



Patient education: Gestational diabetes (Beyond the Basics)

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WHAT IS GESTATIONAL DIABETES?

Gestational diabetes is a type of diabetes that can develop during pregnancy in individuals who don't already have diabetes. The Centers for Disease Control and Prevention (CDC) estimates that gestational diabetes affects between 2 and 10 percent of pregnancies in the United States. It usually goes away after delivery.

WHY DOES GESTATIONAL DIABETES OCCUR?

Insulin is a hormone that enables glucose (sugar) in the bloodstream to enter the cells of the body. Sugar is the source of energy for cells. During pregnancy, the fetus and placenta produce hormones that make the pregnant individual resistant to their own insulin. Most pregnant individuals can produce enough extra insulin to compensate for this and thus keep their blood sugar level normal. However, some cannot, so their blood sugar level rises, resulting in gestational diabetes.

WHY IS GESTATIONAL DIABETES IMPORTANT?

Diagnosis and treatment of gestational diabetes is important to minimize the risk of complications from the disorder. Complications of gestational diabetes can include:

- Giving birth to a large baby (weighing more than 9.0 lbs or 4.1 kg), which can increase the risk of injury to the pregnant individual or baby during birth and increase the chance of needing a cesarean birth. Large babies born to individuals with gestational diabetes can be at increased risk of developing diabetes and obesity during their lifetime.
- Newborn hypoglycemia (low blood sugar in the newborn period).
- Preeclampsia (a type of high blood pressure during pregnancy). (See "[Patient education: Preeclampsia \(Beyond the Basics\)](#)".)
- Stillbirth (a baby who dies before being born), a complication which fortunately is now rare in individuals with gestational diabetes because of good control of blood sugars and careful monitoring of them and their babies during pregnancy.

Furthermore, those with gestational diabetes are at high risk of developing pre-diabetes (impaired glucose tolerance) or type 2 diabetes when they are no longer pregnant, so they need to be tested for diabetes postpartum and in the years after giving birth.

More detailed information about gestational diabetes is available by subscription. (See "[Gestational diabetes mellitus: Screening, diagnosis, and prevention](#)" and "[Gestational diabetes mellitus: Glucose management, maternal prognosis, and follow-up](#)".)

GESTATIONAL DIABETES TESTING

We recommend that all pregnant individuals get tested for gestational diabetes.

Timing of test — Testing for gestational diabetes is usually done once between 24 and 28 weeks of pregnancy. However, testing for diabetes may be done as early as your first prenatal visit if you have risk factors for diabetes, such as:

- A history of gestational diabetes in a previous pregnancy
- Obesity
- A strong family history of diabetes
- Polycystic ovarian syndrome (PCOS)

Test procedure — There are a few ways to test for gestational diabetes.

Two-part test — On the day of the screening test, you can eat and drink normally. You will be given 50 grams of glucose, usually in the form of a specially formulated orange or cola drink. You should drink the entire amount within a few minutes. One hour later, you will have a blood test to measure your blood sugar level.

If your blood sugar level is normal, no other tests are done.

Most doctors and nurses consider your blood sugar level in the screening test to be high if it is above 130 to 140 mg/dL (7.2 to 7.7 mmol/L). If your blood sugar level is very high (≥ 200 mg/dL [11.1 mmol/L]), there is a very strong chance that you have gestational diabetes.

If your screening test blood sugar level is high but not very high, you will need another test to know for sure if you have gestational diabetes. This test is called an oral glucose tolerance test (GTT). The test is done by measuring your blood sugar level before you eat or drink anything in the morning (fasting), then again one, two, and three hours after you drink a glucose drink that contains 100 grams of glucose (twice the amount in the one-hour test). Similar to the one-hour test, this is usually in the form of a specially formulated orange, lemon-lime, or cola drink.

Gestational diabetes is diagnosed if you have **two or more** elevated blood sugar values during the GTT, although some doctors may recommend treatment after a single elevated value, especially if you have other signs of gestational diabetes (a big fetus or extra fluid around your fetus).

One-part test — Some doctors and nurses test for diabetes with a one-part test. The test is done by measuring your blood sugar level before you eat or drink anything in the morning (fasting), then again one and two hours after you drink a glucose drink that contains 75 grams of glucose. This is usually in the form of a specially formulated orange, lemon-lime, or cola drink.

Gestational diabetes is diagnosed if you have **one or more** elevated blood sugar values.

GESTATIONAL DIABETES TREATMENT

After you are diagnosed with gestational diabetes, you will need to make changes in what you eat and learn to check your blood sugar level. You may also be advised to get more exercise. If changing your diet and activity doesn't result in normal blood sugar levels, you will also need to learn how to give yourself insulin injections or take a pill to lower your blood sugar levels. (See "[Gestational diabetes mellitus: Glucose management, maternal prognosis, and follow-up](#)".)

The main goal of treatment for gestational diabetes is to reduce the risk of complications such as those mentioned above. One of the main complications is an overly large baby (weighing more than 9 to 10 lbs at birth). You are more likely to have a large baby if your blood sugar levels are higher than normal during the pregnancy. A large baby can be difficult to deliver vaginally. The baby can get stuck after the head is born (called "shoulder dystocia"). This increases the risk of injury to the baby (eg, broken bones or nerve injury) and to the

mother (eg, more severe vaginal tears). If labor does not progress normally, you may need a cesarean birth.

Eating plan — The first treatment for gestational diabetes is eating right. To help you achieve the changes you should make in your diet, you will meet with a dietitian, nurse, or certified diabetic educator (a nurse or dietician that specializes in diabetes). The general guidelines below will help you until you receive your individualized food plan:

- Continue to eat a healthy pregnancy diet.
- Avoid sweet desserts and presweetened beverages. This includes candy, cake, cookies, ice cream, donuts, jams and jellies, syrups, and sweet sauces. Also avoid adding sugar to your food or drinks, sweetened soda, punch, sweet tea, and other fruity beverages.
- You may use the alternative sweeteners aspartame (NutraSweet), sucralose (Splenda), stevioside (Stevia), or acesulfame potassium (Sunnet). Moderation is suggested. These sweeteners have not been linked to an increased risk of congenital anomalies (birth defects).
- Include protein with limited saturated fat, such as trimmed red meat and pork, chicken, and fish (limit types and amounts of fish due to mercury concerns). Other protein foods like cheese, eggs, nuts, seeds, and peanut butter are also good for you and your baby.
- Eat moderate portions of carbohydrate (natural starches and sugars) containing foods.
 - Starchy foods (eg, breads, rice, pasta, potato, corn, cereals) – Choose whole grains over refined grains when possible.
 - Fruits and fruit juices – Limit fruit servings to a small piece of fruit or approximately 1 cup at a time. Avoid fruit juice or limit 100 percent fruit juice to one-half cup (4 ounces) per serving. Many dietitians recommend avoiding fruits for breakfast because of concerns about higher blood sugar levels in the early morning.
 - Milk and yogurt – Skim or 1 percent milk is healthiest. Choose low-fat yogurt that is plain, "light," or Greek style.
- Many vegetables are low in sugar and carbohydrates. Include plenty of salads, greens (spinach, collards, kale), broccoli, carrots, green beans, tomatoes, onions, mushrooms, and other vegetables you enjoy. Half of the plate at your meals can be non-starchy vegetables.
- Use healthy fats, like olive or canola oil.

Blood sugar monitoring — You will learn how to check your blood sugar level and record the results ([figure 1](#)). Instructions for choosing a blood sugar meter, checking blood sugar levels at home, and ways to record the results are discussed separately. (See "[Patient education: Glucose monitoring in diabetes \(Beyond the Basics\)](#)".)

Initially, most individuals should check their blood sugar level four times per day:

- Before eating in the morning
- One or two hours after the first bite of food with breakfast, lunch, and dinner

This information can help to determine whether your blood sugar levels are on target. If your levels stay higher than they should be, your doctor will probably recommend that you start using insulin. (See '[Insulin](#)' below.)

Exercise — Although exercise is not a necessary part of gestational diabetes treatment, it might help to control blood sugar levels. If you were exercising before, you should continue after being diagnosed with gestational diabetes.

If you did not previously exercise, ask your doctor or nurse if exercise is recommended. Most individuals who do not have medical or pregnancy-related complications are able to exercise, at least moderately, throughout their pregnancy. Walking is a great form of exercise for those starting an exercise regimen.

Insulin — Approximately 15 percent of patients with gestational diabetes will require insulin. Insulin is a medicine that helps to reduce blood sugar levels and can reduce the risk of gestational diabetes-related complications. Insulin is the most common medicine for treating gestational diabetes.

You must give insulin by injection because it does not work when it is taken by mouth. Most pregnant people start by giving one to two shots of insulin per day. If your blood sugar levels are high after eating, you may need to give yourself a shot three or four times per day. Instructions for drawing up and giving insulin shots are available separately. (See "[Patient education: Type 2 diabetes: Insulin treatment \(Beyond the Basics\)](#)".)

If you take insulin, you should check your blood sugar level at least four times per day. You also need to write down your results (or store them in the meter) and how much insulin you took and review these records at each prenatal visit or more frequently based on your doctor's recommendation ([figure 1](#)). Keeping accurate records helps to adjust insulin doses and can decrease the risk of complications.

If you take insulin, you should also:

- Eat three small-sized meals and three to four healthy snacks.

- Eat every two to three hours to space food evenly throughout your day.
- Do not skip meals or snacks. The bedtime snack is especially important to help keep your fasting (first blood sugar of the day before eating) in range.

Oral diabetes medicines, such as those taken by people with type 2 diabetes, are sometimes used during pregnancy in the United States. We prefer insulin therapy for pregnant patients with diabetes who cannot control blood glucose levels adequately by their diet (nutritional therapy). Insulin is effective and safe and does not cross the placenta to the fetus. Most oral diabetes medicines pass from the pregnant individual to their baby through the placenta; while they have not been shown to harm the fetus or newborn, it is not known if there are longer term effects on children. There are studies underway to help answer this question. However, oral anti-hyperglycemic agents are a reasonable alternative for individuals who will not take, or are unable to comply with, insulin therapy, as long as they understand the lack of information on long-term risks or benefits.

MONITORING DURING PREGNANCY

Prenatal visits — Most pregnant individuals who develop gestational diabetes have more frequent prenatal visits (eg, once every week or two), especially if insulin is used. The purpose of these visits is to monitor your and your baby's health, discuss your diet, review your blood sugars, and adjust your dose of insulin (if you are taking it) to keep your blood sugar levels near normal. It is common to change the dose of insulin as the pregnancy progresses. You may also be asked to have one or two ultrasound examinations to check on the growth and size of the baby. (See "[Gestational diabetes mellitus: Obstetric issues and management](#)".)

Nonstress testing — You may need tests to monitor the health of the baby during the later stages of pregnancy, especially if your blood sugars have been high, you are using insulin, or if you have any pregnancy-related complications (eg, high blood pressure). The most commonly used test is the nonstress test. This test is discussed in a separate topic review. (See "[Patient education: Postterm pregnancy \(Beyond the Basics\)](#)".)

LABOR AND DELIVERY WITH GESTATIONAL DIABETES

If your blood sugar levels are close to normal during pregnancy and you have no other complications, the ideal time to give birth is between 39 and 40 weeks of pregnancy, no later than your due date.

If you do not give birth by your due date, you may be offered induction of labor or additional testing to monitor your and your baby's health. (See "[Patient education: Postterm pregnancy](#)".)

([Beyond the Basics](#)).)

In most individuals with gestational diabetes and a normal-size baby, there are no advantages to a cesarean over a vaginal birth, although cesarean may be needed in any pregnancy, especially with a first baby. Those with a very large baby may be offered cesarean birth before labor starts. The risks and benefits of cesarean birth are discussed separately. (See "[Patient education: C-section \(cesarean delivery\) \(Beyond the Basics\)](#)".)

Your blood sugar levels will be monitored during labor. Most individuals have normal blood sugar levels during labor and do not need any insulin. Insulin is given if your blood sugar level becomes high. High blood sugar levels during labor can cause problems in the baby, both before and after delivery. (See "[Preexisting \(pregestational\) and gestational diabetes: Intrapartum and postpartum glucose management](#)".)

AFTER-DELIVERY CARE

After giving birth, most individuals with gestational diabetes have normal blood sugar levels and do not require further treatment with insulin. You can return to your prepregnancy diet, and you are encouraged to breastfeed. (See "[Patient education: Deciding to breastfeed \(Beyond the Basics\)](#)".)

However, your doctor may check your blood sugar level the day after delivery to be sure that it is normal or near normal. Pregnancy itself does not increase the risk of developing type 2 diabetes. However, having gestational diabetes does increase your risk of developing type 2 diabetes later in life.

After you deliver, you should have testing for type 2 diabetes. Typically, this is done between 4 and 12 weeks postpartum, ideally prior to your postpartum check-up. But it may be done in the hospital before you are discharged. Testing usually includes a two-hour glucose tolerance test (GTT) so that you are tested for both pre-diabetes and diabetes.

Risk of recurrent gestational diabetes — One-third to two-thirds of individuals who have gestational diabetes in one pregnancy will have it again in a later pregnancy. If you are overweight or obese, weight reduction through diet and exercise can reduce this risk.

Risk of developing type 2 diabetes — Individuals with gestational diabetes have an increased risk of developing type 2 diabetes later in life, especially if they have other risk factors (eg, family history of type 2 diabetes).

The risk of developing type 2 diabetes is greatly affected by body weight. Individuals with obesity have a 50 to 75 percent risk of developing type 2 diabetes, while this risk is less-than-

25 percent in those who are a normal weight. If you are overweight or obese, you can reduce your risk of type 2 diabetes by losing weight and exercising regularly.

The American Diabetes Association (ADA) recommends that all persons with a history of gestational diabetes have testing for type 2 diabetes **every one to three years after their initial post-pregnancy test for diabetes**. If you have elevations in your blood sugars in the pre-diabetes range at the time of your postpartum screening, the ADA recommends testing yearly testing. It is also recommended that you work with your primary care provider to eat a healthy diet, lose any excess weight, and exercise regularly to help decrease your risk of developing type 2 diabetes.

Cardiovascular disease — Individuals who have had gestational diabetes in the past are at increased risk of developing cardiovascular disease, including heart attack and stroke. While this is mostly tied to the risk of type 2 diabetes (see above), even those who do not develop type 2 diabetes appear to have a small increase in their risk of heart disease later in life. Continuing to make healthy lifestyle choices such as eating a balanced diet, exercising regularly, and avoiding smoking can help minimize this risk. (See "[Patient education: Diet and health \(The Basics\)](#)".)

Birth control — Individuals with a history of gestational diabetes can use any type of birth control after pregnancy. A review of all of the birth control options is available separately. (See "[Patient education: Birth control; which method is right for me? \(Beyond the Basics\)](#)".)

WHERE TO GET MORE INFORMATION

Your health care provider is the best source of information for questions and concerns related to your medical problem.

This article will be updated as needed on our web site (www.uptodate.com/patients). Related topics for patients, as well as selected articles written for health care professionals, are also available. Some of the most relevant are listed below.

Patient level information — UpToDate offers two types of patient education materials.

The Basics — The Basics patient education pieces answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials.

[Patient education: Gestational diabetes \(The Basics\)](#)

Beyond the Basics — Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are best for patients who want in-depth information and are comfortable with some medical jargon.

Patient education: Preeclampsia (Beyond the Basics)

Patient education: Glucose monitoring in diabetes (Beyond the Basics)

Patient education: Type 2 diabetes: Insulin treatment (Beyond the Basics)

Patient education: Postterm pregnancy (Beyond the Basics)

Patient education: C-section (cesarean delivery) (Beyond the Basics)

Patient education: Deciding to breastfeed (Beyond the Basics)

Patient education: Birth control; which method is right for me? (Beyond the Basics)

Professional level information — Professional level articles are designed to keep doctors and other health professionals up-to-date on the latest medical findings. These articles are thorough, long, and complex, and they contain multiple references to the research on which they are based. Professional level articles are best for people who are comfortable with a lot of medical terminology and who want to read the same materials their doctors are reading.

Clinical presentation, diagnosis, and initial evaluation of diabetes mellitus in adults

Advancing maternal age: Pregnancy outcomes and management

Infants of mothers with diabetes (IMD)

Preexisting (pregestational) diabetes mellitus: Obstetric issues and pregnancy management

Gestational diabetes mellitus: Screening, diagnosis, and prevention

Gestational diabetes mellitus: Glucose management, maternal prognosis, and follow-up

Gestational diabetes mellitus: Obstetric issues and management

Preexisting (pregestational) and gestational diabetes: Intrapartum and postpartum glucose management

The following organizations also provide reliable health information.

- National Library of Medicine

(www.nlm.nih.gov/medlineplus/ency/article/000896.htm, available in Spanish)

- National Institute of Diabetes and Digestive and Kidney Diseases

(<https://www.niddk.nih.gov/health-information/diabetes/overview/what-is-diabetes/gestational>)

- American Diabetes Association (ADA)

(800)-DIABETES (800-342-2383)

(www.diabetes.org/diabetes/gestational-diabetes)

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