

Diabetes and Hemoglobin A1C

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Hemoglobin A1C is a measure of average blood-glucose levels over the past two to three months. Health-care providers sometimes reference hemoglobin A1C as “HbA1C” or “A1C.” These names all mean the same thing.

Your health-care provider can order a test to look at A1C levels and give an overview of what your blood-glucose levels have been. It can be used to diagnose prediabetes and diabetes (Table 1). Your treatment team can also use this information to help decide if your diabetes management plan should be changed.

Having an A1C level that is within the range that your health-care provider suggests can help reduce your risk of developing some diabetes-related complications like:

- Heart disease
- Stroke
- Kidney disease
- Loss of eyesight
- Amputations

What is A1C, and how does the A1C test work?

A1C is also called hemoglobin A1C, glycosylated hemoglobin, or estimated average glucose. The A1C test allows you and your provider to see how well your diabetes management plan has been working to manage blood-glucose levels over the previous three months. It also helps your health-care team decide the type and dose of medicine needed.

When there is too much glucose in your blood, the excess glucose attaches to a part of your red blood cells called hemoglobin. The more glucose in the blood (or the higher the blood-glucose levels), the more glucose will be attached to the hemoglobin.

The hemoglobin keeps a memory of the amount of glucose in the blood, even as the level of glucose increases and decreases each day. The memory is kept for the life of the red blood cell, which is about three months.

Daily home glucose testing vs. A1C

When you perform daily blood-glucose testing at home, the results show the amount of glucose in your blood at that moment. However, blood-glucose levels change from hour to hour and from day to day. As a result, it is sometimes difficult to get an overall view of how your diabetes management is working.

The A1C test provides an average or overall view of your blood-glucose levels over the previous three months. The result is given as a percentage, indicating how many red blood cells have sugar attached.

The A1C goal for many people with diabetes is less than 7. However, your health-care provider may have a different goal for you. There are many factors that play a role in blood-glucose levels, so A1C goals can differ from person to person. An A1C test result of 7 shows that blood-glucose levels were around 154 milligrams per deciliter (mg/dL) and lower, on average, for the previous two to three months (Table 2).

Table 1. A1C levels and diagnoses.

Diagnosis	A1C Test Result
Normal	Less than 5.7%
Prediabetes	5.7% to 6.4%
Diabetes	6.5% or higher

Table 2. A1C levels and corresponding average glucose levels.

A1C Level	Average Blood Glucose Numbers (mg/dL)
12	298
11	269
10	240
9	212
8	183
7	154
6	125

Why is it important to know your A1C test result?

Your A1C result tells you and your health-care team if your diabetes management plan is working for you. Keeping your blood-glucose level within your target range can significantly reduce your chances of having eye, kidney, or nerve problems.

Things to remember about A1C

- The A1C test lets your doctor know how well your management plan is working over time. The higher your blood-glucose levels are over time, the higher your A1C test result will be.
- Your health-care provider can help identify your A1C goals and your self-monitoring blood-glucose goals.
- Ask for an A1C test at least twice per year. Your doctor may recommend you have the test done more often if you use insulin and if it is difficult to meet your target range for blood-glucose levels.
- Ask your doctor what your A1C result is, what it means, what it should be, and what you need to do to reach your A1C goal.
- The A1C test does not replace the daily blood-glucose testing you do at home.
- The A1C does not monitor your blood-glucose level on a day-by-day basis, nor can it be used to adjust your insulin.

References

American Diabetes Association. (2023). *Understanding A1C* | ADA. Diabetes.org. <https://diabetes.org/about-diabetes/a1c>

Eyth, E., and Naik, R. (2023). *Hemoglobin A1C*. PubMed; StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK549816/>

NIDDK. (2018). *The A1C test and diabetes* | NIDDK. National Institute of Diabetes and Digestive and Kidney Diseases. <https://www.niddk.nih.gov/health-information/diagnostic-tests/a1c-test#:~:text=The%20A1C%20test%20measures%20the>

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