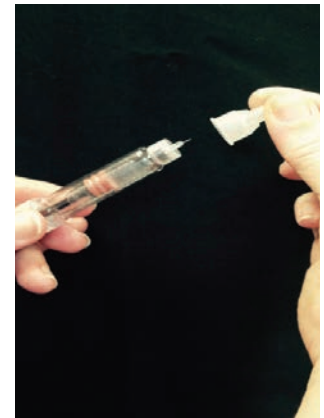
5. Turn the pen dial until you see your dose number in the dose window. You will hear an audible click with each unit increase.



6. Choose injection site and clean with alcohol. Pinch up skin **ONLY** if needed. Insert needle into skin. Depress the dose button completely. When finished, the dose window should display a "0."

**Hold in  
place for  
10  
seconds.**

7. Hold the pen in place. Count to 10 to allow the pen to deliver the entire dose.



8. After injecting, replace the large needle cap onto the needle and turn counterclockwise to remove the used needle from the pen. Dispose of the pen needle safely. Recap the pen.



# Hyperglycemia

## High Blood Glucose

Having diabetes means you are at increased risk of having hyperglycemia, another name for too much glucose in your blood. **Hyperglycemia is high blood glucose or a blood glucose level above 180 mg/dL. Your healthcare provider can help you determine your personal target level.**

### Signs and Symptoms

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



Very thirsty



Needing to pass urine more than usual



Very hungry



Sleepy



Blurry vision



Infections or injuries heal more slowly than usual

### Hyperglycemia can happen if you:

- Eat too much
- Are ill
- Have an infection
- Are taking certain medications (like steroids)
- Do not take enough insulin or diabetes medications
- Are not exercising
- Are under stress (emotional or physical)

### Preventing hyperglycemia:

- Follow your meal plan.
- Exercise daily.
- Check your blood glucose often and keep a record.
- Make a plan to manage stress.
- Take your medications and insulin as prescribed.

### Managing hyperglycemia:

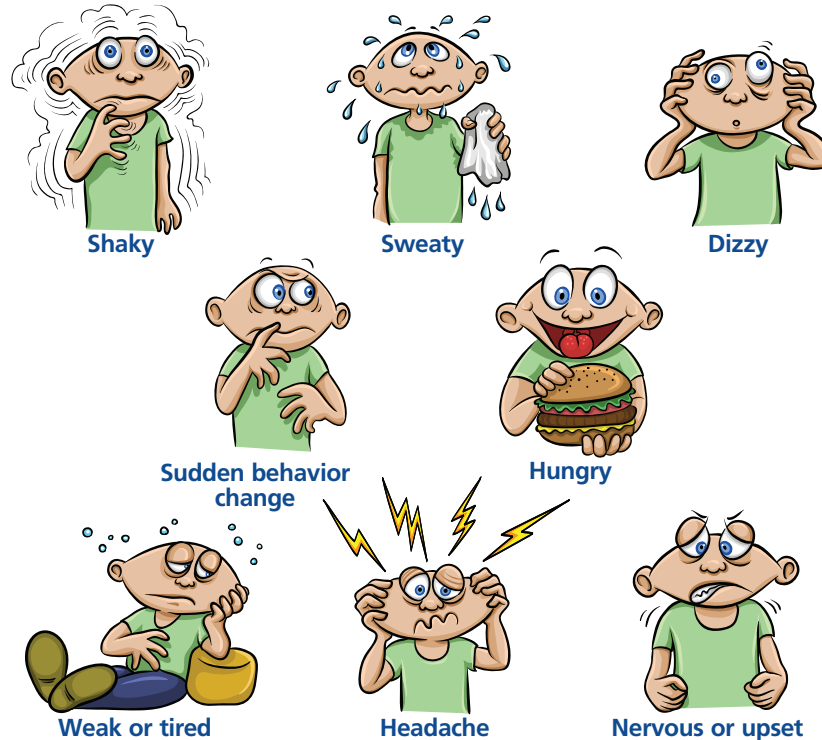
- Call your healthcare provider if your blood glucose readings stay above your target range for more than 2-3 days, or if your blood glucose is over 350 mg/dL twice in a row.
- If you have type 1 diabetes, check your urine or blood for ketones if your blood glucose is greater than 240 mg/dL. If your body is not able to use glucose for energy, it will start breaking down fat to use for energy. When your body starts breaking down fat, ketones may develop. This can lead to a dangerous condition called diabetic ketoacidosis (DKA). If left untreated, DKA can lead to coma and/or death. There are two ways you can check for ketones (1) ketone strips that test urine; (2) ketone meters that test blood. For more information on testing for ketones see "Measuring Urine or Blood Ketones" on page 12.

## Low Blood Glucose

Since diabetes causes blood glucose levels to be high, you may be placed on medications and/or insulin to lower your blood glucose. Sometimes blood glucose levels can drop too low, causing hypoglycemia. **Hypoglycemia is low blood glucose or a blood glucose level less than 70 mg/dL.**

### Signs and Symptoms

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



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.

You may also have blurred vision, a fast heartbeat, or confusion. Symptoms during sleep include restlessness, nightmares, vivid dreams, and sweating. Be aware that you may not have any symptoms. This is why hypoglycemia is dangerous and can possibly lead to seizures, loss of consciousness, and/or death if left untreated. **Always carry a quick source of glucose to treat hypoglycemia.**

### Preventing hypoglycemia:

- Eat meals and snacks at regular times.
- Take medications as prescribed.
- When you exercise, adjust medications and food (you may need less insulin and/or more food).
- If you are going to drink alcohol, eat food along with it.
- Regularly check blood glucose levels. Always check your blood glucose level if you are having symptoms of hypoglycemia.

# Hypoglycemia



When experiencing frequent hypoglycemia and determining an appropriate dose of insulin, give less insulin. In other words, err on the high side for glucose levels by giving less insulin. Always notify your healthcare provider of any changes.



## Things to Know and Do:

- If you are on diabetes medications and/or insulin, always carry glucose tablets or a quick source of sugar/ glucose/ carbohydrate with you, such as hard candy or a small tube of cake icing.
- Wear medical alert identification so that others around you can assist you if needed.
- Teach your family and friends how to treat low blood glucose.
- Check your blood glucose any time you feel different or suspect your level is low.
- Keep a record and learn to recognize your own symptoms.
- Always check your blood glucose before driving.



## What would be an appropriate first choice for treating low blood glucose or hypoglycemia?

- ½ cup of diet soda
- ½ cup of orange juice
- Packet of peanut butter
- Ice cream

Answer on page 42

## Treatment of hypoglycemia:

1. Eat or drink 12-15 grams of carbohydrate, such as:
  - 4 glucose tablets
  - ½ cup of regular soda or juice
  - 1 tablespoon of jam/jelly/glucose gel
  - 1 cup of milk
2. Wait 15 minutes.
3. Recheck your blood glucose.
4. Eat or drink another 12-15 grams of carbohydrate if your blood glucose is not above 70 mg/dL.
5. If your blood glucose is still below 70 mg/dL after three treatments of carbohydrate, call your healthcare provider.
6. If your blood glucose is above 70 mg/dL and it will be more than 60 minutes until you can eat a regular meal, eat a small snack (like four peanut butter crackers).
7. Do not drive or operate hazardous equipment until your blood glucose returns to 100.

## Hypoglycemia can happen if you:

- Skip a meal, or do not eat enough food
- Take insulin or diabetes medications and do not eat within the correct time frame
- Exercise more than usual or do not eat enough carbohydrate before exercising
- Take too much insulin or other diabetes medication
- Drink alcohol and do not eat enough
- Take a medication that increases insulin production (talk to your provider for adjustments, if needed)

## Glucagon

Glucagon is a drug that can be used to treat hypoglycemia when a person is unconscious or unable to swallow. It is given using a syringe and requires a prescription from a healthcare provider. You may be prescribed glucagon if you have a history of severe hypoglycemia or have hypoglycemia unawareness. A family member or friend should be trained on how to use this treatment. The glucagon kit is used in emergencies only. For more information on using glucagon see “Using Glucagon” on page 13.

# Type 1 Diabetes

## Type 1 Diabetes Healthcare Team

It is important to enlist the help of a team of experts made up of an endocrinologist, registered dietitian, certified diabetes educator, and healthcare provider. With their help, you will learn skills that will allow you to manage your blood glucose levels well. An endocrinologist is a specialist who will be vital in managing your diabetes and designing a customized treatment plan. A registered dietitian will help you learn and understand appropriate nutrition (medical nutrition therapy) and reinforce learning regarding carb counting. A certified diabetes educator will provide focused education on all concepts of glucose management and self-care (diabetes self-management education). Your healthcare provider will continue to oversee your overall health and work to decrease your risk of developing complications associated with diabetes.

## Special Considerations for Type 1

Having type 1 diabetes means that special considerations must be made for glucose management, particularly when you become ill. Be aware of hidden sources of carbohydrates in over-the-counter medications used to treat illness. If you are ill, be sure to continue to take your insulin. You will also need to monitor your blood glucose levels more frequently. Diabetic ketoacidosis (DKA) is a potentially fatal complication of untreated type 1 diabetes. When you become ill, you are at risk of developing DKA. It is important to know signs and symptoms of DKA and seek immediate medical help if you suspect you are in or are developing DKA.

### Signs and symptoms of DKA include:

- Nausea
- Vomiting
- Extreme thirst
- Flushed skin
- Rapid breathing
- Stomach pain
- Confusion
- "Fruity" smelling breath or urine
- Measured ketone levels of "moderate" or "large"



## Type 1 Diabetes Management

If you have been diagnosed with type 1 diabetes, your pancreas no longer makes insulin and you are now dependent on insulin supplied through self-injecting. This is why type 1 diabetes is also called insulin dependent diabetes mellitus.

As you develop a treatment plan, you and your endocrinologist can discuss whether your long-term management will involve self-injecting or use of an insulin pump (continuous subcutaneous insulin infusion). Good management of your blood glucose levels is very important in order to prevent and reduce your risk of complications over time. You will want to discuss and explore how to balance insulin doses, nutrition, and activity with your healthcare provider.



### Website

[www.typeonenation.org](http://www.typeonenation.org)

# Sick-Day Rules



**At breakfast, you feel thirsty even after drinking two large glasses of water and your vision is getting blurry.**

**You are starting to feel very sick to your stomach. Your blood glucose was 260 mg/dL last night, and it was 400 mg/dL before breakfast.**

**What should you do first?**

- Drink a glass of diet soda
- Wait to see if your glucose lowers after taking your medications
- Drive to the mall and have your eyes checked
- Call your healthcare provider or endocrinologist

Answer on page 42

## Effect of Sickness on Blood Glucose

Any illness, even the common cold, can make your blood glucose harder to control. When you are sick your body releases hormones to help you recover from your illness. Unfortunately, the effect of these hormones may cause difficulty in managing blood glucose levels.

Following the sick-day rules listed below will give you basic guidelines. However, know that everyone responds to an illness differently. You will need to work with your healthcare provider to design a specific sick-day plan that includes: blood glucose targets, medication adjustments, how often to check blood glucose, and when to call.

## Sick-Day Management

Plan ahead. If you have diabetes and understand exactly what to do when you get sick, you may be able to avoid a trip to the hospital. Consult a pharmacist when selecting over-the-counter medications because some may contain high amounts of sugar. Illness is not always avoidable, so always be prepared by keeping the following glucose management supplies handy:

- Diabetes medications
- Blood glucose strips and meter
- Appropriate fluids to stay hydrated
- Anti-nausea and anti-diarrheal medications
- Urine ketone strips
- Your provider/healthcare team contact number
- Contact number for a friend/family member that can help you through your sickness



## Sick-Day Rules

**Rule #1 - Medicate.** Always take your diabetes medications. When you are sick, your blood glucose levels will often be higher than normal, even if you are not eating. If you cannot keep food down, you still need your insulin and/or diabetes medications. In fact, you may need higher doses than normal. Those who do not normally take insulin may actually require it during an illness.

**Rule #2 - Hydrate.** Drink fluids every hour to stay hydrated. If you are unable to eat, you should drink small amounts of liquids containing carbohydrates until you can eat again. See the list on the following page for ideas on sick-day fluids.

- If your blood glucose is high, drink sugar-free liquids.
- If your blood glucose is low, drink use fluids containing carbohydrates to correct hypoglycemia.

Take in a source of carbohydrates every 2-4 hours while awake if unable to eat regularly. See the list on the following page for sick-day food ideas.

**Rule #3 - Monitor.** Check your blood glucose often when you are sick. Testing every 2-4 hours will help you be aware of concerning changes or trends. If your blood glucose is above 250 during the day, check it once during the night. Even after you feel better, check your blood glucose every four hours until you return to your usual routine.

**Rule #4 - Treat.** Use an anti-nausea medication as soon as nausea begins. Call your healthcare provider if vomiting is not controlled within one hour. Consult a pharmacist when selecting over-the-counter medications because some may contain a high amount of carbohydrates.

**Rule #5 - Communicate.** Call your healthcare provider if the illness persists. Tell a family member or loved one that you are sick. Ask someone to frequently call or check in with you. If possible, have someone stay with you.

**If you have type 1 diabetes, do all of the above plus check your urine for ketones.** This should be done every four hours when you are demonstrating symptoms of DKA (listed on page 33) or when your blood glucose level is greater than 240 mg/dL. Ketone strips are available at your pharmacy.

## Call your healthcare provider or go the nearest emergency care center if:

- You feel dehydrated or your condition is worsening
- Vomiting and/or diarrhea persists and you are unable to keep food/drink down for more than 24 hours
- Your blood glucose is less than 70 mg/dL two times in a row
- Your blood glucose is greater than 350 mg/dL two times in a row
- Your blood glucose stays above 400 mg/dL for three hours
- Your ketones remain moderate to large two checks in a row
- Your elevated urine ketones do not go down to trace or less in 12 hours
- You begin to feel confused
- You cannot think clearly
- You think you need help
- You don't know how to care for yourself

**If you cannot reach your provider, go to the nearest emergency care center or call 911.**

# Sick-Day Rules



**If I am too sick to eat and drink, I should stop taking all my diabetes medications so my blood glucose does not go too low.**

True / False

Answer on page 42

## Sick-Day Food and Drink

Drink a glass of sugar-free, caffeine-free liquid every hour, especially if you are vomiting or have diarrhea. Some suggestions include:

- Water
- Broth
- Crystal Light<sup>®</sup>
- Bouillon
- Diet drink
- Sugar-free Kool-Aid<sup>®</sup>
- Decaffeinated tea (unsweetened or sweetened with sugar substitute)
- Decaffeinated coffee (if sweetened, use sugar substitute)



If you take insulin and cannot eat your regular meals due to nausea or vomiting, eat or drink 15 grams of carbohydrate (one choice from below) every 2-4 hours while you are awake instead:

- 6 saltine crackers
- 1 slice bread
- 1 cup soup
- $\frac{3}{4}$  cup tomato soup
- $\frac{1}{3}$  cup grape juice
- $\frac{1}{2}$  cup apple juice
- $\frac{1}{2}$  cup regular soda
- $\frac{1}{2}$  cup regular lemonade
- $\frac{1}{4}$  cup sherbet
- $\frac{1}{2}$  twin popsicle
- $\frac{1}{3}$  cup regular Jell-O<sup>®</sup>
- $\frac{1}{2}$  cup applesauce



### Medical ID

It is a good idea to wear medical identification to let others know that you have diabetes. This is usually a bracelet or necklace. Companies who provide medical IDs are listed on page 45.

### Foot Care

Having diabetes can decrease blood flow and nerve sensation in your feet. It is important to take good care of your feet to prevent wounds and infection.

- Wash your feet regularly and dry them well, especially between your toes.
- Use cream on your feet, but not between your toes, to keep them moist and to prevent skin from cracking.
- Check your feet every day to see if there are any changes, such as redness, blisters, or wounds. Use a mirror to see the bottom of your feet.
- Be careful cutting your toenails and always cut them straight across.
- Never go barefoot! Always wear comfortable shoes that have a hard sole and fit you well.
- If you are concerned about changes in your feet or if you have corns or bunions, do not try to treat them yourself at home. You need to see a foot specialist (podiatrist).

### Driving

There is a great variety of licensing requirements and restrictions for driving with diabetes. To ensure personal and public safety, you and your healthcare provider should discuss your medical fitness and associated driving risk. Most importantly, you must be aware of your ability to safely operate a vehicle. Abnormal blood glucose levels could cause altered perception or loss of consciousness while driving. One step to improve your driving safety would be to test your blood glucose prior to driving. If you are on insulin or are taking a medication that increases risk for hypoglycemia and your blood glucose level is less than 100, eat a small snack prior to getting behind the wheel. Never drive when your blood glucose is below 70 mg/dL or when you are at increased risk of hypoglycemia.



# Lifestyle



## Depression and Diabetes

A new diagnosis of diabetes may be accompanied by strong emotions. Coping with change is often a process and you may find that you jump from one feeling to the next. It is very common to have feelings of shock, denial, anger, and depression. These negative feelings can hinder diabetes self-care. Poor control of diabetes can cause symptoms of depression such as anxiety, increased hunger, fatigue, and poor sleep. These symptoms may be improved as your glucose management improves. For example, high blood glucose levels will cause excessive urination at night, which contributes to poor sleep and increased fatigue. Learn more about diabetes and take positive steps to control your blood glucose levels. Adjusting to your diagnosis will occur over time and will be an ongoing process. To help your mood, engage in problem solving and take charge of the aspects of your care that you do have control over.

People with diabetes are at a greater risk of having depression than those without diabetes. Depression is associated with loss of pleasure, change in sleep patterns, change in appetite, trouble concentrating, loss of energy, anxiety, guilt, and slowed movements. If you have signs or symptoms of depression lasting more than two weeks, call your healthcare provider. Get help. If you are suffering from depression, you will be less likely to take good care of yourself. If you are feeling suicidal or having thoughts of harming yourself or others, seek immediate help by calling the National Suicide Prevention Lifeline at 1-800-273-8255 or dialing 911.

## Preconception Care

### Would you like to or could you become pregnant in the next year?

If your answer is yes, then talk to your obstetric provider now before you become pregnant. **Women diagnosed with diabetes need pre-pregnancy counseling to decrease maternal and fetal risks.** Pregnancy with diabetes will be considered high risk, but you can take steps to significantly lower your risks.

Prior to becoming pregnant, it is important to have very good control of blood glucose levels. This is necessary because during the first seven weeks of a pregnancy, many women do not yet realize they are pregnant. It is at this time that the vital organs, tissue, and bones of your baby are being formed. It is easy to put off your healthcare provider appointment, but in the United States half of all pregnancies are unintended. That is one reason it is essential that you prepare now. It is recommended that you prevent pregnancy until your diabetes is well controlled for three to six months.

If you are **not** desiring a pregnancy at this time, your healthcare provider can work with you to develop an effective reproductive life plan using highly effective contraceptive methods. If you are planning a pregnancy, your healthcare provider will work with you to develop a diabetes management plan to closely monitor and manage your blood glucose levels. Good control of diabetes **both** prior to and during pregnancy will improve outcomes for you and your baby.





# Follow-up Care



## Initial Follow-up with Your Healthcare Provider

You will need to follow-up with your healthcare provider shortly after your hospitalization and should have an appointment scheduled before you are discharged. Your healthcare provider will be able to perform initial screening, which should include:

- Confirmatory testing
- Screening for cardiovascular risk
- Urine and blood testing to detect kidney/microvascular damage
- Monofilament foot exam
- Scheduling you for a dilated eye exam

Topics you should be prepared to discuss with your healthcare provider include:

- Referral for outpatient diabetes education classes
- Lifestyle changes (activity and nutrition)
- Smoking cessation
- Weight reduction strategies
- Medications to reduce cardiovascular disease risk (medications to reduce lipids and blood pressure)

Register for outpatient diabetes education classes. These classes will provide you with additional information about:

- Lifestyle changes
- Medical nutrition therapy
- Medications used to treat diabetes

## Regular Follow-up Care with Your Healthcare Provider

- **Healthcare Provider Visits** It is important to schedule regular follow-up visits with your healthcare provider to help keep your diabetes well-managed. Your healthcare provider may need to adjust your diabetes medications based on your blood glucose readings. Your healthcare provider may also ask a diabetes specialist (endocrinologist) to assist with your care.
- **Outpatient Education Classes** There are outpatient diabetes education classes available for you to attend in multiple locations. If you are interested in learning more about diabetes, ask your healthcare provider to write a prescription for you to go to the center closest to you.
- **Routine A1c Testing** You should have a lab test called an A1c every 3-6 months. A1c measures your average blood glucose over the past 2-3 months. This is important to know as it may show how likely you are to develop complications of diabetes. Detailed information about the A1c test is available on page 10. Ask your healthcare provider what A1c number is best for you.
- **Blood Pressure Checks** Have your blood pressure checked at every healthcare provider visit. For most people, aim for a blood pressure of less than 140/90.
- **Immunizations** Vaccines are especially critical for people with chronic health conditions such as type 1 and type 2 diabetes. Stay up to date on vaccines to prevent illness and disease. Get vaccinated each year to protect you from the seasonal flu. Also discuss your need for a pneumococcal vaccination with your healthcare provider.
- **Other Important Tests** After your initial screening, your healthcare provider should periodically perform the following important tests.
  - Yearly urine protein and blood creatinine testing
  - Yearly cholesterol and blood fat (triglycerides) testing
  - Eye exam every two years
  - Foot exam by your healthcare provider yearly or at every visit if you have foot problems or are a smoker

**Good blood glucose control and regular diabetes follow-up can help you prevent the long-term complications of diabetes, which include heart attack, stroke, eye disease, kidney disease, nerve damage, and circulation problems. Adopting healthy behaviors now will help you reduce your risk of disease progression.**

# My Diabetes Care Plan

To live healthy with diabetes you may have to make some major lifestyle changes. It is important to know if you are ready to make these changes. It may be helpful to answer the following questions and discuss your readiness with your healthcare provider.

## How important is taking care of my diabetes to me right now?

1      2      3      4      5      6      7      8      9      10  
Not at all                          Somewhat                          Very

## How well do I understand the changes I need to make?

1      2      3      4      5      6      7      8      9      10  
Not at all                          Somewhat                          Very

## How confident am I about making this lifestyle change?

1      2      3      4      5      6      7      8      9      10  
Not at all                          Somewhat                          Very

## My Diabetes Action Plan

My diabetes is being managed with diet and exercise (circle):

only / plus oral medications / plus injectable medications / plus insulin.

I will test and record my blood glucose levels: once daily / four times daily / \_\_\_\_\_.

The name of the medication(s) I take to treat my diabetes is/are: \_\_\_\_\_.

The name of my insulin(s) is/are: \_\_\_\_\_.

I will use insulin at the following times (circle): breakfast    lunch    supper    bedtime.

In case of low blood glucose, I will always carry a quick source of sugar with me in the form of \_\_\_\_\_.

I will follow-up with my healthcare provider \_\_\_\_\_. My next appointment is  
\_\_\_/\_\_\_/\_\_\_ at \_\_\_\_\_ am/pm. I will bring this book including my glucose logs to my next visit.

I will increase my activity levels and will begin by adding \_\_\_\_\_ to my current activities.

## Take a moment to discuss these goals with your healthcare provider and set your diabetes self-management plan:

My target blood glucose range is \_\_\_\_\_ to \_\_\_\_\_.

My current A1c level is \_\_\_\_\_. My target A1c level is \_\_\_\_\_.

I need to eat a consistent diet with no more than \_\_\_\_\_ grams of carbohydrate per meal.

**Answers to self-test questions:** ½ cup orange juice; Pasta; Lower; Insulin; Glucose; Call your healthcare provider or endocrinologist; False



# Resources

## Local Resources

### Buncombe County

Buncombe County Transfer Station	828-250-6205	<a href="http://www.buncombecounty.org">www.buncombecounty.org</a>
Needle disposal for City of Asheville & Buncombe County		
Community Resources NC Database	211	<a href="http://www.nc211.org">www.nc211.org</a>
Land of Sky Regional Council Living Healthy Program	828-251-7438	<a href="http://www.livinghealthywnc.org">www.livinghealthywnc.org</a>
Lifeline	828-257-7204	
Mission Hospital		
Cornerstone Diabetes Support Group		
1 Hospital Drive, 3rd level. Free to the public.	828-213-4700	
Meets the 3rd Wednesday each month at 3:30 p.m.		
Healthy Weight Program	828-213-4700	
Low Vision Center	828-213-4370	
Main Operator	828-213-1111	
Nicotine Dependence Program	828-213-5527	
Outpatient Diabetes Center - Education and Information	828-213-4700	
Weight Management Center	828-213-4100, option 2	
YMCA Diabetes Prevention Program	828-559-2401	<a href="http://www.ymcawnc.org">www.ymcawnc.org</a>
YWCA Diabetes Wellness & Prevention Program	828-254-7206, ext. 212	<a href="http://www.ywcaofasheville.org">www.ywcaofasheville.org</a>

### Cherokee County

Cherokee County Health Department	828-837-7486	<a href="http://www.cherokee-county-nc.gov">www.cherokee-county-nc.gov</a>
Cherokee Indian Hospital	828-497-9163	<a href="http://www.ihs.gov">www.ihs.gov</a>

### Macon County

Angel Medical Center Diabetes Management Program	828-369-4166	<a href="http://www.angelmed.org">www.angelmed.org</a>
--	--------------	--

### McDowell County

McDowell Hospital Diabetes Center	828-659-5157	<a href="http://www.mcdowellhospital.org">www.mcdowellhospital.org</a>
YMCA, Taking Control of Type 2 Diabetes	828-652-1838	

### Mitchell County

Blue Ridge Regional Hospital - Registered Dietitian	828-766-1681	<a href="http://www.blueridgehospital.org">www.blueridgehospital.org</a>
Mitchell County Diabetic Management Course	828-688-2371	

### Transylvania County

Transylvania Regional Hospital Diabetes Care Program	828-883-5195	<a href="http://www.trhospital.org">www.trhospital.org</a>
--	--------------	--



## National Resources

<a href="#">American Association of Diabetes Educators</a> Find an educator near you	1-800-338-3633	<a href="http://www.diabeteseducator.org">www.diabeteseducator.org</a>
<a href="#">American Diabetes Association</a> Education and information	1-800-342-2383	<a href="http://www.diabetes.org">www.diabetes.org</a>
<a href="#">Academy of Nutrition and Dietetics</a> Food and nutrition	1-800-877-1600	<a href="http://www.eatright.org">www.eatright.org</a>
<a href="#">The Americans with Disabilities Act (ADA)</a> Help with employment issues and diabetes	1-800-514-0301	<a href="http://www.ada.gov">www.ada.gov</a>
<a href="#">American Heart Association (AHA)</a> Information on nicotine cessation, blood pressure, heart	1-800-242-8721	<a href="http://www.americanheart.org">www.americanheart.org</a>
<a href="#">American Lung Association</a> Information on nicotine cessation, lung disease	1-800-586-4872	<a href="http://www.lungusa.org">www.lungusa.org</a> or <a href="http://www.lungnc.org">www.lungnc.org</a>
<a href="#">American Medical ID</a> Health ID bracelets and tags	1-800-363-5985	<a href="http://www.americanmedical-id.com">www.americanmedical-id.com</a>
<a href="#">Medic Alert Foundation International</a> Health ID bracelets and tags	1-800-432-5378	<a href="http://www.medicalert.org">www.medicalert.org</a>

## Online Resources

<a href="#">Centers for Disease Control</a>	<a href="http://www.cdc.gov/diabetes">www.cdc.gov/diabetes</a>
<a href="#">Coalition for Safe Community Needle Disposal</a>	<a href="http://www.safeneedledisposal.org">www.safeneedledisposal.org</a>
<a href="#">Diabetes Self-Management</a>	<a href="http://www.diabetesselfmanagement.com">www.diabetesselfmanagement.com</a>
<a href="#">DLife</a>	<a href="http://www.dlife.com">www.dlife.com</a>
<a href="#">My Food Advisor</a>	<a href="http://www.diabetes.org/MyFoodAdvisor">www.diabetes.org/MyFoodAdvisor</a>
<a href="#">National Agricultural Library Federal Nutrition Guide</a>	<a href="http://www.nutrition.gov">www.nutrition.gov</a>
<a href="#">National Diabetes Education Program</a>	<a href="http://www.ndep.nih.gov">www.ndep.nih.gov</a>
<a href="#">National Institute of Health (NIH)</a>	<a href="http://www.diabetes.niddk.nih.gov">www.diabetes.niddk.nih.gov</a>
<a href="#">Needy Meds</a>	<a href="http://www.needymeds.org">www.needymeds.org</a>

## Diabetes Apps

<a href="#">Diabetes Companion</a>	<a href="#">GluCoMo</a>	<a href="#">Glucose Buddy</a>
<a href="#">Vree for Diabetes</a>	<a href="#">Calorie King</a>	<a href="#">Diabetes Goal Tracker</a>

## Terms to Know

**A1c** A test that measures a person's average blood glucose level over the past 2 to 3 months. Hemoglobin (HEE-mo-glo-bin) is the part of a red blood cell that carries oxygen to the cells and sometimes joins with the glucose in the bloodstream. Also called hemoglobin A1c or glycosylated (gly-KOH-sih-lay-ted) hemoglobin, the test shows the amount of glucose that sticks to the red blood cell, which is proportional to the amount of glucose in the blood.

**Blood glucose level** The amount of glucose in a given amount of blood. It is noted in milligrams in a deciliter, or mg/dL.

**Blood glucose meter** A small, portable machine used by people with diabetes to check their blood glucose levels. After pricking the skin with a lancet, one places a drop of blood on a test strip in the machine. The meter (or monitor) soon displays the blood glucose level as a number on the meter's digital display. Also called glucometer.

**Body mass index (BMI)** A measure used to evaluate body weight relative to a person's height. BMI is used to find out if a person is underweight, normal weight, overweight, or obese.

**Calorie** A unit representing the energy provided by food. Carbohydrate, protein, fat, and alcohol provide calories in the diet. Carbohydrate and protein have 4 calories per gram, fat has 9 calories per gram, and alcohol has 7 calories per gram.

**Carbohydrate (kar-boh-HY-drate)** One of the three main components in food (carbohydrate, fat, protein). Foods that provide carbohydrate are starches, vegetables, fruits, dairy products, and sugars.

**Carbohydrate counting** A method of meal planning for people with diabetes based on counting the number of grams of carbohydrate in food.

**Cholesterol (koh-LES-ter-all)** A type of fat produced by the liver and found in the blood. It is also found in some foods. Cholesterol is used by the body to make hormones and build cell walls.

**Complications** Harmful effects of diabetes such as damage to the eyes, heart, blood vessels, nervous system, teeth and gums, feet and skin, or kidneys. Studies show that keeping blood glucose, blood pressure, and low-density lipoprotein cholesterol levels close to normal can help prevent or delay these problems.

**Diabetes mellitus (MELL-ih-tus)** A condition characterized by hyperglycemia resulting from the body's inability to use blood glucose for energy. In type 1 diabetes, the pancreas no longer makes insulin and therefore blood glucose cannot enter the cells to be used for energy. In type 2 diabetes, either the pancreas does not make enough insulin or the body is unable to use insulin correctly.

**Diabetic ketoacidosis (DKA) (KEY-toe-ass-ih-DOH-sis)** An emergency condition in which extremely high blood glucose levels, along with a severe lack of insulin, result in the breakdown of body fat for energy and an accumulation of ketones in the blood and urine. Signs of DKA are nausea and vomiting, stomach pain, fruity breath odor, and rapid breathing. Untreated DKA can lead to coma and death.

**Dietitian (DY-eh-TIH-shun)** A healthcare professional who advises people about meal planning, weight control, and diabetes management. A registered dietitian (RD) has more training.

**Dilated eye exam (DY-lay-ted)** A test done by an eye care specialist in which the pupil (the black center) of the eye is temporarily enlarged with eye drops to allow the specialist to see the inside of the eye more easily.

**Endocrinologist (EN-doh-krih-NAH-luh-jist)** A doctor who treats people who have endocrine gland problems, such as diabetes.

**Glycemic index (gly-SEE-mik)** A ranking of carbohydrate-containing foods, based on the food's effect on blood glucose compared with a standard reference food.

**HDL cholesterol** Stands for high-density-lipoprotein cholesterol (kuh-LESS-tuh-rawl LIP-oh-PRO-teen), a fat found in the blood that takes extra cholesterol from the blood to the liver for removal. Sometimes called "good" cholesterol.

**Heredity** The passing of a trait from parent to child.

### **Hyperglycemia (HY-per-gly-SEE-mee-uh)**

Excessive blood glucose. Fasting hyperglycemia is blood glucose above a desirable level after a person has fasted for at least 8 hours. Postprandial hyperglycemia is blood glucose above a desirable level 1 to 2 hours after a person has eaten.

### **Hyperglycemic nonketotic syndrome (HHNS) (HY-per-oz-MOH-lur HY-per-gly-SEE-mik non-kee-TAH-tik)**

An emergency condition in which one's blood glucose level is very high and ketones are not present in the blood or urine. If HHNS is not treated, it can lead to coma or death.

### **Hypoglycemia (hy-po-gly-SEE-mee-uh)**

A condition that occurs when one's blood glucose is lower than normal, usually less than 70 mg/dL. Signs include hunger, nervousness, shakiness, perspiration, dizziness or light-headedness, sleepiness, and confusion. If left untreated, hypoglycemia may lead to unconsciousness. Hypoglycemia is treated by consuming a carbohydrate-rich food such as a glucose tablet or juice. It may also be treated with an injection of glucagon if the person is unconscious or unable to swallow. Also called an insulin reaction.

### **Hypoglycemia unawareness (un-uh-WARE-ness)**

A state in which a person does not feel or recognize the symptoms of hypoglycemia. People who have frequent episodes of hypoglycemia may no longer experience the warning signs of it.

**Injection (in-JEK-shun)** Inserting liquid medication or nutrients into the body with a syringe. A person with diabetes may use short needles or pinch the skin and inject at an angle to avoid an intramuscular injection of insulin.

**Injection site rotation** Changing the places on the body where insulin is injected. Rotation prevents the formation of lipodystrophies.

**Insulin** A hormone that helps the body use glucose for energy. The beta cells of the pancreas make insulin. When the body cannot make enough insulin, it is taken by injection or through use of an insulin pump.

**Insulin pen** A device for injecting insulin that looks like a fountain pen and holds replaceable cartridges of insulin. Also available in disposable form.

**Insulin pump** An insulin-delivering device about the size of a deck of cards that can be worn on a belt or kept in a pocket. An insulin pump connects to narrow, flexible plastic tubing that ends with a needle inserted just under the skin. Users set the pump to give a steady trickle or basal amount of insulin continuously throughout the day. Pumps release bolus doses of insulin (several units at a time) at meals and at times when blood glucose is too high, based on programming done by the user.

**Insulin resistance** The body's inability to respond to and use the insulin it produces. Insulin resistance may be linked to obesity, hypertension, and high levels of fat in the blood.

**Ketone** A chemical produced when there is a shortage of insulin in the blood and the body breaks down body fat for energy. High levels of ketones can lead to diabetic ketoacidosis and coma. Sometimes referred to as ketone bodies.

**Ketonuria (key-toe-NUH-ree-ah)** A condition occurring when ketones are present in the urine, a warning sign of diabetic ketoacidosis.

**LDL cholesterol** Stands for low-density-lipoprotein cholesterol (kuh-LESS-tuh-rawl LIP-oh-PRO-teen), a fat found in the blood that takes cholesterol around the body to where it is needed for cell repair and also deposits it on the inside of artery walls. Sometimes called "bad" cholesterol.

## Terms to Know

**Lancet** A spring-loaded device used to prick the skin with a small needle to obtain a drop of blood for blood glucose monitoring.

**Lipid profile** A blood test that measures total cholesterol, triglycerides, and HDL cholesterol ("good" cholesterol). LDL cholesterol ("bad" cholesterol) is then calculated from the results. A lipid profile is one measure of a person's risk of cardiovascular disease.

**Lipodystrophy (LIP-oh-DIH-struh-fee)** Defect in the breaking down or building up of fat below the surface of the skin, resulting in lumps or small dents in the skin surface. (See lipohypertrophy or lipoatrophy.) Lipodystrophy may be caused by repeated injections of insulin in the same spot.

**Lipohypertrophy (LIP-oh-hy-PER-truh-fee)** Buildup of fat below the surface of the skin, causing lumps. Lipohypertrophy may be caused by repeated injections of insulin in the same spot.

**Macrosomia (mack-roh-SOH-mee-ah)** Abnormally large; in diabetes, refers to abnormally large babies that may be born to women with diabetes.

**Macrovascular disease (mack-roh-VASK-yoo-ler)** Disease of the large blood vessels, such as those found in the heart. Lipids and blood clots build up in the large blood vessels and can cause atherosclerosis, coronary heart disease, stroke, and peripheral vascular disease.

**Metabolic syndrome** The tendency of several conditions to occur together, including obesity, insulin resistance, diabetes or prediabetes, hypertension, and high lipids.

**Microalbuminuria (MY-kro-al-BYOO-min-your-EE-ah)** The presence of small amounts of albumin, a protein, in the urine. Microalbuminuria is an early sign of kidney damage, or nephropathy, a common and serious complication of diabetes. The ADA recommends that people diagnosed with type 2 diabetes be tested for microalbuminuria at the time they are diagnosed and every year thereafter; people with type 1 diabetes should

be tested 5 years after diagnosis and every year thereafter. Microalbuminuria is usually managed by improving blood glucose control, reducing blood pressure, and modifying the diet.

**Microvascular disease (MY-kro-VASK-yoo-ler)** Disease of the smallest blood vessels, such as those found in the eyes, nerves, and kidneys. The walls of the vessels become abnormally thick but weak. Then they bleed, leak protein, and slow the flow of blood to the cells. Diabetes contributes to this disease.

**Monofilament** A short piece of nylon, like a hairbrush bristle, mounted on a wand. To check sensitivity of the nerves in the foot, the doctor touches the filament to the bottom of the foot.

**Nephropathy (neh-FROP-uh-thee)** Disease of the kidneys. Hyperglycemia and hypertension can damage the kidneys' glomeruli. When the kidneys are damaged, protein leaks out of the kidneys into the urine. Damaged kidneys can no longer remove waste and extra fluids from the bloodstream.

**Neuropathy (ne-ROP-uh-thee)** Disease of the nervous system. The three major forms in people with diabetes are peripheral neuropathy, autonomic neuropathy, and mononeuropathy. Peripheral neuropathy causes pain, numbness, or a tingling feeling in the feet, legs, or hands.

**Nutritionist (noo-TRIH-shuh-nist)** A person with training in nutrition; may or may not have specialized training and qualifications. See dietitian.

**Oral hypoglycemic agents (hy-po-gly-SEE-mik)** Medicines taken by mouth by people with type 2 diabetes to keep blood glucose levels as close to normal as possible.

**Pancreas (PAN-kree-us)** A gland organ that makes insulin and enzymes for digestion. The pancreas is located behind the lower part of the stomach and is about the size of a hand.

**Peripheral vascular disease (PVD) (puh-RIF-uh-rul VAS-kyoo-ler)** A disease of the large blood vessels of the arms, legs, and feet. PVD may occur when major blood vessels in these areas are blocked and do not receive enough blood. The signs of PVD are aching pains and slow-healing foot sores.

**Postprandial blood glucose (post-PRAN-dee-ul)** The blood glucose level taken 1 to 2 hours after eating.

**Prediabetes** A condition in which blood glucose levels are higher than normal but are not high enough for a diagnosis of diabetes. People with prediabetes are at increased risk for developing type 2 diabetes and for heart disease and stroke. Other names for prediabetes are impaired glucose tolerance and impaired fasting glucose.

**Preprandial blood glucose (pree-PRAN-dee-ul)** The blood glucose level taken before eating.

**Renal threshold of glucose (THRESH-hold)** The blood glucose concentration at which the kidneys start to excrete glucose into the urine.

**Retinopathy (REH-tih-NOP-uh-thee)** Eye disease that is caused by damage to the small blood vessels in the retina. Loss of vision may result. Also known as diabetic retinopathy.

**Self-management** In diabetes, the ongoing process of managing diabetes. Includes meal planning, planned physical activity, blood glucose monitoring, taking diabetes medicines, handling episodes of illness, handling episodes of low and high blood glucose, managing diabetes when traveling, and more. The person with diabetes designs his or her own self-management treatment plan in consultation with a variety of healthcare professionals such as doctors, nurses, registered dietitians, pharmacists, and others.

**Sharps container** A container for disposal of used needles and syringes; often made of hard plastic so that needles cannot poke through.

**Sliding scale** A set of instructions for adjusting insulin on the basis of blood glucose test results, meals, or activity levels.

**Sugar alcohols** Sweeteners that produce a smaller rise in blood glucose than other carbohydrates. Their calorie content is about 2 calories per gram. Includes erythritol, hydrogenated starch hydrolysates, isomalt, lactitol, maltitol, mannitol, sorbitol, and xylitol. Also known as polyols (PAH-lee-alls).

**Syringe (suh-RINJ)** A device used to inject medications or other liquids into body tissues. The syringe for insulin has a hollow plastic tube with a plunger inside and a needle on the end.

**Type 1 diabetes** A condition characterized by high blood glucose levels caused by a total lack of insulin. Occurs when the body's immune system attacks the insulin-producing beta cells in the pancreas and destroys them. The pancreas then produces little or no insulin. Type 1 diabetes develops most often in young people but can appear in adults.

**Type 2 diabetes** A condition characterized by high blood glucose levels caused by either a lack of insulin or the body's inability to use insulin efficiently. Type 2 diabetes develops most often in middle-aged and older adults but can appear in young people.

**Unit of insulin** The basic measure of insulin. U-100 insulin means 100 units of insulin per milliliter (mL) or cubic centimeter (cc) of solution. Most insulin made today in the United States is U-100.

# Blood Glucose Monitoring Log



Bring with you to your follow-up appointment

Example	Breakfast		Lunch		Dinner		Bedtime		Notes	
	Blood Glucose	Insulin Dose	Blood Glucose	Insulin Dose	Blood Glucose	Insulin Dose	Blood Glucose	Insulin Dose		
	236	16H	207	15H	200	15H	165	45L	2H	Sick today sinus infection

H = Humalog N=Novolog L = Lantus R=Regular

Date	Breakfast		Lunch		Dinner		Bedtime		Notes
	Blood Glucose	Insulin Dose	Blood Glucose	Insulin Dose	Blood Glucose	Insulin Dose	Blood Glucose	Insulin Dose	





