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Patient education: Gestational diabetes (Beyond the Basics)

Author: Celeste Durnwald, MD**Section Editors:** David M Nathan, MD, Erika F Werner, MD, MS**Deputy Editor:** Vanessa A Barss, MD, FACOG

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INTRODUCTION

Insulin is a hormone whose job is to enable glucose (sugar) in the bloodstream to enter the cells of the body, where sugar is the source of energy. All fetuses (babies) and placentas (afterbirths) produce hormones that make the mother resistant to her own insulin. Most pregnant women produce more insulin to compensate and keep their blood sugar level normal. Some pregnant women cannot produce enough extra insulin and their blood sugar level rises, a condition called gestational 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.

It is important to recognize and treat gestational diabetes to minimize the risk of complications to mother and baby. In addition, it is important for women with a history of gestational diabetes to be tested for diabetes after pregnancy because of an increased risk of developing pre-diabetes and type 2 diabetes in the years following delivery.

More detailed information about gestational diabetes is available by subscription. (See "[Gestational diabetes mellitus: Screening, diagnosis, and prevention](#)".)

GESTATIONAL DIABETES TESTING

We recommend that all pregnant women be tested for gestational diabetes. Identifying and treating gestational diabetes can reduce the risk of pregnancy complications. (See "[Gestational diabetes mellitus: Screening, diagnosis, and prevention](#)".)

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 mother or baby during birth and increase the chance of needing a cesarean birth. Large babies born to mothers with gestational diabetes can be at increased risk of developing diabetes and obesity during their lifetime.
- Stillbirth (a baby who dies before being born), a complication which fortunately is now rare in women with gestational diabetes because of good control of blood sugars and careful monitoring of mothers and babies during pregnancy.
- Neonatal hypoglycemia (low blood sugar in the newborn period).
- Preeclampsia. (See "[Patient education: Preeclampsia \(Beyond the Basics\)](#)".)

Timing of test — Testing for gestational diabetes is usually done between 24 and 28 weeks of pregnancy. However, testing may be done as early as your first prenatal visit if you have risk factors for gestational 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 whole 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 or cola drink. It is important to not limit your diet in the two to three days before the GTT since low food intake may cause the test results to be falsely high.

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 others signs of gestational diabetes (a big fetus or extra fluid around your fetus).

One-part test — Some doctors test for diabetes with a different type of oral GTT. 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 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 you will need to learn to check your blood sugar level. In some cases, 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 and maternal prognosis](#)".)

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 (weighs greater than 9 to 10 lbs at birth). A large baby can be difficult to deliver through the pelvis (called "shoulder dystocia"). A vaginal birth increases the risk of injuring a large baby (eg, broken bones or nerve injury). A large baby is also more likely to cause injury to the mother during the birth (eg, more severe vaginal lacerations).

You are more likely to have a large baby if your blood sugar levels are higher than normal during pregnancy.

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.
 - 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.
- 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 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: Blood glucose monitoring in diabetes \(Beyond the Basics\)](#)".)

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

- Before eating in the morning
- One or two hours after 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 women who do not have medical or pregnancy-related complications are able to exercise, at least moderately, throughout their pregnancy.

Insulin — Approximately 15 percent of women 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 women 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.

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 women with diabetes who cannot control blood glucose levels adequately with nutritional therapy. Insulin is effective and safe and does not cross the placenta to the fetus. The oral diabetes medicines pass from the mother to her 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 women 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 women 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 deliver is between 39 and 40 weeks of pregnancy, no later than your due date.

If you do not deliver by your due date, you may need additional testing to monitor your and your baby's health. (See "[Patient education: Postterm pregnancy \(Beyond the Basics\)](#)".)

In most women 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. 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 women 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 "[Pregestational \(preexisting\) and gestational diabetes: Intrapartum and postpartum glucose management](#)".)

AFTER-DELIVERY CARE

After delivery, most women 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. Testing usually includes a two-hour glucose tolerance test (GTT) so that you are tested for both pre-diabetes and diabetes.

Risk of gestational diabetes — One-third to two-thirds of women 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 type 2 diabetes — Women with gestational diabetes have an increased risk of developing type 2 diabetes later in life, especially if the woman has other risk factors (eg, obesity, family history of type 2 diabetes).

The risk of developing type 2 diabetes is greatly affected by body weight. Women who are obese have a 50 to 75 percent risk of type 2 diabetes, while women who are a normal weight have a less-than-25 percent risk. 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 women 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 healthfully, lose any excess weight, and exercise regularly to help decrease your risk of developing type 2 diabetes.

Cardiovascular disease — Women 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 women who do not progress to 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.

Birth control — Women 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 \(diabetes that starts during pregnancy\) \(The Basics\)](#)

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: Blood 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

Effects of advanced maternal age on pregnancy

Infants of women with diabetes

Pregestational (preexisting) diabetes mellitus: Obstetric issues and management

Gestational diabetes mellitus: Screening, diagnosis, and prevention

Gestational diabetes mellitus: Glucose management and maternal prognosis

Gestational diabetes mellitus: Obstetric issues and management

Pregestational (preexisting) 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)

[1-7]

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Celeste Durnwald, MD Consultant/Advisory Boards: Dexcom [Gestational diabetes]. All of the relevant financial relationships listed have been mitigated. **David M Nathan, MD** No relevant financial relationship(s) with ineligible companies to disclose. **Erika F Werner, MD, MS** Other Financial Interest: Iron Health [Providing expert advice to digital case management company]. All of the relevant financial relationships listed have been mitigated. **Vanessa A Barss, MD, FACOG** No relevant financial relationship(s) with ineligible companies to disclose.

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