

SARS-CoV-2 Antibodies Analysis

This test looks at the overall diversity or variety of antibodies your body makes to the SARS-CoV-2 virus which causes the disease COVID-19. To fight off the virus, you make antibodies that target specific parts of the virus to help remove them from your body. These targets on the virus are called epitopes and can be very specific and quite personal to your immune response, or they may be common across many people.

To assist with this report, a glossary of medical terms used throughout can be found on the last two pages.

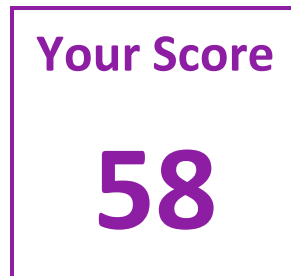
Summary of Results

Panel	Score	Interpretation
COVID-19 Total Antibody Score	58	This antibody score falls within the range of individuals who had COVID-19.
Natural Infection vs. Vaccination	78	This antibody score falls within the range of individuals who were naturally infected with the SARS-CoV-2 virus.
Acute or Recent COVID-19 Infection	35	This antibody score falls within the range of individuals who have NOT had an acute or recent infection.

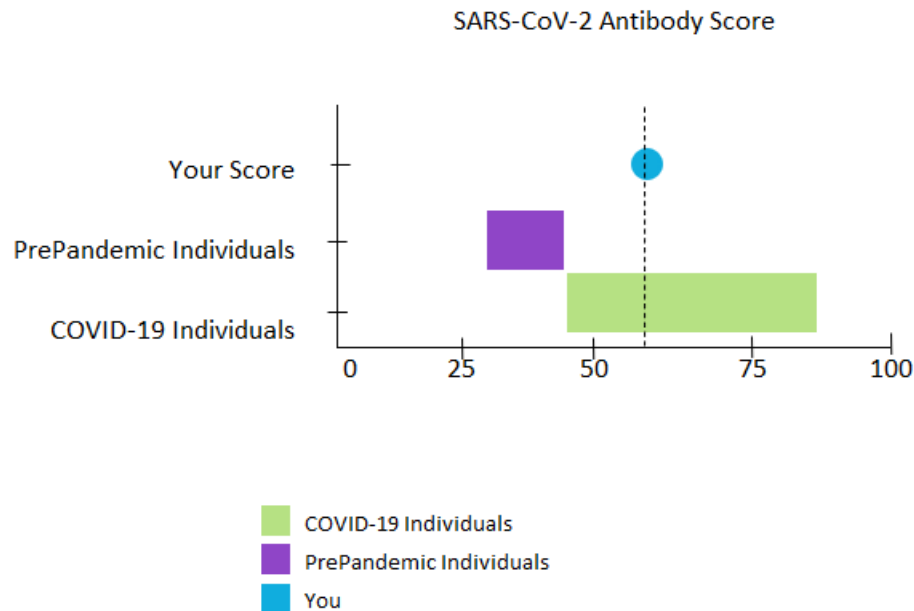
COVID-19 Total Antibody Score

Your score is an indication of your personal immune response to the SARS-CoV-2 virus and reflects the diversity and quantity of antibodies you make based on your personal exposures to either the virus or the vaccine.

In the results and graph below, you will see a range of scores that come from individuals prior to the pandemic (pre-pandemic). These people have never been exposed to the virus. This range is 27-48. You will also see a range of scores that come from individuals who have had COVID-19. This range is 48-82. **Lower scores** indicate a lack of exposure to the SARS-CoV-2 virus. **Higher scores** indicate exposure to the SARS-CoV-2 virus from either natural infection or vaccination.



Your score is 58. This antibody score falls within the range of individuals who had COVID-19.

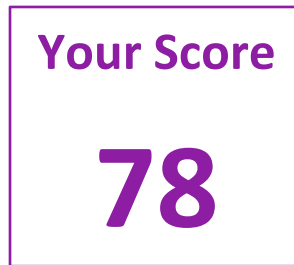


Natural Infection vs. Vaccination

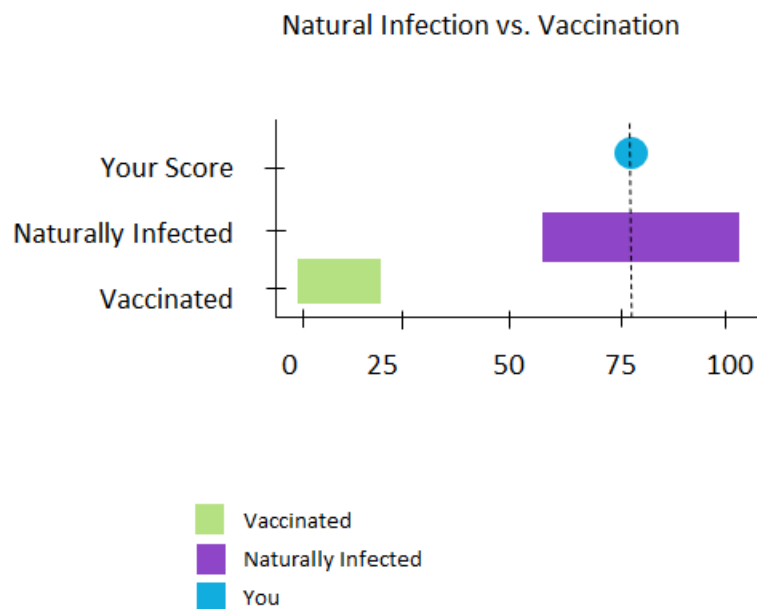
This result measures a specific type of antibody (non-spike glycoprotein IgG) which indicates whether you had COVID-19.

The SARS-CoV-2 virus has sharp bumps that protrude from its surface. These bumps are called spike glycoproteins. The SARS-CoV-2 virus uses the spike glycoprotein to enter your cells to start an infection. If the antibodies you make are only to the spike protein, you are likely vaccinated instead of having a natural infection*. In a natural infection, most individuals develop antibodies against other non-spike proteins. Antibodies formed from a vaccine are **not any less** effective or protective than those formed in a natural infection.

In the results and graph below, you will see a range of scores that have been calculated from antibodies to non-spike proteins that only occur from a natural infection. For individuals that have been vaccinated, this range is 2-20. You will also see a range of scores that come from naturally infected individuals. This range is 52-105. **Lower scores** indicate a greater likelihood that you were vaccinated. **Higher scores** reflect a greater likelihood of natural infection.



Your score is 78. This antibody score falls within the range of individuals who were naturally infected with the SARS-CoV-2 virus.



*Currently, all approved COVID-19 vaccines in the United States only target the spike protein

Acute or Recent COVID-19 Infection

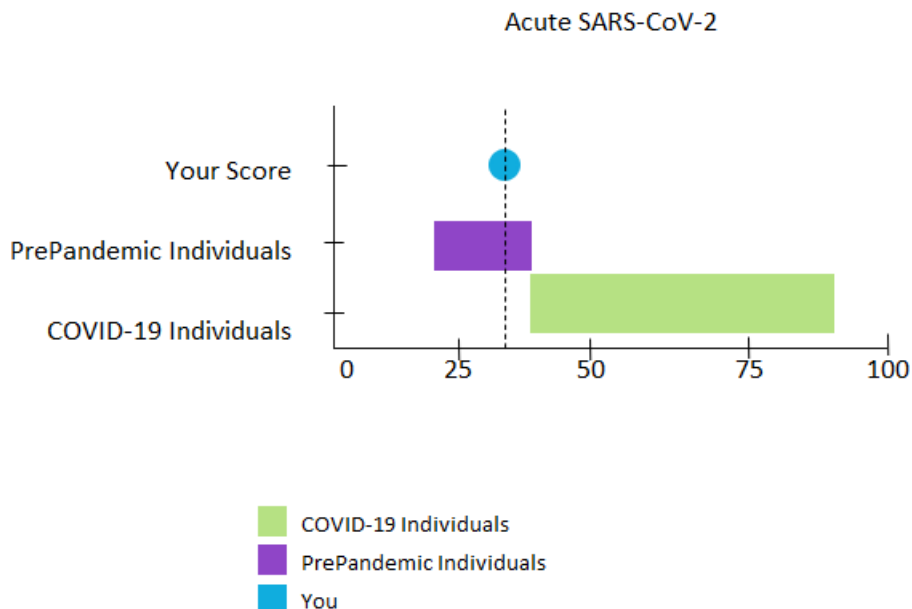
This score is an indication of whether you have acute or recent COVID-19. This is determined by the level of IgM antibodies in your blood. IgM antibodies associated with acute infections generally will not last longer than 6 months.

IgM is the type of antibody that is typically produced first by the immune system after an infection occurs and may be indicative of an acute or recent infection. IgG is the type of antibody that generally develops after IgM antibodies and remain in the blood long after the infection has passed.

In the results and graph below, you will see a range of scores that come from individuals that have had an acute or recent infection. This range is 40-90. You will also see a range of scores that come from individuals prior to the pandemic (pre-pandemic). This range is 20-40. **Lower scores** indicate a greater likelihood you do **NOT** have acute COVID-19. **Higher scores** indicate a greater likelihood that you do **HAVE** acute COVID-19.

Your Score
35

Your score is 35. This antibody score falls within the range of individuals who do NOT have an acute infection.



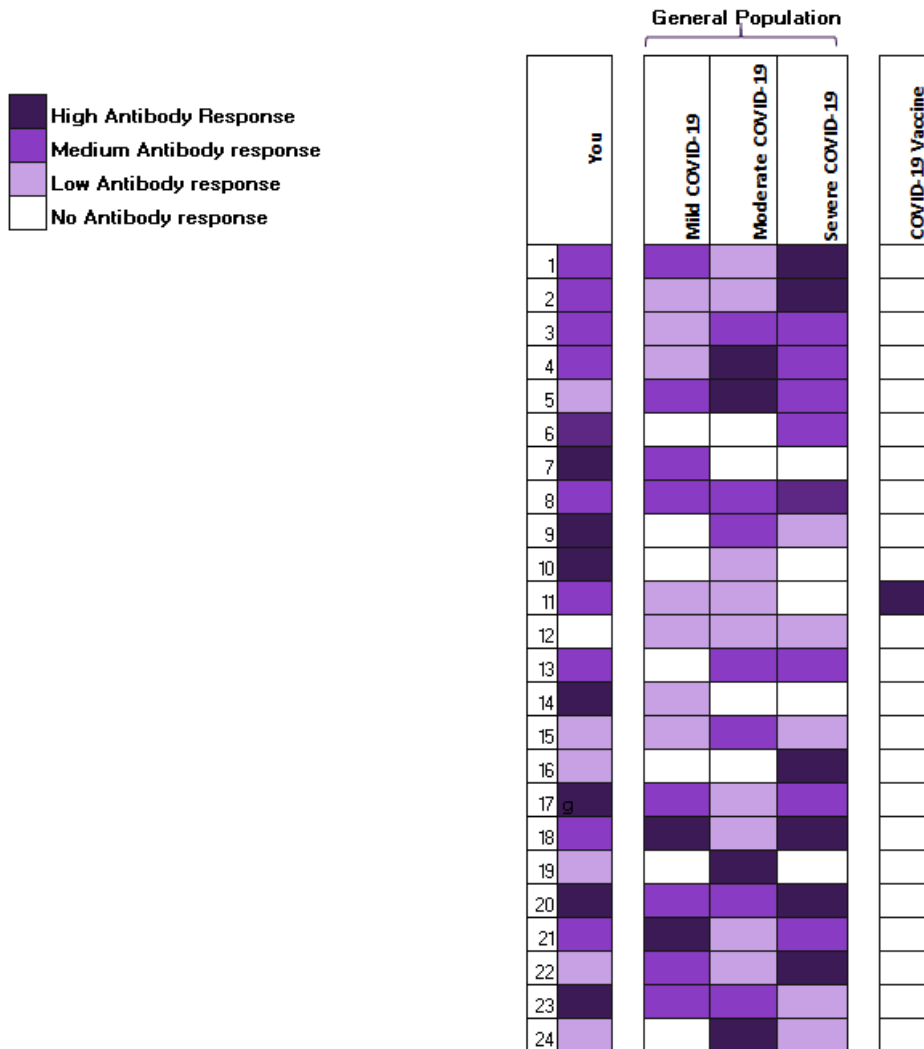
Immune Map

Throughout the 5-year study, you will receive an immune map that will provide a visual depiction of how your immune response changes over time. These types of maps may reveal patterns that may be associated with mild, moderate, or severe cases of COVID-19.

The graph below represents your antibody response to individual targets (unique regions) on the virus included in our test panel. There are 55 rows in the graph with rows 1-24 on this page and rows 25-55 continued on the next page. Each row represents a distinct antibody that recognizes a unique region of the SARS-CoV-2 virus, for a total of 55 distinct and unique antibodies.

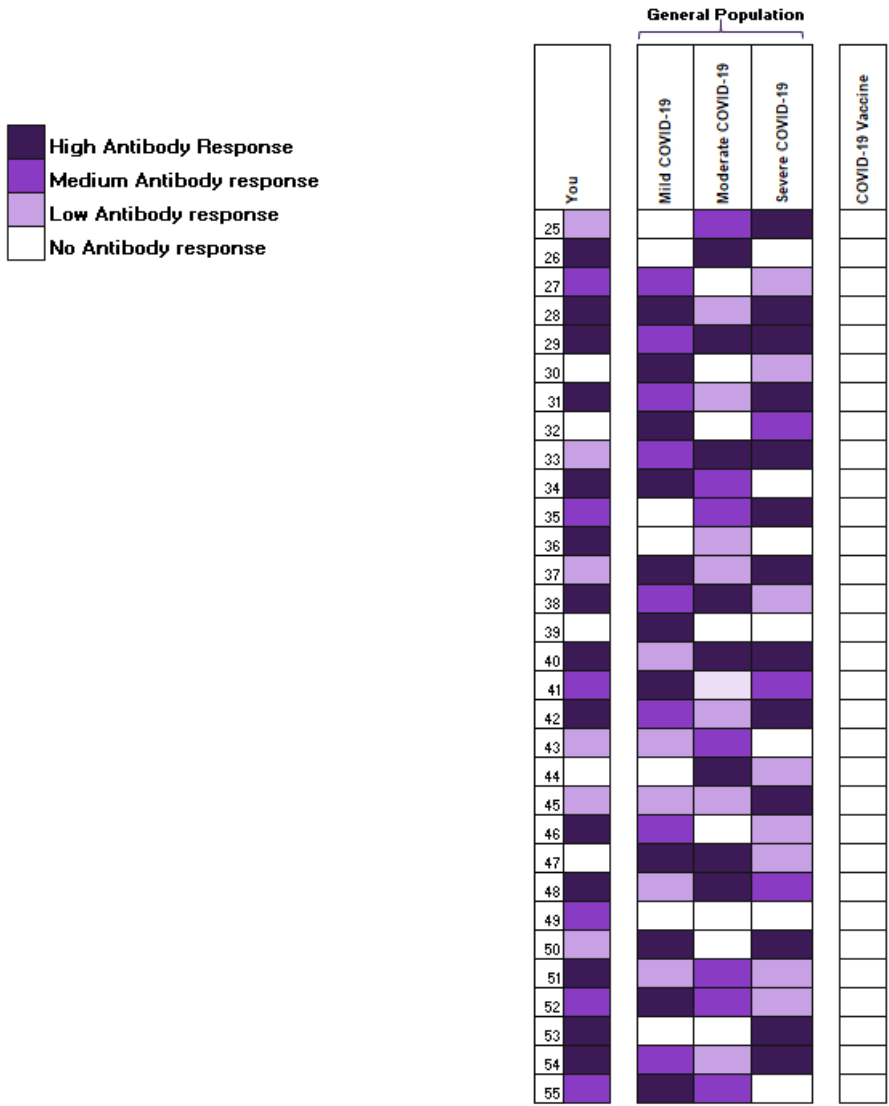
Each row shows an immune response that is high, medium, low, or none. Additionally, your antibody response level to each region is compared to the response made by other individuals in our database. The other individuals are categorized into different groups: those who experienced a mild case of COVID-19, those who experienced a moderate case of COVID-19, those who experience a severe case of COVID-19, and those that were vaccinated. To interpret each row, you can compare your response (column titled **You**) against the response of the other 4 groups. For example, the graph below shows that individuals who received the COVID-19 vaccine only develop an antibody response to the region represented in row 11. However, this does **NOT** mean they are any less protected than those who were naturally infected.

The Immune Map is meant to provide you with information that allows you to compare yourself to others who have experienced a range of severity of COVID-19 symptoms or to those who have been vaccinated. This is not meant to provide an indication of your personal level of immunity against COVID-19.



Immune Map Continued

Antibody rows 25-55 continued below.



Method

The SERA SARS-CoV-2 antibody analysis uses a random library of peptides to bind all antibodies, IgG and IgM, in a specimen. Using Next Generation Screening and a suite of proprietary analytical tools, these peptides can be mapped to describe the epitopes, or locations, to which the antibodies bind. From these data, scientists at Serimmune compute a score which reflects the total number and diversity of antibodies to the target. A more technical description of our methods can be found in the FAQ.

The presence of antibodies to the SARS-CoV-2 virus does not necessarily indicate immunity, but it may help researchers understand how long the immune response lasts, how the response differs in people that are vaccinated versus those that are naturally infected, and how the antibody profiles differ between people with severe versus mild disease. If you have questions about the report, please contact us at COVID19Study@serimmune.com.

Disclaimer

These results are being returned to you as part of research study. The Serimmune SARS-CoV-2 Serum Epitope Repertoire Analysis (SERA) assay has not been validated in a clinical setting and is not intended for use as a diagnostic. The SERA Assay detects the presence of antibodies that are associated with SARS-CoV-2 infection that have been identified from a repository of hundreds of individuals with confirmed COVID-19 infection and thousands of pre-pandemic controls. Even if you have been exposed to the virus, it is possible that antibodies may not be detected by the SERA assay.

- For Research Use Only. Not for use in diagnostic procedures.
- These results are provided as part of a research study examining immune response to COVID-19. As such, they are for research purposes only and are not for use in diagnostic procedures.
- These results were not conducted in a CLIA certified facility.
- As with every test the possibility for an incorrect result exists. The performance, sensitivity, specificity and accuracy of the methods used in this assessment have not be validated. This test is not a substitute for visits to a healthcare professional. You should consult with a healthcare professional if you have any questions or concerns about your health status.
- An indeterminate result indicates the results did not detect a clear presence or absence of antibodies from the sample provided.
- Do not use your results to start, stop, or change any course of treatment.
- This test does not provide information on specific immunity, neutralizing or immune status.
- Results from this test should not be used to make medical decisions. Results should be confirmed in a clinical setting with independent testing before taking any medical action.
- Immune response to COVID-19 is a complex biological process involving multiple immune cells and systems. This test does NOT provide complete information about your immunity to SARS-CoV2.
- This test does not detect all antibodies related to COVID-19. The absence of antibodies to SARS-CoV2 in this study does not mean that you lack immune response to the virus. Likewise, the presence of antibodies corresponding to epitopes on SAR-CoV2 does not mean that you are immune to the virus.
- If antibodies are detected, it can indicate exposure to the virus or a SARS-CoV-2 vaccine, but there is a small chance that antibodies from other infections may cross-react to SARS-CoV-2 on the SERA assay.
- Different companies offering serological testing for SARS-CoV2 may be measuring different immune epitopes, so you may get different results from a different test.

Glossary

Term	Definition
Acute	An illness that has developed recently. Antibodies associated with an acute illness generally will not last longer than six months.
Antibodies	An antibody is a protein found in the blood or other body fluids that is produced by a person's immune system to protect it from harmful invaders (such as bacteria, viruses, and parasites). Antibodies latch on to the foreign invaders and remove them from the body. The presence of antibodies does not necessarily mean that you have a disease or are ill but may be a sign that you were previously infected or have been vaccinated.
Antigens	An antigen is a substance, typically foreign to the body (a component such as a protein from bacteria, viruses, and parasites), that generates an immune response. When an antigen is introduced into the body, it triggers the production of antibodies.
Blood serum	Blood serum is the clear liquid that is a component of your blood and contains antibodies.
COVID-19 Subjects	Individuals in the Serimmune database that were diagnosed with COVID-19
Epitope	A specific region on the surface of a virus that an antibody recognizes and binds to, similar to a lock and key.
Functional Antibody Repertoire	Similar to a repertoire of skills or accomplishments a person has acquired, the functional antibody repertoire refers to the entire set of individual antibodies with functions you have acquired to fight off outside invaders. This is sometimes referred to as FAR
Glycoprotein	A type of protein that is found on the surface of a cell. Many viruses have glycoproteins that help them enter host cells (for example a person's cells).
IgG	IgG is the dominant antibody making up 70-80% of all immunoglobulins. The IgG antibody may help protect from a repeat infection in the future.
IgM	Generally, the first immunoglobulin made during a typical immunological response. These antibodies are associated with acute illness.
Immune response	Your body's reaction and defense against foreign invaders (e.g. bacteria, viruses, parasites, etc.).
Immune system	The immune system is the body's defense against infectious disease and foreign invaders (bacteria, viruses, toxins, parasites, etc.) to keep you healthy. The immune system defends against infections by producing antibodies. There are two main parts of the immune system: 1) The part you are born with, also called the innate immune system 2) The part you develop as your body is exposed to foreign or outside invaders, also called the adaptive immune system.
Immunoglobulins	The body produces different types of antibodies, or immunoglobulins (also known as Ig).

Glossary

Term	Definition
Natural exposure	Also known as natural immunity. Natural exposure is the creation of antibodies due to getting a disease or illness instead of through a vaccine.
Pandemic	A disease existing in almost a whole country or the world.
Pre-pandemic	The time period before a pandemic.
SARS-CoV-2 virus	A virus that causes the disease COVID-19. This virus is a part of a larger family of viruses call coronaviruses.
Serology	The measure of antibodies in the blood serum. Blood serum is the clear liquid that is a component of your blood and contains antibodies.
Seropositivity	Having or testing positive for the presence of a specific antibody.
Spike glycoprotein	A glycoprotein that extends or pokes out from the surface of some viruses (e.g. coronavirus).
Vaccine	A substance that is introduced into someone's body (usually via an injection) to produce immunity to a specific illness or disease.
Virus	A microorganism that causes infectious disease.