
Information from your Patient Aligned Care Team

A1C Test

Because you have diabetes, you and your doctor, diabetes educator, and other members of your health care team work to keep your blood glucose (sugar) at ideal levels. There are two powerful reasons to work for effective blood sugar control:

- You will feel better.
- You may prevent or delay the start of diabetes complications such as nerve, eye, kidney, and blood vessel damage.

One way to keep track of your blood sugar changes is by checking your blood sugar at home. These tests tell you what your blood sugar level is at any one time.

But suppose you want to know how you've done overall. There's a test that can help. An A1C (also known as glycated hemoglobin or HbA1c) test gives you a picture of your average blood glucose control for the past 2 to 3 months. The results give you a good idea of how well your diabetes treatment plan is working.

In some ways, the A1C test is like a baseball player's season batting average. Both A1C and the batting average tell you about a person's overall success. Neither a single day's blood test results nor a single game's batting record gives the same big picture.

How It Works

You know from the name that the test measures something called A1C. You may wonder what it has to do with your blood sugar control. Hemoglobin is found inside red blood cells. Its job is to carry oxygen from the lungs to all the cells of the body. Hemoglobin, like all proteins, links up with sugars such as glucose.

You know that when you have uncontrolled diabetes you have too much sugar in your bloodstream. This extra glucose enters your red blood cells and links up (or glycosylates) with molecules of hemoglobin. The more excess glucose in your blood, the more hemoglobin gets glycosylated. It is possible to measure the percentage of A1C in the blood. The result is an overview of your average blood glucose control for the past few months.

A1C Test (continued)

Thanks for the Memories

How does the A1C test look backward? Suppose your blood sugar was high last week. What happened? More glucose hooked up (glycated) with your hemoglobin. This week, your blood glucose is back under control. Still, your red blood cells carry the 'memory' of last week's high blood glucose in the form of more A1C.

This record changes as old red blood cells in your body die and new red blood cells (with fresh hemoglobin) replace them. The amount of A1C in your blood reflects blood sugar control for the past 120 days, or the lifespan of a red blood cell.

In a person who does not have diabetes, about 5% of all hemoglobin is glycated. For someone with diabetes and high blood glucose levels, the A1C level is higher than normal. How high the A1C level rises depends on what the average blood glucose level was during the past weeks and months. Levels can range from normal to as high as 25% if diabetes is badly out of control for a long time.

You should have had your A1C level measured when your diabetes was diagnosed or when treatment for diabetes was started. To watch your overall glucose control, your doctor should measure your A1C level at least twice a year. This is the minimum. There are times when you need to have your A1C level tested about every 3 months. If you change diabetes treatment, such as start a new medicine, or if you are not meeting your blood glucose goals, you and your doctor will want to keep a closer eye on your control.

How Does It Help Diabetes Control?

How can your A1C test results help your control? Here are two examples.

Bob D., 49 years old, has type 2 diabetes. For the past seven years, he and his doctor have worked to control his blood sugar levels with diet and diabetes pills. Recently, Bob's control has been getting worse. His doctor said that Bob might have to start insulin shots. But first, they agreed that Bob would try an exercise program to improve control.

That was three months ago. Bob stuck to his exercise plan. Last week, when the doctor checked Bob's blood sugar, it was near the normal range. But the doctor knew a single blood test only showed Bob's control at that time. It didn't say much about Bob's overall blood sugar control.

The doctor sent a sample of Bob's blood to the lab for an A1C test. The test results would tell how well Bob's blood sugar had been controlled, on average, for the past few months. The A1C test showed that Bob's control had improved. With the A1C

A1C Test (continued)

results, Bob and the doctor had proof that the exercise program was working. The test results also helped Bob know that he could make a difference in his blood sugar control.

The A1C test can also help someone with type 1 diabetes. Nine-year-old Lisa J. and her parents were proud that she could do her own insulin shots and urine tests. Her doctor advised her to begin a routine of two shots a day and to check her blood sugar as well.

Lisa kept records of all her test results. Most were close to the ideal range. But at her next checkup, the doctor checked her blood and found her blood sugar level was high. The doctor sent a sample of Lisa's blood for an A1C test. The results showed that Lisa's blood glucose control had in fact been poor for the last few months.

Lisa's doctor asked Lisa to do a blood sugar check. To the doctor's surprise, Lisa turned on the timer of her meter before pricking her finger and putting the blood drop on the test strip. The doctor explained to Lisa and her parents that the way Lisa was testing was probably causing the blood sugar test errors.

With time and more accurate blood sugar results, Lisa and her parents got better at using her results to keep food, insulin, and exercise in balance. At later checkups, her blood sugar records and the A1C test results showed good news about her control.

A1C tests can help:

- Confirm self-testing results or blood test results by the doctor
- Judge whether a treatment plan is working
- Show you how healthy choices can make a difference in diabetes control.

Test Limit

Although the A1C test is an important tool, it can't replace daily self-testing of blood glucose. A1C tests don't measure your day-to-day control. You can't adjust your insulin on the basis of your A1C tests. That's why your blood sugar checks and your log results are so important to staying in effective control.

It is important to know that different labs measure A1C levels in different ways. If you sent one sample of your blood to four different labs, you might get back four different test results.

For example, an 8 at one lab might mean that blood glucose levels have been in the near-normal range. At a second lab, a 9 might be a sign that, on average, blood glucose was high. This doesn't mean that any of the results are wrong. It does mean that what your results say depends on the way the lab does the test.

A1C Test (continued)

Talk to your doctor about your A1C test results. Know that if you change doctors or your doctor changes labs, your test numbers may need to be "read" differently.

The A1C test alone is not enough to measure good blood sugar control. But it is good resource to use along with your daily blood sugar checks, to work for the best possible control.

References:

American Diabetes Association

<http://www.diabetes.org/type-1-diabetes/a1c-test.jsp>