TEST

Glucose tolerance test - non-pregnant

A glucose tolerance test checks how your body handles a measured glucose drink.

WHAT IT MEASURES
Blood sugar before and after a measured glucose drink

SAMPLE
Blood

FASTING NEEDED?
Yes, usually for at least eight hours

HOW LONG IT TAKES
About two to three hours

RESULTS IN
Usually one to three days; laboratory turnaround differs

USED FOR
Screening and diagnosing diabetes or prediabetes

MAIN LIMITATION
Day-to-day glucose changes can shift the result

Overview

A glucose tolerance test checks how your body processes glucose, a type of sugar used for energy. The test described here is for people who are not pregnant. Testing during pregnancy uses different timing and interpretation.

The usual test is called a 75-gram oral glucose tolerance test, or OGTT. After fasting, you have a blood sample taken and drink a liquid containing a measured amount of glucose. Another blood sample is usually taken two hours later. Some services collect extra samples.

The test can show whether your blood glucose remains higher than expected after the drink. This may help identify diabetes or prediabetes, meaning glucose levels are above the expected range but do not meet the criteria for diabetes.

An OGTT is different from an HbA1c test, which estimates your average blood glucose over the previous two to three months. It is also different from a home glucose meter reading.

Why the test is ordered

A clinician may order an OGTT when they need more information about how your body handles glucose after eating or drinking carbohydrates.

It may be used to:

The OGTT can detect some glucose problems that a fasting glucose or HbA1c test may miss. However, it takes longer and requires more preparation, so it is not always the first test used.

- investigate a fasting glucose or HbA1c result near a diagnostic threshold
- check for diabetes when other results do not agree
- look for impaired glucose tolerance, a form of prediabetes
- assess people with symptoms or risk factors for diabetes
- test for glucose problems linked to certain medical conditions

Who should have the test

Whether this test is suitable depends on your symptoms, previous results, age, health history, medicines and risk factors. A clinician may suggest it if another glucose test is unclear or if there is a reason to examine your response to a glucose drink.

Certain conditions, including cystic fibrosis or previous stomach surgery, may require specialist testing or interpretation. The usual OGTT may not be the best option after some forms of bariatric surgery because the drink can be absorbed unusually quickly and may cause symptoms.

This article does not cover gestational diabetes. If you are pregnant, you need a pregnancy-specific testing protocol and reference values.

How to prepare

Follow the instructions from your testing service because protocols can differ.

You will usually be asked to eat your normal diet in the days before the test. Do not deliberately restrict carbohydrates, such as bread, rice, potatoes, fruit or cereals. A very low-carbohydrate diet before an OGTT can make the result misleading.

You will usually need to fast for at least eight hours. During the fast, have only plain water unless your service gives different instructions. Coffee, tea, soft drinks, flavoured water, chewing gum and sweets may affect the test.

Avoid unusually strenuous exercise before the appointment. Do not smoke or vape during the

fast or the test.

Tell the testing service about prescription medicines, non-prescription medicines and supplements. Some can change glucose levels. Do not stop prescribed treatment unless the clinician responsible for your care has told you how to manage it.

Contact the service if you are acutely unwell, have a fever, are vomiting or have recently had surgery. Illness and physical stress can temporarily raise glucose, so the test may need to be rearranged.

What happens during the test

The test is often booked in the morning because you need to fast.

First, a healthcare professional takes a blood sample, usually from a vein in your arm. This measures your fasting glucose.

You then drink a glucose solution, commonly containing 75 grams of glucose. It is very sweet and should be finished within the time given by the testing service.

You must remain at the clinic until the test is complete. You will normally be asked to sit quietly and avoid food, smoking, vaping and exercise. Small amounts of plain water may be allowed.

Another blood sample is usually taken two hours after you finish the drink. Some protocols include additional samples. Tell staff if you feel sick, faint or vomit, because the test may no longer be valid.

Understanding your results

Results are commonly reported in millimoles per litre, written mmol/L, or milligrams per decilitre, written mg/dL.

For a standard 75-gram OGTT in a non-pregnant adult, commonly used criteria include:

A fasting plasma glucose of 7.0 mmol/L, or 126 mg/dL, or higher is also within the diabetes range. Criteria for the intermediate fasting range differ between major organizations.

One result does not always confirm diabetes. If you do not have clear symptoms of high glucose, a result in the diabetes range is usually confirmed with repeat testing or another laboratory test.

Ranges and interpretation vary by laboratory, age, sex, pregnancy status, medicines and clinical context. Your fasting and two-hour results should be considered together rather than interpreted in isolation.

- a two-hour result below 7.8 mmol/L, or 140 mg/dL, generally does not indicate impaired glucose tolerance
- a two-hour result from 7.8 to 11.0 mmol/L, or 140 to 199 mg/dL, may indicate impaired glucose tolerance
- a two-hour result of 11.1 mmol/L, or 200 mg/dL, or higher is within the diabetes range

What affects the results

An OGTT reflects your glucose response on one particular day. Several factors can change it without indicating a lasting problem.

Important influences include:

Pregnancy changes glucose metabolism and requires a separate protocol. A recent blood transfusion affects HbA1c more directly than an OGTT, but it remains important to mention because it may influence which glucose test is chosen.

- Diet before testing: Restricting carbohydrates for several days may produce an abnormally high two-hour result.
- Fasting: Eating, drinking coffee or having a sweetened drink can invalidate the fasting sample.
- Exercise: Recent strenuous activity may raise or lower glucose, depending on its timing and intensity.
- Illness or physical stress: Infection, fever, surgery, pain or poor sleep can temporarily raise glucose.
- Medicines: Corticosteroids like prednisone or hydrocortisone , some diuretics like furosemide or hydrochlorothiazide , certain antipsychotics and other medicines may affect glucose.
- Smoking or vaping: Nicotine can affect the body's glucose response.
- Vomiting: If you cannot keep down the full drink, the result cannot be interpreted normally.
- Stomach surgery: Rapid movement of glucose into the intestine can cause an unusual rise and fall.
- Age and other conditions: Glucose handling can change with age and with liver, pancreatic or hormonal conditions.

Accuracy and limitations

The OGTT can identify impaired glucose tolerance that fasting glucose or HbA1c testing misses. However, its repeatability is limited because glucose responses naturally change from day to day.

The test may suggest a problem when glucose is only temporarily high because of illness, stress, medicine or incorrect preparation. It may miss a problem if glucose happens to be lower on the day of testing or if an abnormal response occurs mainly at other times.

Errors in timing, an incomplete drink, vomiting or activity during the waiting period can make the result unreliable. Blood samples must also be handled correctly because glucose can fall in a sample if processing is delayed.

HbA1c or fasting glucose may be more convenient for routine screening. An OGTT may be more useful when those tests are unclear or when detecting glucose rises after a drink is especially important. Home meters and continuous glucose monitors are useful in some care plans, but they are not normally used alone to establish a diagnosis.

Risks and complications

Blood sampling may cause brief pain, a small bruise or light-headedness. Pressure over the site usually stops minor bleeding.

The glucose drink can cause nausea, sweating, dizziness or abdominal discomfort. Vomiting is uncommon but can prevent completion of the test.

What happens next

A result within the expected range may need no immediate action, although future screening may still be appropriate based on your health and risk factors.

A result in the prediabetes range usually leads to routine follow-up. This may include discussion of food, physical activity, weight, medicines and when testing should be repeated.

A result in the diabetes range often needs confirmation unless you also have clear symptoms and unequivocally high glucose. Follow-up may use another fasting glucose, HbA1c or repeat OGTT.

Seek urgent medical help rather than waiting for routine follow-up if you have severe vomiting, abdominal pain, deep or rapid breathing, marked drowsiness, confusion or difficulty staying

awake. These symptoms can have several causes and need prompt assessment.

Common questions

Can I drink coffee before the test?

No. Even black coffee can affect glucose and your body's stress response. During the fast, have only plain water unless your testing service says otherwise.

Can I drink water?

Usually, yes. Plain water can make blood sampling easier, but follow the instructions provided with your appointment.

Does the time of day matter?

The test is usually done in the morning after an overnight fast. Glucose responses can change during the day, so arrive at the scheduled time.

Can I exercise beforehand?

Avoid strenuous or unusual exercise before the appointment. During the test, remain seated and do not walk around for exercise.

Should I take my usual medicines?

Ask the testing service in advance. Some medicines affect glucose, but stopping prescribed treatment without instructions may be unsafe.

Can I drive home afterwards?

Most people can. If you feel faint, weak or unwell, tell the staff and wait until you have recovered before driving.

Sources

- American Diabetes Association Professional Practice Committee. Diagnosis and Classification of Diabetes: Standards of Care in Diabetes-2024
- World Health Organization and International Diabetes Federation. Definition and Diagnosis of Diabetes Mellitus and Intermediate Hyperglycaemia
- National Institute of Diabetes and Digestive and Kidney Diseases. Diabetes Tests and Diagnosis
- MedlinePlus. Glucose Tolerance Test

- Sacks DB, Arnold M, Bakris GL, and colleagues. Guidelines and Recommendations for Laboratory Analysis in the Diagnosis and Management of Diabetes Mellitus