CONDITION

Antibody testing COVID-19

Learn what COVID-19 antibody tests measure, how vaccination and past infection affect results, and why these tests cannot diagnose an active infection or confirm immunity.

WHAT IT IS
Blood test for SARS-CoV-2 antibodies

BODY SYSTEM
Blood and immune system

MAIN SYMPTOMS
No antibody-related symptoms, fever with active infection, cough with active infection, fatigue with active infection

WHAT CAUSES IT
Immune response after infection or vaccination

HOW IT IS DIAGNOSED
Blood antibody test from vein or finger stick

MAIN TREATMENT
No treatment for antibody results

CAN IT BE CURED?
No, antibody results require no treatment

IS IT AN EMERGENCY?
Sometimes, severe breathing difficulty or chest pain

LONG-TERM OUTLOOK
Results cannot reliably determine future protection

Overview

COVID-19 antibody testing is a blood test that looks for antibodies to SARS-CoV-2, the virus that causes COVID-19. Antibodies are proteins made by the immune system after infection or vaccination. The process of testing for antibodies in blood is also called serology .

Antibody tests are different from tests used to find an active infection. Molecular tests, including PCR tests, look for the virus's genetic material. Antigen tests look for specific proteins from the virus. Those tests are more appropriate when someone has symptoms or a recent exposure.

A COVID-19 antibody test may provide evidence of a previous infection or an immune response to vaccination. However, the meaning of a result depends on which antibody the test

detects, when testing occurs, vaccination history, and the person's health.

Most antibody tests look for antibodies against one or both of these viral proteins:

Antibody tests cannot reliably determine how well someone is protected from future infection. They also should not be used by themselves to decide whether vaccination is needed. Protection involves antibodies, immune memory, and immune cells that routine antibody tests do not measure.

- Spike protein: Antibodies may develop after infection or after receiving a vaccine that uses the spike protein.
- Nucleocapsid protein: Antibodies usually develop after infection. Vaccines used in the United States do not contain this protein, although some vaccines used in other countries may produce nucleocapsid antibodies.

Symptoms

Having COVID-19 antibodies does not cause symptoms. A person may have antibodies after an infection that caused noticeable illness or no symptoms at all. Symptoms cannot show whether antibodies are present, and an antibody result cannot show when an infection occurred.

Possible symptoms of an active COVID-19 infection include fever or chills, cough, sore throat, congestion, fatigue, headache, muscle aches, shortness of breath, nausea, vomiting, diarrhea, or a new loss of taste or smell. Symptoms vary and can overlap with influenza, respiratory syncytial virus, and other infections.

If symptoms have started recently, an antigen or molecular test is generally more useful than an antibody test. A negative home antigen result does not always rule out infection, especially early in the illness. Follow the test instructions, including recommendations for repeat testing.

Seek emergency care for symptoms such as:

Other severe or rapidly worsening symptoms also need prompt medical attention. An antibody test should not delay evaluation or treatment.

- Severe difficulty breathing
- New chest pain or pressure
- New confusion or inability to stay awake
- Pale, gray, or blue-colored lips, skin, or nail beds, depending on skin tone

Causes and risk factors

A positive antibody result usually means the test detected antibodies above its reporting threshold. These antibodies may have developed after infection, vaccination, or both.

Timing is important. Antibodies take time to develop, so testing too soon after infection may produce a negative result. Antibody levels may also fall over time. Someone who had COVID-19 months or years earlier may later have a negative antibody test even though the immune system retains some memory of the virus.

Vaccination affects interpretation. A positive spike-antibody result may reflect vaccination, infection, or both. A positive nucleocapsid-antibody result more often suggests previous infection in a person who received only spike-based vaccines. However, test results should be interpreted with the specific vaccine and test target in mind.

Factors that can affect results include:

Sensitivity describes how well a test detects antibodies when they are present. Specificity describes how well it avoids a positive result when the antibodies are absent. No antibody test is completely accurate.

A false-negative result means antibodies were not detected even though the person was previously infected or vaccinated. A false-positive result means the test reports antibodies that do not represent a true response to SARS-CoV-2. Unexpected results may need review by a healthcare professional rather than automatic repeat testing.

- How long it has been since infection or vaccination
- Which viral protein the test measures
- The sensitivity and specificity of the test
- A person's immune response
- Medicines or health conditions that suppress the immune system
- Whether the result is near the test's reporting threshold
- How common previous infection is in the tested population

Diagnosis

Antibody testing is not used to diagnose most current COVID-19 infections. Antibodies often appear too late to guide decisions during the first days of illness. A viral test, such as an antigen or molecular test, is usually preferred for current symptoms or a recent exposure.

Antibody tests use a blood sample. Depending on the test, blood may be collected from a vein or through a finger stick. Testing may be performed in a laboratory, clinic, pharmacy, or another authorized setting.

Results may be reported in several ways:

A higher number does not necessarily mean a person has stronger or longer-lasting protection. Results from different test brands may not be directly comparable. There is no single routine antibody level that can guarantee protection against infection or severe illness.

Most commercial tests measure binding antibodies , which attach to part of the virus. They do not directly measure whether antibodies can block the virus from entering cells. Tests that assess this blocking ability are called neutralization tests . These are more complex and are not routinely used to make personal decisions about vaccination or daily precautions.

In selected situations, a clinician may use antibody testing as one part of a broader evaluation. Examples can include investigating certain delayed complications after infection or helping assess a past infection when viral testing is no longer expected to be positive. The result must be considered with symptoms, medical history, examination findings, and other laboratory tests.

An indeterminate or borderline result means the laboratory could not clearly classify the sample. This may occur when antibody levels are close to the test cutoff. It does not confirm or exclude a previous infection.

- Qualitative: Reported as positive, negative, or sometimes indeterminate.
- Semi-quantitative: Reports a value that reflects the relative amount of detected antibody.
- Quantitative: Reports an antibody concentration using the test's measurement system.

Treatment and management

An antibody result does not itself require treatment. There is no medicine used simply to make an antibody test positive or negative.

If testing was performed because of current symptoms, management should be based on a viral test and clinical evaluation rather than the antibody result. People at higher risk for severe COVID-19 should contact a healthcare professional promptly after symptoms begin or a viral test becomes positive. Treatments for active COVID-19 work best when started within a limited period, and a clinician must determine whether a treatment is appropriate.

A positive antibody result should not be used as proof that a person cannot become infected or transmit the virus. Reinfections can occur, and the virus changes over time. Continue to

follow current public health advice for testing, respiratory illness, and vaccination.

A negative result does not necessarily mean the immune system failed to respond. Antibody levels may have fallen below the test threshold, the test may not measure the relevant antibody, or immune protection may involve cells that the test does not assess.

Routine antibody testing is not recommended to determine whether a COVID-19 vaccine worked or whether an additional vaccine dose is needed. Vaccination decisions should be based on current recommendations, age, health conditions, previous doses, and discussion with a healthcare professional when needed.

People with weakened immune systems may have different immune responses. Even in this group, a commercial antibody value does not provide a complete measure of protection. A specialist may sometimes order testing for a specific clinical reason, but results require careful interpretation.

Complications

COVID-19 antibody testing has few physical risks. Blood drawn from a vein may cause brief pain, bruising, lightheadedness, or, rarely, infection at the needle site. Finger-stick testing may cause minor soreness or bleeding.

The more important risks come from misinterpreting the result. A positive test may create false reassurance and lead someone to ignore symptoms, skip appropriate viral testing, or assume vaccination is unnecessary. A negative test may cause worry even when immune memory is still present.

Testing can also produce unexpected or conflicting results. One test may detect spike antibodies while another measures nucleocapsid antibodies. Tests from different manufacturers may use different methods and cutoffs. Comparing the numbers without clinical context can be misleading.

Antibody tests cannot predict whether a person will develop long COVID. They also do not confirm that ongoing symptoms are caused by a past infection. Persistent symptoms deserve a clinical assessment based on their pattern, severity, and effect on daily life.

Follow up

Routine follow-up may be appropriate if an antibody result was ordered as part of a medical evaluation. Ask the clinician which antibody was measured and what question the test was intended to answer. If the result was unexpected, the clinician can review infection history,

vaccination history, medications, and timing.

Repeat antibody testing is usually not helpful when it is done only to watch the number rise or fall. Changes between tests may reflect different laboratory methods rather than a meaningful change in protection.

Contact a healthcare professional promptly if you have current COVID-19 symptoms and are at increased risk for severe illness. Do not wait for an antibody result. Use an appropriate viral test and ask about the time window for available treatment.

Routine medical review is appropriate for symptoms that continue after a suspected or confirmed infection, especially if they interfere with work, school, sleep, or usual activities. Antibody testing may or may not be useful, depending on the circumstances.

Seek urgent or emergency care for severe breathing difficulty, persistent chest pain or pressure, new confusion, inability to wake or stay awake, or other serious and rapidly worsening symptoms.

Sources

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