



Home → Medical Tests → Hemoglobin A1C (HbA1c) Test

URL of this page: <https://medlineplus.gov/lab-tests/hemoglobin-a1c-hba1c-test/>

Hemoglobin A1C (HbA1c) Test

What is a hemoglobin A1C (HbA1C) test?

A hemoglobin A1C [<https://medlineplus.gov/a1c.html>] (HbA1C) test is a blood test that shows your average level of blood glucose [<https://medlineplus.gov/bloodglucose.html>] , also called blood sugar, over the past two to three months.

Glucose is a type of sugar in your blood that comes from the foods you eat. Your cells use glucose for energy. A hormone [<https://medlineplus.gov/hormones.html>] called insulin helps glucose get into your cells. If you have diabetes [<https://medlineplus.gov/diabetes.html>] your body doesn't make enough insulin, or your cells don't use it well. As a result, glucose can't get into your cells, so your blood glucose levels increase.

Glucose in your blood sticks to hemoglobin, a protein in your red blood cells. As your blood glucose levels increase, more of your hemoglobin will be coated with glucose. An A1C test measures the percentage of your red blood cells that have glucose-coated hemoglobin.

An A1C test can show your average glucose level for the past three months because:

- Glucose sticks to hemoglobin for as long as the red blood cells are alive.
- Red blood cells live about three months.

High A1C levels are a sign of high blood glucose from diabetes. Diabetes can cause serious health problems [<https://medlineplus.gov/diabetescomplications.html>] , including heart disease [<https://medlineplus.gov/heartdiseases.html>] , kidney disease [<https://medlineplus.gov/kidneydiseases.html>] , and nerve damage [<https://medlineplus.gov/diabeticnerveproblems.html>] . But with treatment and lifestyle changes, you can control your blood glucose levels.

Other names: HbA1C, A1C, glycohemoglobin, glycated hemoglobin, glycosylated hemoglobin

What is it used for?

Your blood glucose level changes all the time. If you're checking it at home, you are measuring what your blood glucose level is at that time. An A1C test gives you an average level of your blood glucose level over the past two to three months.

An A1C test may be used to screen for [<https://medlineplus.gov/healthscreening.html>] or diagnose:

- Type 2 diabetes [<https://medlineplus.gov/diabetestype2.html>] . With type 2 diabetes your blood glucose gets too high because your body doesn't make enough insulin or doesn't use insulin well. The glucose then stays in your blood and not enough goes into your cells.
- Prediabetes [<https://medlineplus.gov/prediabetes.html>] . Prediabetes means that your blood glucose levels are higher than normal, but not high enough to be diagnosed as diabetes. Lifestyle changes, such as healthy eating [<https://medlineplus.gov/diabeticdiet.html>] and exercise

[<https://medlineplus.gov/benefitsofexercise.html>] , may help delay or prevent prediabetes from becoming type 2 diabetes.

If you have diabetes or prediabetes, an A1C test can help monitor your condition and check how well you've been able to control your blood glucose levels.

The A1C test isn't used to diagnose type 1 diabetes [<https://medlineplus.gov/diabetestype1.html>] but may be used for monitoring your blood glucose levels.

Why do I need an A1C test?

The Centers for Disease Control (CDC) recommends A1C testing for diabetes and prediabetes if:

- **You are over age 45.**
 - If your results are normal, your provider will tell you how often you should be tested based on your age and risk factors.
 - If your results show you have prediabetes, you will usually need to be tested every 1 to 2 years. Ask your provider how often to get tested and what you can do to reduce your risk of developing diabetes.
 - If your results show you have diabetes, you should get an A1C test at least twice a year to monitor your condition and treatment.
- **You are under 45 and are more likely to develop diabetes because you:**
 - Have prediabetes.
 - Are overweight or have obesity [<https://medlineplus.gov/obesity.html>] .
 - Have a parent or sibling with type 2 diabetes.
 - Have high blood pressure [<https://medlineplus.gov/highbloodpressure.html>] or high cholesterol [<https://medlineplus.gov/cholesterol.html>] levels.
 - Have heart disease [<https://medlineplus.gov/heartdiseases.html>] or have had a stroke [<https://medlineplus.gov/stroke.html>] .
 - Are physically active [<https://medlineplus.gov/exerciseandphysicalfitness.html>] less than 3 times a week.
 - Have had gestational diabetes [<https://medlineplus.gov/diabetesandpregnancy.html>] (diabetes during pregnancy) or given birth to a baby over 9 pounds.
 - Are African American, Hispanic or Latino, American Indian, or an Alaska Native person. Some Pacific Islander and Asian American people also have a higher risk of developing diabetes.
 - Have polycystic ovarian syndrome [<https://medlineplus.gov/polycysticovarysyndrome.html>] (PCOS).

You may also need an A1C test if you have symptoms of diabetes, such as:

- Feeling very thirsty
- Urinating (peeing) a lot
- Losing weight without trying
- Feeling very hungry
- Blurred vision
- Numb or tingling hands or feet
- Fatigue [<https://medlineplus.gov/fatigue.html>]
- Dry skin
- Sores that heal slowly
- Having more infections than usual

What happens during an A1C test?

A health care professional will take a blood sample from a vein in your arm, using a small needle. After the needle is inserted, a small amount of blood will be collected into a test tube or vial. You may feel a little sting when the needle goes in or out. This usually takes less than five minutes.

Will I need to do anything to prepare for the test?

Certain medicines such as opioids and some HIV medicines may affect your results, so tell your provider about everything you take. But don't stop taking any medicines unless your provider tells you to. Also, let your health care provider know if you are pregnant, since this may affect your results.

Are there any risks to the test?

There is very little risk to having a blood test. You may have slight pain or bruising at the spot where the needle was put in, but most symptoms go away quickly.

What do the results mean?

A1C results tell you what percentage of your hemoglobin is coated with glucose. The ranges are just a guide to what is normal. What's normal for you depends on your health, age, and other factors. Ask your provider what A1C percentage is healthy for you.

To diagnose diabetes or prediabetes, the percentages commonly used are:

- **Normal:** A1C below 5.7%
- **Prediabetes:** A1C between 5.7% and 6.4%
- **Diabetes:** A1C of 6.5% or higher

Providers often use more than one test to diagnose diabetes. So, if your test result was higher than normal, you may have another A1C test or a different type of diabetes test [<https://medlineplus.gov/lab-tests/diabetes-tests/>] , usually either a fasting **blood glucose test** [<https://medlineplus.gov/lab-tests/blood-glucose-test/>] or an oral glucose tolerance test (OGTT).

If your A1C test was done to monitor your diabetes, talk with your provider about what your test results mean.

Learn more about laboratory tests, reference ranges, and understanding results [<https://medlineplus.gov/lab-tests/how-to-understand-your-lab-results/>] .

Is there anything else I need to know about an A1C test?

The A1C test is not used to diagnose gestational diabetes. Also, if you have a condition that affects your red blood cells, such as anemia [<https://medlineplus.gov/anemia.html>] or another type of blood disorder, [<https://medlineplus.gov/blooddisorders.html>] an A1C test may not be accurate for diagnosing diabetes. Kidney failure [<https://medlineplus.gov/kidneyfailure.html>] and liver disease [<https://medlineplus.gov/liverdiseases.html>] can also affect A1C results. In these cases, your provider may recommend different tests to diagnose diabetes and prediabetes.

References

1. American Diabetes Association [Internet]. Arlington (VA): American Diabetes Association; c1995–2025. Understanding A1C: What is the A1C Test?; [cited 2025 Apr. 10]; [about 3 screens]. Available from: <https://www.diabetes.org/diabetes/A1C> [<https://www.diabetes.org/diabetes/A1C>]
2. American Diabetes Association [Internet]. Arlington (VA): American Diabetes Association; c1995–2025. Common Terms; [cited 2025 Apr. 10]; [about 33 screens]. Available from: <https://diabetes.org/about-diabetes/common-terms> [<https://diabetes.org/about-diabetes/common-terms>]
3. Centers for Disease Control and Prevention [Internet]. Atlanta: U.S. Department of Health and Human Services; A1C Test for Diabetes and Prediabetes; [reviewed 2024 May 15; cited 2025 Apr. 10]; [about 2 screens]. Available from: <https://www.cdc.gov/diabetes/diabetes-testing/prediabetes-a1c-test.html> [<https://www.cdc.gov/diabetes/diabetes-testing/prediabetes-a1c-test.html>]
4. Centers for Disease Control and Prevention [Internet]. Atlanta: U.S. Department of Health and Human Services; Diabetes Risk Factors; [reviewed 2024 May 15; cited 2024 Apr. 10]; [about 2 screens]. Available from: <https://www.cdc.gov/diabetes/risk-factors/> [<https://www.cdc.gov/diabetes/risk-factors/>]

5. Cleveland Clinic: Health Library: Diagnostics & Testing [Internet]. Cleveland (OH): Cleveland Clinic; c2025. Blood Tests; [reviewed 2022 Dec 06; cited 2025 Apr. 10]; [about 16 screens]. Available from: <https://my.clevelandclinic.org/health/diagnostics/24508-blood-tests> [<https://my.clevelandclinic.org/health/diagnostics/24508-blood-tests>]
6. Mayo Clinic [Internet]. Mayo Foundation for Medical Education and Research; c1998–2025. A1c test; 2025 Feb. 22; [cited 2025 Apr. 10]; [about 6 screens]. Available from: <https://www.mayoclinic.org/tests-procedures/a1c-test/about/pac-20384643> [<https://www.mayoclinic.org/tests-procedures/a1c-test/about/pac-20384643>]
7. Mayo Clinic [Internet]. Mayo Foundation for Medical Education and Research; c1998–2025. Type 1 diabetes; 2024 Mar. 27; [cited 2025 Apr. 14]; [about 19 screens]. Available from: <https://www.mayoclinic.org/diseases-conditions/type-1-diabetes/diagnosis-treatment/drc-20353017> [<https://www.mayoclinic.org/diseases-conditions/type-1-diabetes/diagnosis-treatment/drc-20353017>]
8. National Institute of Diabetes and Digestive and Kidney Diseases [Internet]. Bethesda (MD): U.S. Department of Health and Human Services; Diabetes Tests & Diagnosis; [reviewed 2022 July; cited 2025 Apr. 10]; [about 6 screens]. Available from: <https://www.niddk.nih.gov/health-information/diabetes/overview/tests-diagnosis#who> [<https://www.niddk.nih.gov/health-information/diabetes/overview/tests-diagnosis#who>]
9. National Institute of Diabetes and Digestive and Kidney Diseases [Internet]. Bethesda (MD): U.S. Department of Health and Human Services; The A1C Test & Diabetes; [reviewed 2018 Apr; cited 2025 Apr. 10]; [about 10 screens]. Available from: <https://www.niddk.nih.gov/health-information/diagnostic-tests/a1c-test#affected> [<https://www.niddk.nih.gov/health-information/diagnostic-tests/a1c-test#affected>]
10. National Institute of Diabetes and Digestive and Kidney Diseases [Internet]. Bethesda (MD): U.S. Department of Health and Human Services; Insulin Resistance & Prediabetes; [reviewed 2018 May; cited 2025 Apr. 10]; [about 8 screens]. Available from: <https://www.niddk.nih.gov/health-information/diabetes/overview/what-is-diabetes/prediabetes-insulin-resistance#develop> [<https://www.niddk.nih.gov/health-information/diabetes/overview/what-is-diabetes/prediabetes-insulin-resistance#develop>]
11. National Institute of Diabetes and Digestive and Kidney Diseases [Internet]. Bethesda (MD): U.S. Department of Health and Human Services; Type 1 Diabetes; [reviewed 2025 Feb.; cited 2025 Apr. 14]; [about 12 screens]. Available from: <https://www.niddk.nih.gov/health-information/diabetes/overview/what-is-diabetes/type-1-diabetes> [<https://www.niddk.nih.gov/health-information/diabetes/overview/what-is-diabetes/type-1-diabetes>]
12. National Institute of Diabetes and Digestive and Kidney Diseases [Internet]. Bethesda (MD): U.S. Department of Health and Human Services; What is Diabetes?; [reviewed 2023 Apr.; cited 2025 Apr. 10]; [about 4 screens]. Available from: <https://www.niddk.nih.gov/health-information/diabetes/overview/what-is-diabetes#types> [<https://www.niddk.nih.gov/health-information/diabetes/overview/what-is-diabetes#types>]
13. Nemours KidsHealth [Internet]. Jacksonville (FL): The Nemours Foundation; c1995–2025. Getting a Blood Test; [reviewed 2021 Sep; cited 2025 Apr. 10]; [about 4 screens]. Available from: <https://kidshealth.org/en/parents/blood-tests.html> [<https://kidshealth.org/en/parents/blood-tests.html>]
14. Testing.com [Internet]. Seattle (WA): OneCare Media; c2025. Hemoglobin A1c; [modified 2022 Sept. 13; cited 2025 Apr. 10]; [about 12 screens]. Available from: <https://www.testing.com/tests/hemoglobin-a1c/> [<https://www.testing.com/tests/hemoglobin-a1c/>]
15. Testing.com [Internet]. Seattle (WA): OneCare Media; c2025. Glucose Testing; [modified 2021 Nov 9; cited 2025 Apr. 10]; [about 11 screens]. Available from: <https://www.testing.com/glucose-testing/> [<https://www.testing.com/glucose-testing/>]

Show references

Related Health Topics

A1C [<https://medlineplus.gov/a1c.html>]

Blood Glucose [<https://medlineplus.gov/bloodglucose.html>]

Diabetes [<https://medlineplus.gov/diabetes.html>]

Diets [<https://medlineplus.gov/diets.html>]

Exercise and Physical Fitness [<https://medlineplus.gov/exerciseandphysicalfitness.html>]

High Blood Pressure [<https://medlineplus.gov/highbloodpressure.html>]

Obesity [<https://medlineplus.gov/obesity.html>]

Prediabetes [<https://medlineplus.gov/prediabetes.html>]

Related Medical Tests

[Blood Glucose Test](https://medlineplus.gov/lab-tests/blood-glucose-test/) [https://medlineplus.gov/lab-tests/blood-glucose-test/]

[C-Peptide Test](https://medlineplus.gov/lab-tests/c-peptide-test/) [https://medlineplus.gov/lab-tests/c-peptide-test/]

[Diabetes Tests](https://medlineplus.gov/lab-tests/diabetes-tests/) [https://medlineplus.gov/lab-tests/diabetes-tests/]

[Diabetic Foot Exam](https://medlineplus.gov/lab-tests/diabetic-foot-exam/) [https://medlineplus.gov/lab-tests/diabetic-foot-exam/]

[Glucagon Blood Test](https://medlineplus.gov/lab-tests/glucagon-blood-test/) [https://medlineplus.gov/lab-tests/glucagon-blood-test/]

[Glucose in Urine Test](https://medlineplus.gov/lab-tests/glucose-in-urine-test/) [https://medlineplus.gov/lab-tests/glucose-in-urine-test/]

[How to Cope with Medical Test Anxiety](https://medlineplus.gov/lab-tests/how-to-cope-with-medical-test-anxiety/) [https://medlineplus.gov/lab-tests/how-to-cope-with-medical-test-anxiety/]

[How to Understand Your Lab Results](https://medlineplus.gov/lab-tests/how-to-understand-your-lab-results/) [https://medlineplus.gov/lab-tests/how-to-understand-your-lab-results/]

[Insulin in Blood](https://medlineplus.gov/lab-tests/insulin-in-blood/) [https://medlineplus.gov/lab-tests/insulin-in-blood/]

[Ketones in Blood](https://medlineplus.gov/lab-tests/ketones-in-blood/) [https://medlineplus.gov/lab-tests/ketones-in-blood/]

[Ketones in Urine](https://medlineplus.gov/lab-tests/ketones-in-urine/) [https://medlineplus.gov/lab-tests/ketones-in-urine/]

[What You Need to Know About Blood Testing](https://medlineplus.gov/lab-tests/what-you-need-to-know-about-blood-testing/) [https://medlineplus.gov/lab-tests/what-you-need-to-know-about-blood-testing/]

The information on this site should not be used as a substitute for professional medical care or advice. Contact a health care provider if you have questions about your health.

[Learn how to cite this page](#)

National Library of Medicine 8600 Rockville Pike, Bethesda, MD 20894 U.S. Department of Health and Human Services

National Institutes of Health

Last updated May 20, 2025