



Keys to Control



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Written by the team of educators
at the Braden Diabetes Center

Introduction



Traveling well through life with diabetes.

This booklet is designed to help you learn vital skills to manage your diabetes over a lifetime. With support from your healthcare team, including your Certified Diabetes Educator (CDE), you can begin to learn tools and techniques for diabetes self-management — the key to helping you feel better, prevent complications from diabetes, and live a healthier life. Each section addresses key information you need to know for living well with diabetes, including:

What is Diabetes

- Types of Diabetes
- Diagnosis of Diabetes
- Skills for Caring for your Diabetes
- Self-Monitoring of Blood Glucose
- Healthy Eating
- Being Active

Taking Medications

- Problem Solving*
- Reducing Risks
- Healthy Coping

Resources and Tools to Manage your Diabetes

- Helpful Resources
- My Diabetes Goals and Progress
- My Medical Information

*Knowing what to do when blood glucose is too low or too high

What is Diabetes?

Diabetes Mellitus is a group of conditions that affect the way your body uses sugar, or “glucose,” for energy. Glucose is the fuel that the cells of the body need to do their work. Foods, especially carbohydrates like starch and sugar, turn into glucose and are absorbed into the blood. This **raises the blood glucose.**

Insulin is a hormone made by “beta” cells in the pancreas (a gland located behind the stomach), that works to regulate blood glucose. Insulin helps move the glucose from the bloodstream into the cells of the body, which in turn **lowers the blood glucose.** Once the glucose is in the cells, energy is provided to the body.

Thus, insulin is like a **key that unlocks the door to the cells of the body, letting the glucose enter.**

With diabetes, there are a few things that happen with insulin. If either the amount of insulin is not adequate or the cells resist the insulin, blood glucose cannot get into the cells, leaving them without the energy to do their job.

The glucose builds up in the bloodstream and causes “hyperglycemia,” or high blood glucose. There are also other hormones that play a role in keeping blood glucose levels steady. Amylin and Glucagon-like Peptide-1 (GLP-1) help lower the blood glucose. Insulin and Amylin are made in the pancreas; GLP-1 is made by the small intestine.

A different hormone, called Glucagon, has the opposite effect. Glucagon, which is made in the pancreas, helps to raise the blood glucose if it dips too low by telling the liver to release stored glucose. This helps ensure you always have some glucose or “fuel” in the body when you aren’t eating. In summary, two main things can occur with diabetes:

Insulin deficiency –

There is not enough insulin in your system

Insulin resistance –

The insulin you make does not work as well as it should



Types of Diabetes

Type 1 Diabetes

- The pancreas cannot make insulin
- The body’s immune system destroys the cells in the pancreas where the insulin is made
- Need daily insulin injections or an insulin pump to deliver insulin
- Usually starts in childhood or early adulthood, but can occur at any age

Type 2 Diabetes

- Occurs when there is not enough insulin (insulin deficiency) or when insulin does not work well (insulin resistance)
- Usually appears after age 40, more commonly among overweight patients; it can also occur in children and young adults
- Risk factors for type 2 diabetes
 - Prediabetes – blood glucose levels are higher than normal, but not high enough for a diabetes diagnosis
 - Eating an unhealthy diet
 - Being overweight
 - Inactivity, lack of regular exercise
 - Stressful situations – illness, surgery, or hospitalization
 - Age 45 or older
 - Family history of diabetes, especially in parents, siblings, or children
 - History of gestational diabetes or large babies (birth weight over 9 pounds)
 - Certain health conditions, medications, and treatments
 - Ethnicity – certain populations have a higher risk, including Hispanic/Latinos, African Americans, Asians, Pacific Islanders, and Native Americans

Gestational Diabetes

- Diabetes that occurs when the mother’s blood glucose becomes elevated due to hormonal changes during pregnancy
- After birth, the mother’s blood glucose usually returns to pre-pregnancy levels
- Diagnosis of gestational diabetes is a risk factor for developing type 2 diabetes later in life
- Annual lab work to check blood glucose levels is recommended following pregnancy

Diagnosis of Diabetes

Typical Diagnostic Tests

Any of the following tests can be used to diagnose diabetes. To confirm a diagnosis, a second blood test may be ordered.

- **Fasting blood glucose** — blood glucose is tested after at least eight hours of no food or drink
- **Non-fasting (random) blood glucose** — blood glucose is tested at any time of day, regardless of food or drink
- **A1C test** — measures average blood glucose for the previous two to three months

What Results of Your Blood Glucose Tests Mean

TEST	NO DIABETES	PRE-DIABETES	DIABETES
Fasting blood glucose (mg/dl)	Less than 100	100–125	126 or more
Random blood glucose (mg/dl)	Less than 140	140–199	200 or more
A1C	4–5.6%	5.7–6.4%	6.5% or more

What Results of Your A1C Test Mean

A1C (%)	AVERAGE BLOOD GLUCOSE (MG/DL)
6	126
7	154
8	183
9	212
10	240
11	269
12	298
13	316

Skills for Caring for Your Diabetes

Self-Monitoring of Blood Glucose

The main ways to track blood glucose are

- daily home testing with a glucose meter (glucometer)*
- use of a continuous glucose monitor (CGM)*
- laboratory testing

Blood glucose results give you valuable information about whether you need to make changes in your lifestyle or medication routine. Your healthcare provider or diabetes educator can help you determine how often to test. Be sure to pay attention to any trends or patterns in your home blood glucose results, and bring your glucometer or blood glucose log book to each appointment.

* Items require a prescription for supplies. Make sure to always obtain refills before you run out



General Targets for Blood Glucose Levels

Fasting: 80–130 mg/dl

2 hours after meal: < 180 mg/dl

When to Check Blood Glucose

- Common times to check blood glucose include fasting, before meals, two hours after the start of eating, and before bedtime.
- It is best to check blood glucose more frequently during illness, infection, surgery, pregnancy, travel, times of excessive stress, changes in physical activity, and with meals or medication.
- If you are worried about low blood glucose, test before you drive.
- If your blood glucose is low, do not drive and treat it right away with a simple carbohydrate (see page 29 for details).
- Test anytime you have unusual symptoms (high or low blood glucose).
- Your healthcare team will work with you to create a testing plan.

Tips for Successful Blood Glucose Testing

Using a blood glucose monitor (glucometer)

- Wash hands with soap and warm water; alcohol wipes are not necessary
- Make sure finger or other testing site is dry (talk to your healthcare provider about using other testing sites)
- Ensure meter and supplies are working well and not expired or damaged; store supplies as recommended by the manufacturer
- Stick the side (not the tip or middle) of the finger and obtain a well-rounded drop of blood; use a different finger each time

What is Continuous Glucose Monitoring (CGM)?

- A CGM is a small sensor applied to your abdomen or arm held in place by an adhesive patch. A transmitter is connected to the sensor allowing your blood glucose data to wirelessly be sent to a monitoring device or to your smartphone using an app.
- In addition to blood glucose readings, CGMs can alert you when your blood sugar levels are rising too high or dropping too low.
- This real time information allows you to avoid potentially dangerous situations of hyperglycemia or hypoglycemia.
- If you use an insulin pump, your CGM can work with certain pumps to ensure accurate and timely dosing.



Healthy Eating

What you eat, when you eat, and how much you eat are all important pieces of nutrition for diabetes. There are many options for healthy eating available, and a registered dietitian can help you create a flexible plan tailored to your specific needs.

Good health begins with good nutrition, especially in diabetes.

Basic Nutrition for People with Diabetes

The three main nutrients in food, also called “macronutrients,” are carbohydrates, proteins, and fats. Foods in these groups provide calories and energy for your body. There are also other important nutrients in the foods and drinks we consume, such as water, vitamins, minerals, and fiber.

This booklet will help you learn how to create a healthy eating plan by balancing carbohydrates at meals and snacks. Let’s learn more about the main nutrients in your diet.

Carbohydrates are foods that turn into glucose in the blood, which act as the “fuel” for our cells. Carbohydrates can raise blood glucose levels. Sources include starches, grains, starchy vegetables, fruit, milk, and yogurt.

Proteins are foods that contain amino acids, which help form the muscles and nourish the cells of the body. Sources of protein include meats, poultry, fish, eggs, nuts and seeds, tofu, cottage cheese, and low-fat cheese.

Fats are an energy source found in foods. Fats also help protect your tissues and organs, and provide essential vitamins. Sources of heart healthy fats include nuts, avocados, fish, and olive oil.



Understanding Food Portions and Carbohydrate Choices

A portion is the amount of food you choose to eat at one time.

Learning how to manage portions will allow you to keep eating the foods you enjoy in moderation. If your weight is a concern, reducing portion size and increasing your activity can help you lose weight. Achieving a healthy weight is important in keeping your risk low for diabetes complications.

To help keep your blood glucose stable, it is important to have a good understanding of which foods can affect your blood glucose. A consistent carbohydrate, or “carb,” intake can help regulate blood glucose. Skipping meals can make it harder to manage your blood glucose, or cause you to have low blood glucose, especially if you are using insulin. Timing of food intake in relation to physical activity and medications is also important to regulate blood glucose.

Meals which include a mix of carbohydrates, protein, and small amounts of heart-healthy fats can help keep blood glucose stable. Adding foods with fiber, like whole grains, vegetables, and fruits also helps manage the blood glucose levels after a meal. Here are some tips for healthy carbohydrate intake.

- **Choose “complex” whole grain carbohydrates** like brown rice, whole grain bread, starchy vegetables, beans, and popcorn; they do not raise blood glucose as much as foods like white bread or boxed cereals
- **Limit simple or quickly digested carbohydrates** like sweets, desserts, fruit juice, sugar, honey, or brown sugar; they raise blood glucose quickly and are high in calories
- **Limit all sugar-sweetened beverages** like soda, lemonade, and chocolate milk
- **Choose beverages without sugar** like plain water, sparkling water, or decaffeinated coffee and tea

Planning Meals and Tracking Carbohydrates

There are several methods you can use to monitor your carbohydrate intake. Each method is described in detail on the following pages so you can choose the one that works best for you.

- **Plate method for meal planning**
- **Hand method for estimating portion sizes**
- **Counting carbohydrates**

Plate Method For Meal Planning

This plate diagram demonstrates how to balance the portions of a variety of different foods. The goal is for you to nourish your body and also feel satisfied after your meal without causing the blood glucose to go too high. The portions below are based on using a 9-inch dinner plate.

vegetables
 $\frac{1}{2}$ **plate**
 non-starchy vegetables like salad and leafy greens, raw or cooked

protein
 $\frac{1}{4}$ **plate**
 3 oz. of meat or protein

carbohydrates
 $\frac{1}{4}$ **plate**
 starches, grains, and/or starchy vegetables

You may choose to include 1 fruit portion, 1 milk or yogurt portion, and healthy fats (like 1 tbsp. of olive oil)

Hand Method For Estimating Portion Sizes

You can estimate portion size fairly accurately without any measuring tools simply by using your hand. This method is handy for when you are eating in restaurants or away from home.

palm
 3 oz. of meat, fish, or poultry

thumb
 2 tbsp. or 1 oz. of fats/butters

cupped hand
 1–2 oz. or $\frac{1}{2}$ cup of pasta, rice or cooked vegetables

fist
 1 cup of raw vegetables or fruits

Counting Carbohydrates

Carbohydrate counting is a tool you can use to track the amount of carbohydrates you eat. Carbohydrates are measured in grams.

The basic rule is one carbohydrate choice = 15 grams of carbohydrates.

You can learn the portion sizes equal to this on pages 14–15. For example:

1 choice = 15 grams

2 choices = 30 grams

3 choices = 45 grams

Each meal typically includes about 2–4 carbohydrate choices, and snacks include about 1–2 carbohydrate choices. This all depends on your age, gender, health status, and activity level. Your Certified Diabetes Educator (CDE) can help you match your diabetes medication or insulin to the amount of carbohydrates you eat.

Carbohydrate Choices

	CARBOHYDRATES PER MEAL	CARBOHYDRATES PER SNACK
Women	2–3 (30–45 grams)	1–2 (15–30 grams)
Men	3–4 (45–60 grams)	1–2 (15–30 grams)

Reading the Nutrition Facts Label

The nutrition facts on a food label give you basic information about the nutrients in the foods you eat. Once you have a healthy meal plan and know about how many carbohydrates to eat at each meal, you can use the food label to help plan your carbohydrate choices.

calories> Check out the total calories per serving. Cut back on calories if you are trying to lose weight.

sodium> Foods containing 140mg or less per serving are defined as low in sodium.

sugars> Avoid consuming more than 10% of your total daily calories as added sugars.

servings size <..... NOTE: the serving size may not be the same as the portion you choose to eat.

fat <..... Choose heart-healthy fats. Limit saturated fat, cholesterol, and avoid trans fat completely.

carbohydrate <..... Check out the total carbohydrate per serving.

fiber <..... Aim to eat 25–35 grams of fiber per day.

Aim for a high percentage daily value of these nutrients.

Nutrition Facts	
8 servings per container	
Serving size	2/3 cup (55g)
Amount per serving	
Calories	230
% Daily Value*	
Total Fat 8g	10%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 160mg	7%
Total Carbohydrate 37g	13%
Dietary Fiber 4g	14%
Total Sugars 12g	
Includes 10g Added Sugars	20%
Protein 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 235mg	6%

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

Learn how to use % Daily Value (DV) to evaluate how a food fits into your daily meal plan.

% Daily Value (DV) is for the entire day, not just one meal or snack.

You may need more or less than 2,000 calories per day. For some nutrients, you may need more or less than 100% DV.

Low is 5% DV or less. Aim low in saturated fat, trans fat, cholesterol, and sodium.

High is 20% DV or more. Aim high in vitamins, minerals, and fiber.
(source: Academy of Nutrition and Dietetics, eatright.org)

Carbohydrate Food Choices and Portions

Breads and Grains

- Bagel, ¼ large (1 oz.)
- Biscuit, 1 biscuit (2½ in. across)
- Breads, loaf-type, sliced
 - White, wheat, whole-grain, sourdough, unfrosted, rye, 1 slice
- Breads, flat-type
 - Chapatti, 1 oz.
 - Ciabatta, 1 oz.
 - Naan, 3 ¼ in. square (1 oz.)
 - Pita, 6 in. or ½ pita
 - Roti, 1 oz.
 - Sandwich buns, 1 bun, top and bottom (1½ oz.)
 - Taco shell, 2 taco shells
 - Tortilla, corn, 1 small (6 in.)
 - Tortilla, flour, 1 small (6 in.) or 1/3 large tortilla
- Cereal, cooked, oatmeal, ½ cup
- Cereal, dry, unsweetened, ¾ cup
- Chips, tortilla or potato, 13 chips (1 oz.)
- Cornbread, ½ muffin
- Crackers, graham, 3 squares
- English muffin, ½ muffin
- Hot dog bun or hamburger bun, ½ bun
- Matzoh, ¾ oz.
- Pancake, 1 pancake (4 in. across, ¼ in. thick)
- Pasta, white or whole wheat, 1/3 cup
- Polenta, 1/3 cup
- Pretzels, ¾ oz.
- Quinoa, 1/3 cup
- Rice, white or brown, 1/3 cup
- Roll, plain, 1 small roll
- Saltines, 6 crackers
- Stuffing, bread, 1/3 cup
- Waffle, 1 waffle (4 in. square)

One carbohydrate choice = 15 grams of carbohydrates

The portions listed are equal to 15 grams of carbohydrates.

Beans and Lentils

- Baked beans, canned, 1/3 cup
- Beans, all types, cooked, ½ cup
- Lentils, any color, cooked, ½ cup

Dairy Products

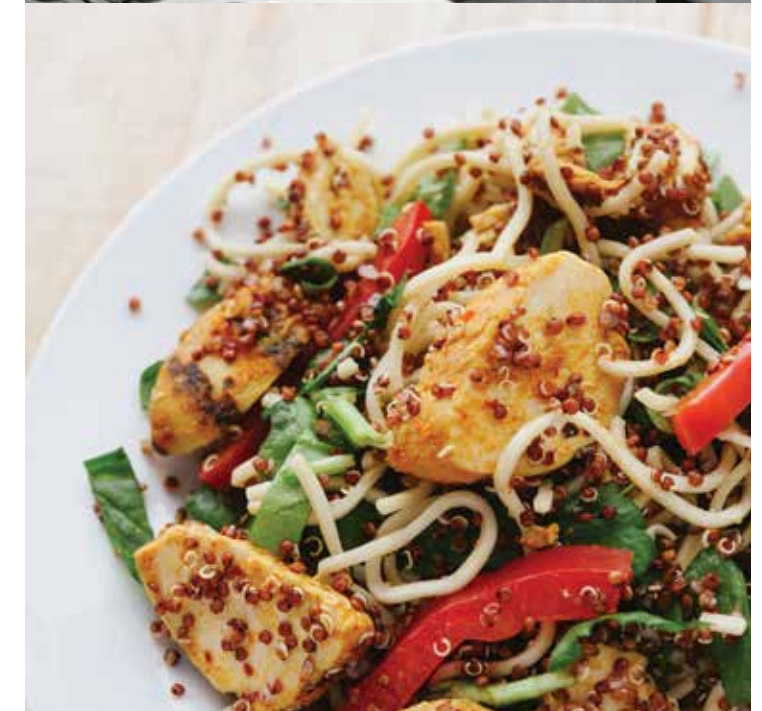
- (1 choice = 12 grams carbohydrate)
- Milk, cow, skim or lowfat (1%), 1 cup
- Yogurt, plain or Greek, 2/3 cup (6 oz.)
- Soy milk, ½ carbohydrate

Starchy Vegetables

- Corn, ½ cup
- Corn on the cob, ½ large cob (4 in.)
- Mixed corn and peas, 1 cup
- Peas, ½ cup
- Potato, ¼ large baked
- Mashed with milk and fat, ½ cup
- Sweet potato/winter squash, ½ cup

Fruits

- Apple, unpeeled, 1 small apple (4 oz.)
- Applesauce, unsweetened, ½ cup
- Apricot, fresh, 4 apricots (5½ oz)
- Banana, 1 extra small banana, about 4 in. long (4 oz.)
- Blackberries, 1 cup
- Blueberries, ¾ cup
- Cantaloupe, 1 cup diced
- Cherries, sweet, fresh, 12 cherries (3 ½ oz.)
- Dried fruits (blueberries, cherries, cranberries, mixed fruit, raisins), 2 tbsp.
- Fruit cocktail, ½ cup
- Fruit juice, ½ cup
- Grapefruit, fresh, ½ large grapefruit (5½ oz.)
- Grapes, 17 small grapes (3 oz.)
- Kiwi, ½ cup sliced
- Mandarin orange, canned, ¾ cup
- Mango, ½ small, or ½ cup (5 ½ oz.)
- Orange, 1 medium orange (6 ½ oz.)
- Peaches, canned ½ cup
- Fresh, 1 medium peach
- Pears, canned ½ cup
- Fresh, ½ large pear (4 oz.)
- Pineapple, canned, ½ cup
- Fresh, ¾ cup
- Plum, fresh, 2 small plums (5 oz.)
- Prunes, 3 prunes
- Raspberries, 1 cup
- Strawberries, 1 ¼ cup whole berries
- Tangerine, 1 large tangerine (6 oz.)
- Watermelon, 1 ¼ cups diced



Sample Menus

Carbohydrate Choices

BREAKFAST	CARBOHYDRATE CHOICES	CARBOHYDRATE GRAMS
¾ cup raspberries	1	15
1 egg/egg substitute	0	0
1 whole wheat english muffin	2	30
1 tsp. butter	0	0
¼ avocado	0	0
Unsweetened beverage of choice (coffee, tea, water, or sugar-free drink)	0	0
	TOTAL = 3	TOTAL = 45

LUNCH	CARBOHYDRATE CHOICES	CARBOHYDRATE GRAMS
½ cup beans and 1/3 cup brown rice	2	30
1 small apple	1	15
3–5 oz. chicken, (not fried or breaded)	0	0
Non-starchy vegetable, and/or green salad	0	0
1 tsp. olive oil vinaigrette	0	0
Unsweetened beverage of choice (coffee, tea, water, or sugar-free drink)	0	0
	TOTAL = 3	TOTAL = 45

DINNER	CARBOHYDRATE CHOICES	CARBOHYDRATE GRAMS
½ baked sweet potato	2	30
3–5 oz. meat, chicken, or fish (not fried or breaded)	0	0
non-starchy vegetable	0	0
Tossed salad with 1 tbsp. olive oil vinaigrette	0	0
¾ cup blueberries	1	0
Unsweetened beverage of choice (coffee, tea, water, or sugar-free drink)	0	15
	TOTAL = 3	TOTAL = 45

Snack Ideas = 15 Grams of Carbohydrates

You may include a snack between meals or at bedtime if recommended by your healthcare team. Pick one protein and one carbohydrate from each column to make a healthy snack.

<p>Proteins</p> <ul style="list-style-type: none"> 1 oz. (about 20) almonds ½ cup cottage cheese 1 oz. cheese 2 tbsp. nut butter 	+	<p>Carbohydrates</p> <ul style="list-style-type: none"> 1¼ cup strawberries 1 slice whole wheat bread 4–6 whole wheat crackers 1 small apple
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Weight Loss and Heart Health

Weight Loss

Even a modest amount of weight loss, around 10%, can have a big impact on your health.

- Weight loss can help improve blood glucose, blood pressure, and cholesterol.
- A good goal is to lose no more than 1–2 pounds per week; slow and steady weight loss can help you reach your goal weight and keep the weight off.
- Eat regularly, three meals a day and maybe snacks; always include breakfast.
- Add a regular exercise program.
- Check blood glucose more often when losing weight; diabetes medicine doses may need to be decreased.

Don't forget a healthy heart!

- For a healthy heart, it is best to limit saturated animal fats like red meat, bacon, fatty cheeses, and cream cheese. Avoid trans fats completely.
- Choose heart-healthy fats and oils in moderation, like olive oil, canola oil, or avocado.
- 1 tbsp. of oil is approximately 120 calories, or the size of your thumb.
- Reducing your sodium salt intake can help to lower your blood pressure — the American Diabetes Association recommends having a total of around 2,300 mg sodium per day.
- Try using fresh or dry herbs instead of salt to add more flavor to your food.



Alcohol Safety

Drinking alcohol and using certain diabetes medications (such as insulin or sulfonylureas) can put you at risk for low blood glucose. This can be an unsafe combination.

If your diabetes is well-managed and you have discussed the risks of drinking alcohol with your medical provider, you may be able to drink on occasion, in moderation, and with a meal. However, you must remember to check your blood glucose more often for safety.

- Do not drink alcohol on an empty stomach
- For women, one alcoholic beverage per day, at most
- For men, two alcoholic beverages per day, at most

One drink is equal to the following:

Beer = 12 oz. (15 carbohydrates),
wine = 5 oz., distilled = 1.5 oz.



Being Active

The benefits of regular physical activity are endless! Activity will help manage your blood glucose, improve your blood pressure, reduce your risk of heart disease, help with weight loss, and improve your sense of well-being.

Planning to Exercise When You Have Diabetes

- Talk with your healthcare provider before starting or changing your exercise program
- Choose different forms of exercise that fit your lifestyle, including aerobic, stretching, and strengthening exercises, as well as activities like housework, yard work, gardening, walking upstairs, etc.
- Increase activity gradually
- Check your blood glucose when first beginning an exercise program to see how activity affects your blood glucose level
- Consider checking your blood glucose before and after exercise on occasion; avoid exercise if glucose is over 300 mg/dl
- If glucose is less than 100 mg/dl, have a snack with carbohydrates and protein before exercise
- Carry an emergency sugar source to treat low blood glucose
- Carry snacks with carbohydrates and protein for longer or more strenuous exercise
- Drink plenty of water before and during activity
- Carry medical alert or identification, cell phone, or take a friend along
- Wear comfortable socks and closed-toed shoes to protect your feet
- Keep feet warm and dry

Physical activity helps manage blood glucose. It can also delay or prevent complications of diabetes. Every step counts!

Exercise Recommendations

- 150 minutes of moderate or 75 minutes of vigorous activity per week.
- If you are not able to exercise, talk with your healthcare provider about other ways to be active. Be as active as you are able.
- If you have a sedentary lifestyle, try to get up and move at least every 30 minutes.
- Try to do muscle-strengthening activities at least 2 times per week.
- Try to achieve 10,000 steps per day or determine a goal that works best for you.
- If you need help getting started with exercise, speak to your healthcare provider.



Taking Medications

There are many medications to help keep your blood glucose in control. If needed, your healthcare provider or diabetes educator can help you get started with medications.

If you have a procedure or surgery scheduled, be sure to discuss medication needs with your healthcare provider prior, as oral medications and non-insulin injectables are often stopped in order to give insulin when you are hospitalized. The oral agents and non-insulin injectables can be started again once you are discharged.

Medication Guidelines

- Call your healthcare provider if you have low blood glucose or any of these symptoms:
 - Nausea or vomiting
 - Stomach pain
 - Hives or skin rash
 - Dizziness
 - Unusual bruising or bleeding
 - Chest pain or shortness of breath
- Take your medications as directed; missing or delaying medication can affect your blood glucose. Some medications must be taken before or with meals; ask your healthcare provider what to do if your eating habits change often, or if you skip or delay meals
- Read the label on the bottle to check the dose, expiration date, and special instructions



Oral Diabetes Medications (Pills, Tablets)

The charts on pages 23–27 give basic information about many of the typical medications that are prescribed for diabetes management. There are also medications that may be a combination of the drugs in the chart on page 25.



<p>ALPHA-GLUCOSIDASE INHIBITORS</p> <ul style="list-style-type: none"> • Acarbose (Precose) • Miglitol (Glyset) 	<p>WHAT IT DOES</p> <ul style="list-style-type: none"> • Slows blood glucose rise after eating <p>WHAT YOU SHOULD KNOW</p> <ul style="list-style-type: none"> • Risk of low blood glucose if taken with certain diabetes medicines • Take with first bite of a meal
<p>BIGUANIDES</p> <ul style="list-style-type: none"> • Glucophage XR • Metformin (Glucophage) • Riomet (liquid Metformin) 	<p>WHAT IT DOES</p> <ul style="list-style-type: none"> • Prevents liver from making extra glucose <p>WHAT YOU SHOULD KNOW</p> <ul style="list-style-type: none"> • Risk of low blood glucose if taken with certain diabetes medicines • Take with food to reduce gastrointestinal side effects
<p>DPP-4 INHIBITORS</p> <ul style="list-style-type: none"> • Saxagliptin (Onglyza) • Sitagliptin (Januvia) • Linagliptin (Tradjenta) • Alogliptin (Nesina) 	<p>WHAT IT DOES</p> <ul style="list-style-type: none"> • Lowers blood glucose when it is high, especially after eating • Lowers production of glucose by the liver <p>WHAT YOU SHOULD KNOW</p> <ul style="list-style-type: none"> • Take with or without food
<p>MEGLITINIDES</p> <ul style="list-style-type: none"> • Nateglinide (Starlix) • Repaglinide (Prandin®) 	<p>WHAT IT DOES</p> <ul style="list-style-type: none"> • Helps pancreas produce more insulin <p>WHAT YOU SHOULD KNOW</p> <ul style="list-style-type: none"> • Do not take if you skip a meal • May cause low blood glucose • Take right before meals
<p>SGLT2 INHIBITORS</p> <ul style="list-style-type: none"> • Canagliflozin (Invokana) • Dapagliflozin (Farxiga) • Empagliflozin (Jardiance) • Ertugliflozin (Steglatro) 	<p>WHAT IT DOES</p> <ul style="list-style-type: none"> • Causes glucose to be excreted in the urine <p>WHAT YOU SHOULD KNOW</p> <ul style="list-style-type: none"> • Drink plenty of water to keep from getting dehydrated • May contribute to urinary tract infections and low blood pressure
<p>SULFONYLUREAS</p> <ul style="list-style-type: none"> • Glimpiride (Amaryl) • Glipizide (Glucotrol, Glucotrol XL) • Glyburide (Glynase, DiaBeta) 	<p>WHAT IT DOES</p> <ul style="list-style-type: none"> • Helps pancreas produce more insulin <p>WHAT YOU SHOULD KNOW</p> <ul style="list-style-type: none"> • Use caution if you skip a meal • May cause low blood glucose • Take right before meals unless otherwise instructed by your healthcare provider
<p>THIAZOLIDINEDIONES (TZD)</p> <ul style="list-style-type: none"> • Pioglitazone (ACTOS®) • Rosiglitazone (Avandia) 	<p>WHAT IT DOES</p> <ul style="list-style-type: none"> • Helps your own insulin work better (less insulin resistance) <p>WHAT YOU SHOULD KNOW</p> <ul style="list-style-type: none"> • May take six weeks for full effect • Take with or without food • Many serious side effects such as bladder cancer and heart failure

Insulin

Insulin is used to treat type 1 and 2 diabetes. It is given by injection from a vial or pen under the skin, or delivered continuously by an insulin pump. Some insulins work fast and do not last long, while others work slowly but last longer.

Talk to your provider regarding the best delivery option for your needs.

- **Onset of action** = when insulin begins to take effect
- **Peak action** = when insulin has its maximum effect
- **Duration of action** = how long insulin has an effect

TYPE AND NAME OF INSULIN	ONSET OF ACTION	PEAK ACTION	DURATION OF ACTION	CONSIDERATIONS
Very rapid-acting <ul style="list-style-type: none"> • Aspart (Fiasp) • Lispro-aabc (Lyumjev) 	5–15 minutes	1½–2½ hours	5–7 hours	
Rapid-acting <ul style="list-style-type: none"> • Aspart (Novolog) U100 • Glulisine (Apidra) U100 • Lispro (Admelog) U100 • Lispro (Humalog) U100 • Lispro (Humalog) U200 	15–20 minutes	1–3 hours	3–7½ hours	<ul style="list-style-type: none"> • Clear • Take 0–15 minutes before a meal • Cannot be mixed with other types of insulin
Short-acting <ul style="list-style-type: none"> • Humulin-R/Regular U100 • Novolin-R/Regular U100 	30 minutes	2–4 hours	4–8 hours	<ul style="list-style-type: none"> • Clear • Take 30 minutes before a meal
Short/Intermediate-acting <ul style="list-style-type: none"> • Humulin-R/Regular U500 	30 minutes	2–4 hours	20–22 hours	<ul style="list-style-type: none"> • Take 30 minutes before a meal
Intermediate-acting (NPH) <ul style="list-style-type: none"> • Humulin-N • Novolin-N 	90 minutes to 4 hours	4–12 hours	10–24 hours	<ul style="list-style-type: none"> • Cloudy
Long-acting <ul style="list-style-type: none"> • Detemir (Levemir) U100 • Glargine (Lantus) U100 • Glargine (Toujeo) U300 • Glargine (Basaglar) U100 • Glargine (Semglee) U100 • Glargine (Rezvoglar) U100 • Degludec (Tresiba) U100 	1–4 hours	No or minimal peak	Up to 24 hours Up to 42 hours (for Degludec)	<ul style="list-style-type: none"> • Clear • Cannot be mixed with other types of insulin
Premixed: Rapid and intermediate-acting <ul style="list-style-type: none"> • Humalog®-Mix 50/50 • Humalog®-Mix 75/25 • NovoLog®-Mix 70/30 	15–30 minutes	1–6½ hours	18–24 hours	<ul style="list-style-type: none"> • Cloudy
Premixed: Short and intermediate-acting <ul style="list-style-type: none"> • 70/30: NPH 70% + Reg 30% • 50/50: NPH 50% + Reg 50% 	30 minutes	2–12 hours	18–24 hours	<ul style="list-style-type: none"> • Cloudy

Tips When Taking Insulin

- Clean vial or insulin pen with alcohol before drawing insulin
- Make sure the dose is accurate
- Make sure skin is clean and dry
- It is recommended that you inject in the abdomen (make sure you rotate the injection site each time)
- Tell your healthcare provider if you notice leaking of clear fluid at the injection site, especially if using insulin pens
- Check expiration date on the vial/pen and store unopened vials/pens in refrigerator; once opened, keep clean, dry, and at room temperature
- Keep an extra supply of insulin, syringes or pens, and needles with you at all times
- As a rule, change your insulin vial or insulin pen every month
- Discard all needles, syringes, and lancets in special “sharps” containers and sites; do NOT throw them in the garbage

Insulin/Injectable Combos

DRUG/NAME	COMBINES	CONSIDERATIONS / SIDE EFFECTS
IdegLira (Xultophy)	Insulin degludec (IDeg or Tresiba) Ultra long insulin + Liraglutide (Victoza) GLP-1 Receptor Agonist (GLP-1RA)	<ul style="list-style-type: none"> • Xultophy 100/3.6 pre-filled pen: once daily injection • Once opened, good for 21 days (supplied in package of five single-use 3mL pens)
iGlarLixi (Soliqua)	Insulin glargine (Lantus) Basal Insulin + Lixisenatide (Adlykin) GLP-1 Receptor Agonist	<ul style="list-style-type: none"> • Soliqua 100/33 Solostart Pen • Once opened, good for 14 days (supplied in package of five single-use 3mL pens)

Non-Insulin Injectable Medications

There are also injectable medications, which like insulin, are hormones that help manage your blood glucose. These medications work differently than insulin and have different side effects.

DRUG/NAME	FREQUENCY OF INJECTION	WHAT IT DOES	CONSIDERATIONS / SIDE EFFECTS
GLP-1 AGONIST “INCRETIN MIMETIC”			
Dulaglutide (Trulicity)	Once a week	Helps pancreas make more insulin, slows digestion, promotes feeling “full” after eating, prevents glucose release from the liver	May not be appropriate if patient has a history of pancreatitis (inflammation of the pancreas). Contraindicated if personal or family history of Medullary Thyroid Cancer or MEN type 2. Side effects: Nausea, Vomiting, weight loss, injection site reaction, pancreatitis (severe abdominal pain, vomiting)
Exenatide (Byetta)	Twice a day		
Exenatide XR (Bydureon)	Once a week		
Liraglutide (Victoza)	Once a day		
Lixisenatide (Adlyxin)	Once a day		
Semaglutide (Ozempic)	Once a week injection (pre filled pen)		
Semaglutide (Rybelsus)	Daily oral tablet		
AMYLIN MIMETIC			
Pramlintide (Symlin)	Before meals, up to three times a day	Slows digestion, promotes feeling “full” after eating, prevents glucose release from the liver	May need to decrease insulin dose to prevent severe low blood glucose Side effects: nausea, weight loss
DUAL INCRETIN AGONIST			
Tirzepatide (Mounjaro)	Once a week injection (pre filled pen)	Combines both GLP-1 and GIP incretins. Same action profile as GLP-1 RA, with more intensive action profile	Avoid if hx of pancreatitis or family hx of medullary thyroid tumor Side effects: nausea, diarrhea, injection site reactions

Problem Solving

Low Blood Glucose (Hypoglycemia)

Hypoglycemia = blood glucose less than or equal to 70 mg/dl (with or without symptoms), or 70–100 mg/dl with symptoms. It can happen suddenly and is considered an emergency. Below are some of the symptoms that you may experience:

Early Symptoms

- Weakness or fatigue
- Dizziness
- Shaking
- Sweating, or cold skin
- Anxiety, irritability, or nervousness
- Fast heartbeat
- Headache

Later Symptoms

- Numbness around the mouth
- Mental dullness
- Blurred vision
- Personality changes
- Fainting/losing consciousness

Causes

Some causes of hypoglycemia are not eating enough; not eating soon enough after taking medication; taking too much medication (including insulin); doing too much physical activity without enough food; taking certain medications; and vomiting or diarrhea.



Treatment of Hypoglycemia (The Rule of “15”)

- 1 STEP 1: TEST**
Whenever you feel symptoms of hypoglycemia, test your blood glucose right away. If you are not able to test your blood glucose or if you feel too shaky, eat first (see step 2), then test later.
- 2 STEP 2: TREAT**
If your blood glucose reading is 70mg/dl or less, treat with one serving of 15 grams of fast-acting sugar. Each serving below contains 15 grams of fast-acting sugar.
 - 3–4 glucose tablets
 - ½ cup (4 oz.) juice
 - 5 small sugar cubes
 - 6–8 life savers
 - ½ cup (4 oz.) regular soda (not diet!)
 - 1 tablespoon of honey or sugar
 - 2 tablespoons of raisins (mini box size)
 - 1 cup non-fat milk
- 3 STEP 3: REPEAT**
Wait 15 minutes and recheck your blood glucose. If it is still 70 mg/dl or less or you continue to have symptoms, take another treatment of 15 grams of fast-acting sugar. Try not to overeat, which can lead to high blood glucose later. The goal is a blood glucose level above 70mg/dl.

NOTE: If blood glucose is 50mg/dl or less, treat with 30 grams of simple sugar. Glucagon may be needed if not responding. Call 911 after glucagon is injected.

FOLLOW UP

If the next meal is more than 30 minutes away and your blood glucose is above 70 mg/dl, you should eat a small snack. Examples of balanced snacks are:

- ½ sandwich with peanut butter
- 1 piece of fruit with cheese
- 6 crackers with meat, cheese, or peanut butter

If you have multiple low glucose readings in a week, call your medical provider.

HYPOGLYCEMIA PREVENTION

- Carry fast-acting sugar
- Eat at scheduled times
- Take medications as prescribed
- Coordinate physical activity with meals and medication
- If glucose is under 100 mg/dl, eat a snack before exercise or driving

High Blood Glucose (Hyperglycemia)

Hyperglycemia = blood glucose higher than 180 mg/dl or over your target range.

Symptoms

- Increased thirst
- Increased urination
- Dry mouth
- Dry or itchy skin
- Drowsiness or fatigue
- Blurred vision
- More frequent infections
- Sores or cuts that heal slowly
- Excessive hunger
- Unexplained weight loss

Causes

Common causes of hyperglycemia include eating too much, not doing enough physical activity, taking certain medications (steroids), not taking enough diabetes medication, a broken insulin pen or pump, and a reaction to physical stressors (illness, injury, infection, or surgery).

Treatment of High Blood Glucose

- Drink plenty of sugar-free liquids, especially water
- Try to figure out possible reasons and patterns for hyperglycemia
- Call your healthcare provider if your blood glucose is over 250 mg/dl several days in a row, or your blood glucose is over 300 mg/dl twice in a row
- If you use insulin, you may need to check for urine ketones; call your healthcare provider if you have moderate or high ketones (type 1 diabetes only)



Sick Day Guidelines

- When you are sick, you may need more or less insulin; make sure to talk to your healthcare provider before changing or stopping your insulin.
- Test your blood glucose more often; blood glucose tends to go up during illness and times of excessive stress
- Drink plenty of sugar-free clear liquids
- Avoid heavy or greasy foods
- Get plenty of rest
- If you have type 1 diabetes, you may need to check for urine ketones
- If you live alone, ask someone to check on you every few hours

When to Call your Healthcare Provider

- If you cannot keep food, liquids, or medication down
- If blood glucose is under 70 mg/dl or over 300 mg/dl for more than a day
- If you have a fever over 100.4 F (38° C)
- If you have trouble breathing
- If you have severe abdominal pain
- If you feel sleepy or confused
- If you have moderate or large ketones (type 1 diabetes only) in the urine or blood

What to Drink and Eat When Sick

- Eat small amounts of easy-to-digest foods containing carbohydrates frequently, every one to two hours
 - ½ cup fruit juice > ½ cup regular soda (caffeine-free)
 - ½ cup Jell-O > 1 cup Gatorade®
 - 1 double popsicle > ½ cup regular ice cream
 - ¼ cup sherbet > 1 slice toast
 - ½ cup cooked cereal > 6 saltine crackers
 - ½ cup soft pudding > ½ cup yogurt
 - 1 cup cream-based soup
- You can have unlimited amounts of these sugar-free clear liquids: water, diet soda, diet Kool-Aid, Crystal Light, decaffeinated teas, and broth

Being in the hospital can also have an impact on your blood glucose. Whether you have just been diagnosed or have had diabetes for some time, conditions such as stress, injury, trauma, or surgery may make it more difficult to manage blood glucose levels. While in the hospital, good diabetes management can help to restore your health more quickly.

Reducing Risks

Prevention Complications

Prevent serious long-term complications by learning how to manage your blood glucose with the help of your diabetes healthcare team. Refer to the “My Diabetes Goals and Progress” on page 34 for recommendations.

Complications of Diabetes

- Kidney problems (nephropathy)
- Eye problems (retinopathy)
- Nerve problems (neuropathy) — change in sensation, especially in lower extremities
- Hardening of the arteries (atherosclerosis)

Know your ABC's

A = A1C

B = Blood pressure

C = Cholesterol

A1C Blood Test

The A1C test shows your average blood glucose (reported as a percent) over the past two to three months. Your healthcare team will give you a target A1C to keep you healthy and lower your risk of complications from diabetes. The American Diabetes Association (ADA) recommends a target A1C of 7% for most patients and re-checking 2–4 times per year.

Blood Pressure

High blood pressure can lead to problems with your circulation, which include stroke and heart attack. Managing your blood pressure is important for staying healthy with diabetes.

Many people use medications, but diet, activity, and stress management also play big parts in keeping your blood pressure at a good level.

The American Diabetes Association recommends a blood pressure under 140/90, or a number that your healthcare team decides is best for you.

Cholesterol

Your lifestyle is important for keeping your cholesterol at goal. Good nutrition and regular physical activity can help keep your cholesterol at healthy levels. Some people will also need to use medications called “statins” to help lower their cholesterol. Your healthcare team will decide what your cholesterol goals should be.

A1C (%)	AVERAGE BLOOD GLUCOSE (MG/DL)
6	126
7	154
8	183
9	212
10	240
11	269
12	298
13	316

Taking Care of Yourself

Dental and Gum Care

People with diabetes have a higher risk of dental disease, but with proper care this can be prevented.

- Brush your teeth twice a day, and floss daily
- Have a dental check-up every six months, or sooner if any problems

Eye Care

Over time, high blood glucose and blood pressure can damage the eye, leading to a condition called “retinopathy,” and eventually blindness. Taking good care of your diabetes can prevent this.

- Have dilated eye exams with an eye healthcare provider (ophthalmologist) once a year or more if needed

Foot Care

It is very important to take care of your feet when you have diabetes. Many people fear amputation, but this is preventable if you take action early on to keep your blood glucose at a healthy level.

- Check your feet daily
- Look for cuts, sores, redness, swelling, scratches, cracks, calluses, blisters, or changes in color, shape, or temperature
- Keep feet clean, dry, and warm
- Be careful not to burn your feet, and avoid soaking them
- Avoid lotion in between the toes
- You may need to use a mirror to inspect the soles of your feet
- Cut toenails straight across and soften corners with an emery board to avoid ingrown toenails
- Use caution going barefoot, even indoors, if you have any loss of sensation in your feet
- Use comfortable, well-fitting shoes and socks that are not too tight
- Daily exercise can help circulation in your legs and feet
- You may need to see a podiatrist (foot doctor) to cut and file your toenails safely
- Remove your shoes and socks every time you see your healthcare provider so your feet can be examined

Skin Care

With diabetes, it is important to take care of your skin to prevent infection.

- Bathe daily with mild soap and lukewarm water
- Apply a small amount of moisturizing lotion while your skin is moist
- Wear gloves when you garden or do things that may injure your hands
- Use sunscreen to avoid sunburn
- Avoid scratches, punctures, and other injuries
- Clean cuts and scrapes right away and cover them with a bandage

Healthy Coping

Emotional Health in Diabetes

Living with any long-term health condition, such as diabetes, can be a source of stress. It is common to feel angry, frustrated, fearful, worried, and confused. Chronic stress can lower the immune system's ability to protect you from infections, raise your blood pressure and blood glucose, and make you feel unwell. Learn tools to reduce stress and take time to relax and do things you enjoy. Reach out for support from family, friends, and your healthcare team or join our support group. You are not alone in dealing with diabetes, so don't be afraid to ask for help if you need it.

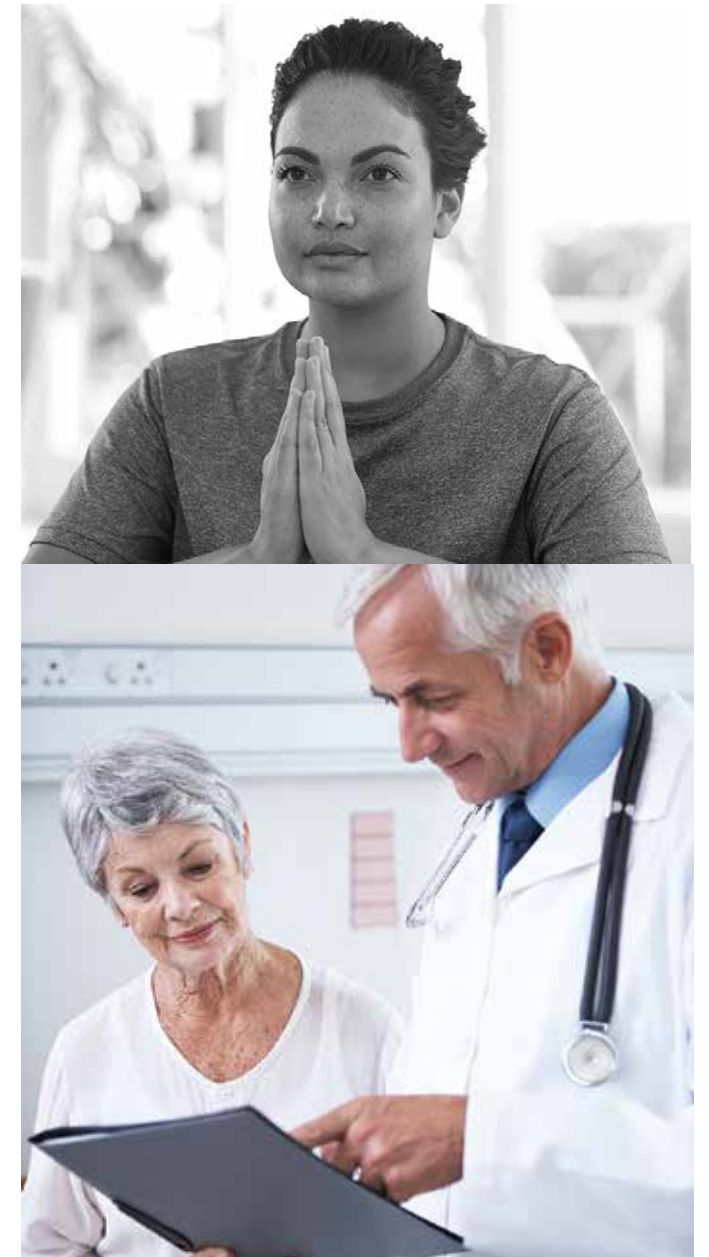
Stay involved: Learn as much as you can about diabetes. Ask questions. Keep track of your tests and visits. Talk to your healthcare provider about taking diabetes education classes or meeting with a diabetes educator, both of which are offered at our center.

You are in charge! Nobody else can do it for you. Work closely with your healthcare team (doctors, nurses, diabetes educators, dietitians, and pharmacists) to create a plan that works best for you.

Helpful Tips

- Get plenty of rest and sleep
- Take time to relax; helpful relaxation techniques include yoga, tai chi, meditation, prayer, deep breathing, and visualization
- Make time to do things you enjoy
- Laughter is good medicine
- Get support and ask for help if you need it
- You may be depressed if you have any of these symptoms for more than two months:
 - > Feeling very sad
 - > Loss of interest in life
 - > Sleeping problems
 - > Inability to concentrate
 - > Eating too much or too little
 - > Weight loss or gain

If you think you are depressed, talk with your healthcare provider and/or a counselor right away.



Resources & Tools to Manage Your Diabetes

Helpful Resources

American Diabetes Association

www.diabetes.org
1-800-342-2383

American Association of Diabetes Educators

www.diabeteseducator.org
1-800-832-6874

American Dietetic Association

www.eatright.org
1-800-366-1655

American Heart Association

www.americanheart.org
1-800-AHA-USA-1 (800-242-8721)

American Association of Clinical

Endocrinologists
www.aace.com

Diabetes Health e-Newsletter

www.diabeteshealth.com

National Diabetes Education Program (NDEP)

www.ndep.nih.gov
1-800-438-5383

National Diabetes Information Clearinghouse

www.diabetes.niddk.nih.gov

Centers for Disease Control and Prevention

www.cdc.gov

Medicare's coverage of diabetes supplies

www.medicare.gov
1-800-MEDICARE (1-800-633-4227)

(English and Spanish)

Juvenile Diabetes Research Foundation (JDRF)

www.jdrf.org
1-800-533-CURE (2873)

How to live well with diabetes

www.dlife.com

Stop Smoking information

1-800-NO-BUTTS (1-800-662-8887)

Sharps Disposal: local pharmacies, garbage service, or public health department

www.cdc.gov/needledisposal
www.safeneedledisposal.org
www.earth911.org
www.epa.gov/osw/nonhaz/industrial/medical/med-govt.pdf

My Medical Information

My Healthcare Providers

Primary Care Provider: _____

Diabetes Specialist (Endocrinologist): _____

Diabetes Educator: _____

Dietitian: _____

Eye Specialist (Ophthalmologist): _____

Foot Specialist (Podiatrist): _____

Dentist: _____

Next Checkup Dates: _____

My Medications

MEDICATION	DOSAGE	WHEN TO TAKE	WITH OR WITH OUT FOOD
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

My Diabetes Goals and Progress

TEST	HOW OFTEN	ADA TARGETS AND RECOMMENDATIONS	CURRENT	MY GOAL
A1C	Every 3–6 months	Less than 7%; ideally 6.5% or less		
Blood Pressure	Each visit	Less than 140/90		
LDL (“bad” cholesterol)	Every year	Less than 100 in absence of overt Coronary Artery Disease (CAD) Less than 70 in presence of CAD		
HDL (“good” cholesterol)	Every year	Men over 40; Women over 50		
Triglycerides	Every year	Less than 150		
Urine micro-albumin	Every year	Less than 30		
Weight	Every year	BMI less than 25		

IMMUNIZATIONS	HOW OFTEN	DATE RECEIVED
DPT	Every 10 years	
Influenza (flu)	Every year	
Pneumonia	Once ages 19–64; repeat once after age 65	
Zoster (shingles)	Once after age 60	
Hepatitis B	As needed	

	HOW OFTEN	CURRENT
EYES		
Dilated Eye Exam (Ophthalmologist)	Each year	
FEET		
Foot Inspection	Each visit	
Foot Exam (Podiatrist)	Every year	
TEETH/MOUTH		
Dental Exam	Every 6–12 months	
OTHER		
Diabetes Educator Visit*	Initially; Annual follow-ups recommended	
Diabetes Dietitian Visit*		

*To learn more about diabetes or seek help in managing this condition, call the Braden Diabetes Center at 415-925-7370. Most insurance companies, including Medicare, cover initial and ongoing diabetes and nutrition education with a referral from your provider.

My Next Steps

Goal: _____

Action Plan: _____

Goal: _____

Action Plan: _____

Goal: _____

Action Plan: _____

Goal: _____

Action Plan: _____

Goal: _____

Action Plan: _____

Braden Diabetes Center Appointments

Date: _____ Time: _____ am/pm

Date: _____ Time: _____ am/pm

Date: _____ Time: _____ am/pm

Date: _____ Time: _____ am/pm

Date: _____ Time: _____ am/pm

Date: _____ Time: _____ am/pm

Notes



Braden Diabetes Center

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