

Hemoglobin A1c Test

- What it measures
- How it works
- Understanding the results
- Accuracy in A1C testing
- High A1C
- Takeaway

What is the A1C test?

People with diabetes used to depend only on urine tests or daily finger pricks to measure their blood sugar levels. These tests are accurate, but only in the moment.

They're actually very limited as an overall measurement of blood sugar control. This is because your blood sugar can vary wildly depending on the time of day, your activity levels, and even hormonal changes. Some people may have high blood sugar at 3 a.m. and be totally unaware of it.

A1C tests became available in the 1980s and quickly became an important tool in monitoring diabetes control. A1C tests measure average blood glucose over the past two to three months. So even if you have a high fasting blood sugar, your overall blood sugar may be normal, or vice versa.

A normal fasting blood sugar may not eliminate the possibility of type 2 diabetes. This is why A1C tests are now being used for diagnosis and screening of prediabetes and diabetes. Because it doesn't require fasting, the test can be given at any time as part of an overall blood screening.

The A1C test is also known as the hemoglobin A1c test or HbA1c test. Other names for the test include the glycosylated hemoglobin test, glycohemoglobin test, glycated hemoglobin test, or A1C.

What exactly does A1C measure?

A1C measures the amount of hemoglobin in the blood that has glucose attached to it. Hemoglobin is a protein found inside red blood cells that carries oxygen to the body. Hemoglobin cells are constantly dying and regenerating. Their lifespan is approximately three months.

Glucose attaches (glycates) to hemoglobin, so the record of how much glucose is attached to your hemoglobin also lasts for about three months. If there's too much glucose attached to the hemoglobin cells, you'll have a high A1C. If the amount of glucose is normal, your A1C will be normal.

How does the test work?

The test is effective because of the lifespan of the hemoglobin cells.

Let's say your blood glucose was high last week or last month, but it's normal now. Your hemoglobin will carry a "record" of last week's high blood glucose in the form of more A1C in your blood. The glucose that was attached to the hemoglobin during the past three months will still be recorded by the test, since the cells live for approximately three months.

The A1C test provides an average of your blood sugar readings for the past three months. It's not accurate for any given day, but it gives your doctor a good idea of how effective your blood sugar control has been over time.

What do the numbers mean?

Someone without diabetes will have about 5 percent of their hemoglobin glycosylated. A normal A1C level is 5.6 percent or below, according to the National Institute of Diabetes and Digestive and Kidney Diseases.

A level of 5.7 to 6.4 percent indicates prediabetes. People with diabetes have an A1C level of 6.5 percent or above.

To monitor overall glucose control, people with diabetes should have an A1C test at least twice a year. More frequent measurements (e.g., every 3 months) should be taken if you have type 1 diabetes, if your treatment is being adjusted, if you and your doctor are setting certain blood sugar targets, or if you are pregnant.

What factors can affect my test results?

Accuracy is relative when it comes to A1C or even blood glucose tests, though. The A1C test result can be up to half a percent higher or lower than the actual percentage. That means if your A1C is 6, it might indicate a range from 5.5 to 6.5.

Some people may have a blood glucose test that indicates diabetes but their A1C is normal, or vice versa. Before confirming a diagnosis of diabetes, your doctor should repeat the test that was abnormal on a different day. This is not necessary in the presence of unequivocal symptoms of diabetes (increased thirst, urination, and weight loss) and a random sugar over 200.

What if your A1C number is high?

High A1C levels are indicative of uncontrolled diabetes, which has been linked to an increased risk of the following conditions:

- cardiovascular diseases, such as stroke and heart attack
- kidney disease
- nerve damage
- eye damage that may result in blindness
- numbness, tingling, and lack of sensation in the feet due to nerve damage
- slower wound healing and infection

If you're in the early stages of type 2 diabetes, small changes in lifestyle can make a big difference and even put your diabetes in remission. Losing a few pounds or starting an exercise program can help. Type 1 diabetes needs insulin as soon as diagnosed.

For those who have had prediabetes or diabetes for a long time, higher A1C results may be a sign that you need to start on medication or change what you're already taking.

Prediabetes can progress to diabetes at a rate of 5–10 percent per year. You may also need to make other lifestyle changes and monitor your daily blood glucose more closely. Talk to your doctor about the best treatment plan for you.

The takeaway

The A1C test measures the amount of hemoglobin in the blood that has glucose attached to it. The test provides an average of your blood sugar readings for the past three months.

It's used to monitor blood sugar levels, as well as for diagnosis and screening of prediabetes and diabetes. People with diabetes should have an A1C test at least twice a year and more frequently in some cases.