

Your SARS-CoV-2 Antibody 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.

This report is divided into two sections: the first section includes detailed results and interpretation from the most recent sample you provided. The second section is the longitudinal analysis that includes results from all of your previous samples and will allow you to see how your antibody response has changed over time.

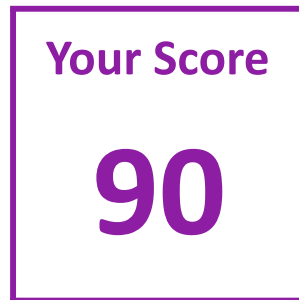
Summary of Results for Current Sample Only

Panel	Score	Interpretation
COVID-19 Total Antibody Score	90	This antibody score falls within the range of individuals who had COVID-19 or received a vaccine.
Vaccination vs. Natural Infection	8	This antibody score falls within the range of individuals who were vaccinated, but it can occur in some cases of natural infection.
Acute or Recent COVID-19 Infection	28	This antibody score falls within the range of individuals who do NOT have an acute or recent infection.

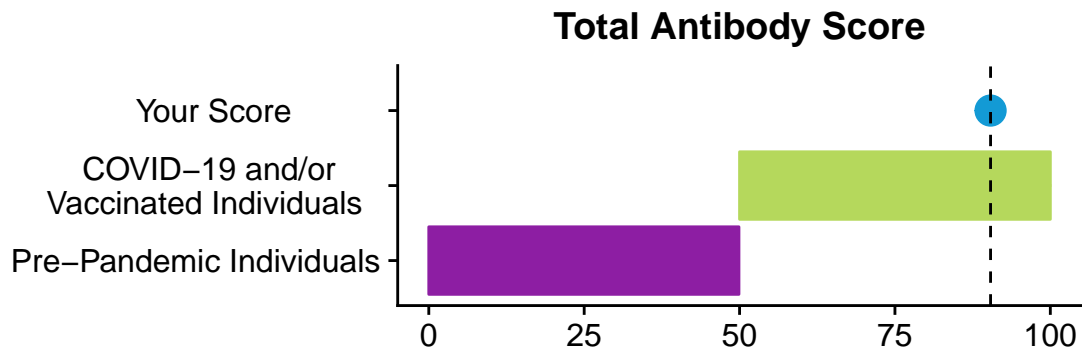
COVID-19 Total Antibody Score

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 0-49. You will also see a range of scores that come from individuals who have had COVID-19. This range is 50-100. **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 90. This antibody score falls within the range of individuals who had COVID-19 or received a vaccine.



Vaccination vs Natural Infection

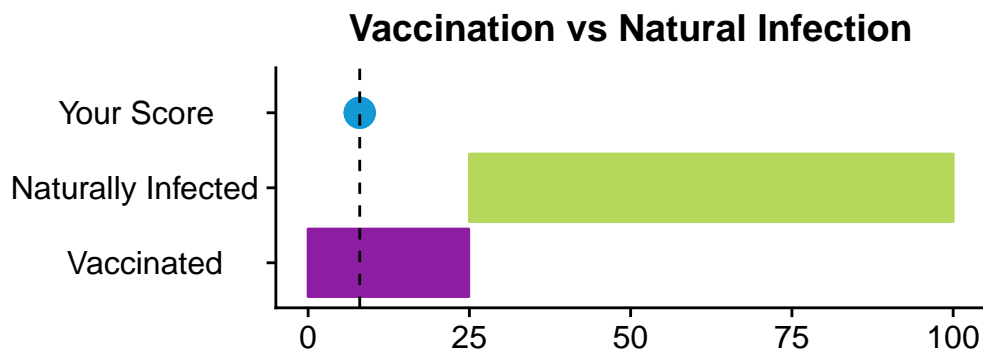
This result measures antibodies against proteins other than the spike glycoprotein, which indicate whether you have had COVID-19.

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 cells to start an infection. If the antibodies you make are only to the spike protein, you were likely vaccinated instead of having had a natural infection*. In a natural infection, most individuals develop antibodies against other proteins in addition to spike. 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 proteins other than spike, that only occur from a natural infection. For individuals that have been vaccinated, this range is 0-24. For naturally infected individuals, this range is 25-100. **Lower scores** indicate a greater likelihood that you were vaccinated. **Higher scores** reflect a greater likelihood of natural infection.



Your score is 8. This antibody score falls within the range of individuals who were vaccinated, but it can occur in some cases of natural infection.



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

Acute or Recent COVID-19 Infection

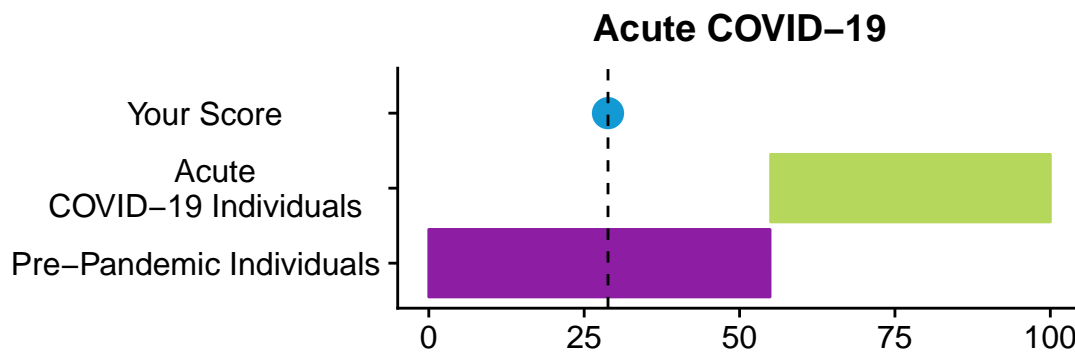
This score is an indication of whether you have acute or recent COVID-19. This is determined by the level of IgM antibodies in your blood. IgM antibodies associated with acute infections generally will not last longer than 6 months.

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 55-100. You will also see a range of scores that come from individuals prior to the pandemic (pre-pandemic). This range is 0-54. **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 is 28. This antibody score falls within the range of individuals who do NOT have an acute or recent infection.



Your Longitudinal Antibody Response

The first part of this report focused on your antibody response from your most recent sample. In this section, you will see how your response has changed over time.

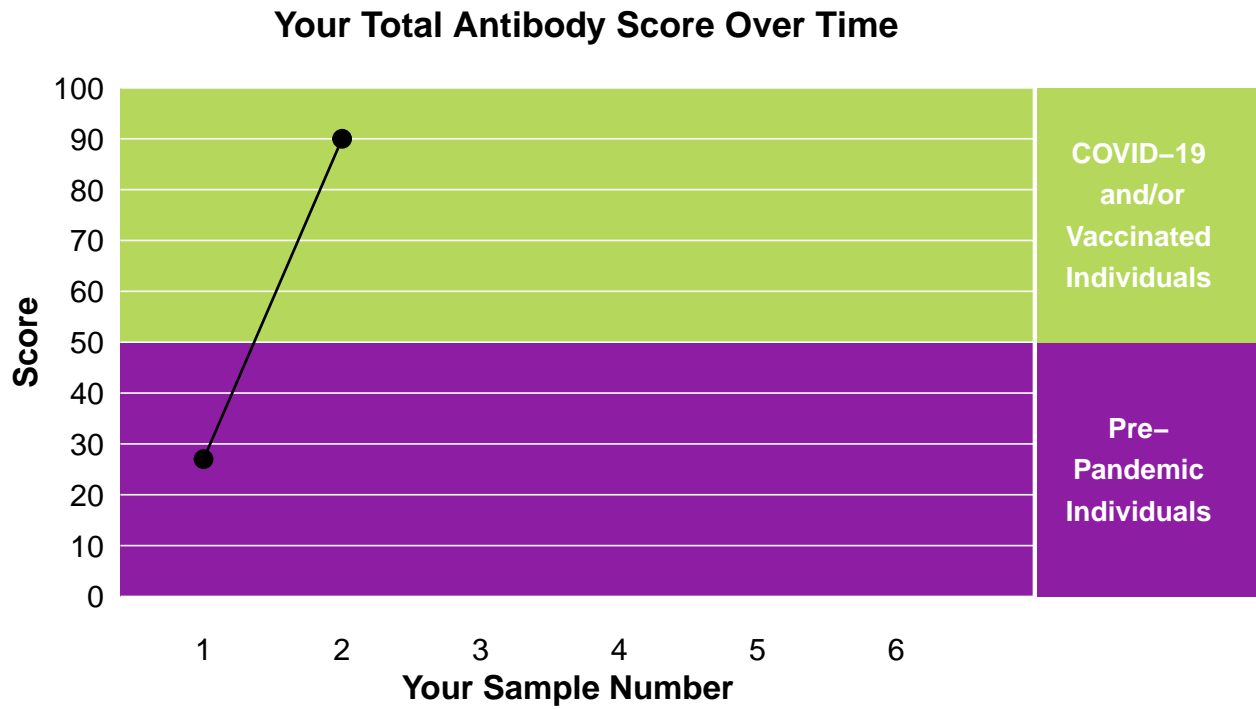
The change in your antibody scores reflects the change in your levels of the antibodies that are circulating in your blood. The information does not provide an indication of your personal level of immunity against COVID-19. Because the SARS-CoV-2 virus is so new, researchers are still learning about how the changes in antibody response correlate with protection and how long people will remain immune. One of the major questions our study is looking to answer is at what point do people become susceptible to the virus after vaccination or natural infection and whether/how the antibody response we measure reflects that susceptibility.

Your Samples

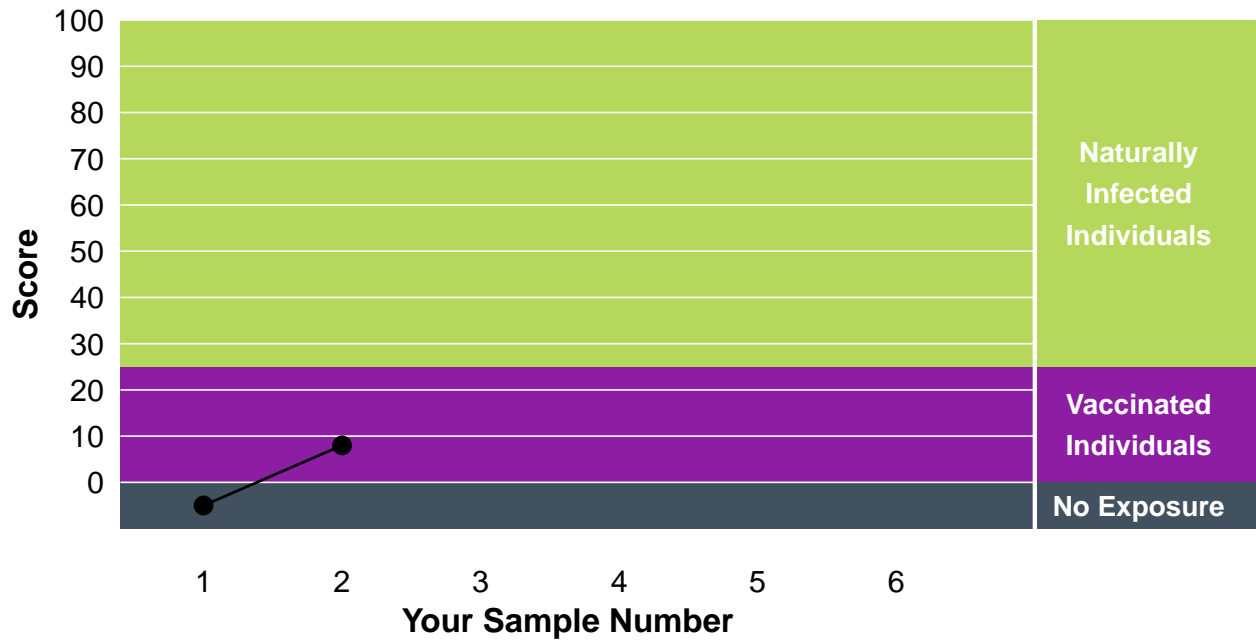
Here is a summary of the blood samples you provided us to date.

Sample Number	Approximate Date of Collection
1	2021-02-18
2	2021-04-16
3	
4	
5	
6	

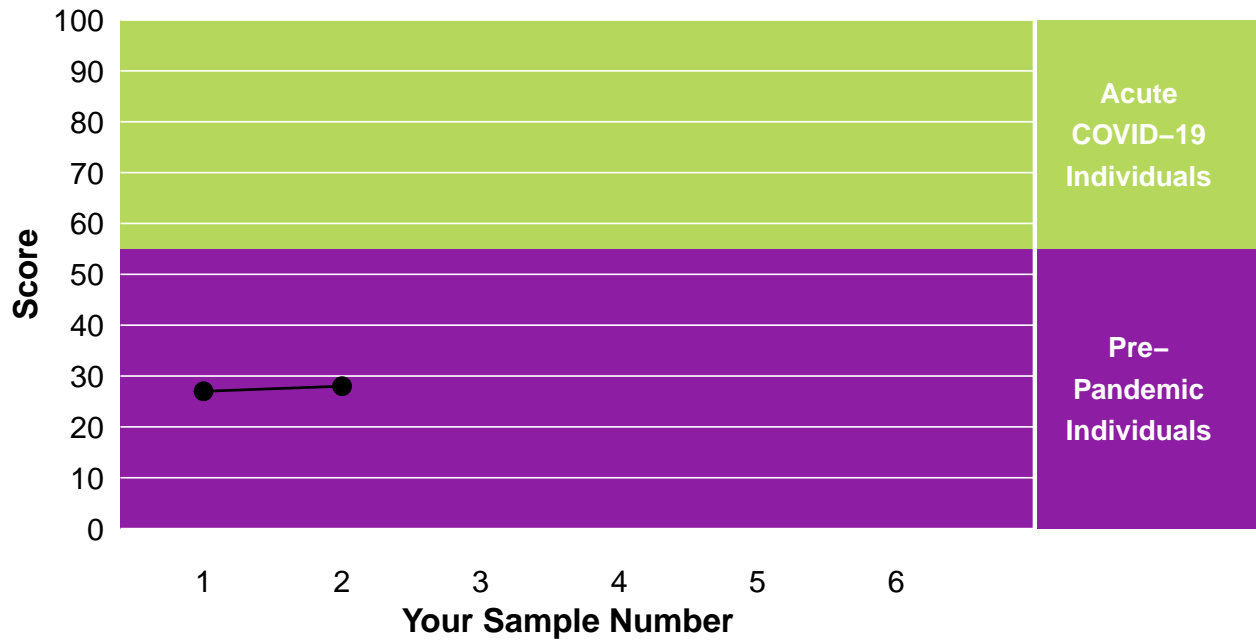
Changes in Your COVID-19 Antibody Response Over Time



Your Vaccination vs. Natural Infection Response Over Time



Your Acute Antibody Response Over Time

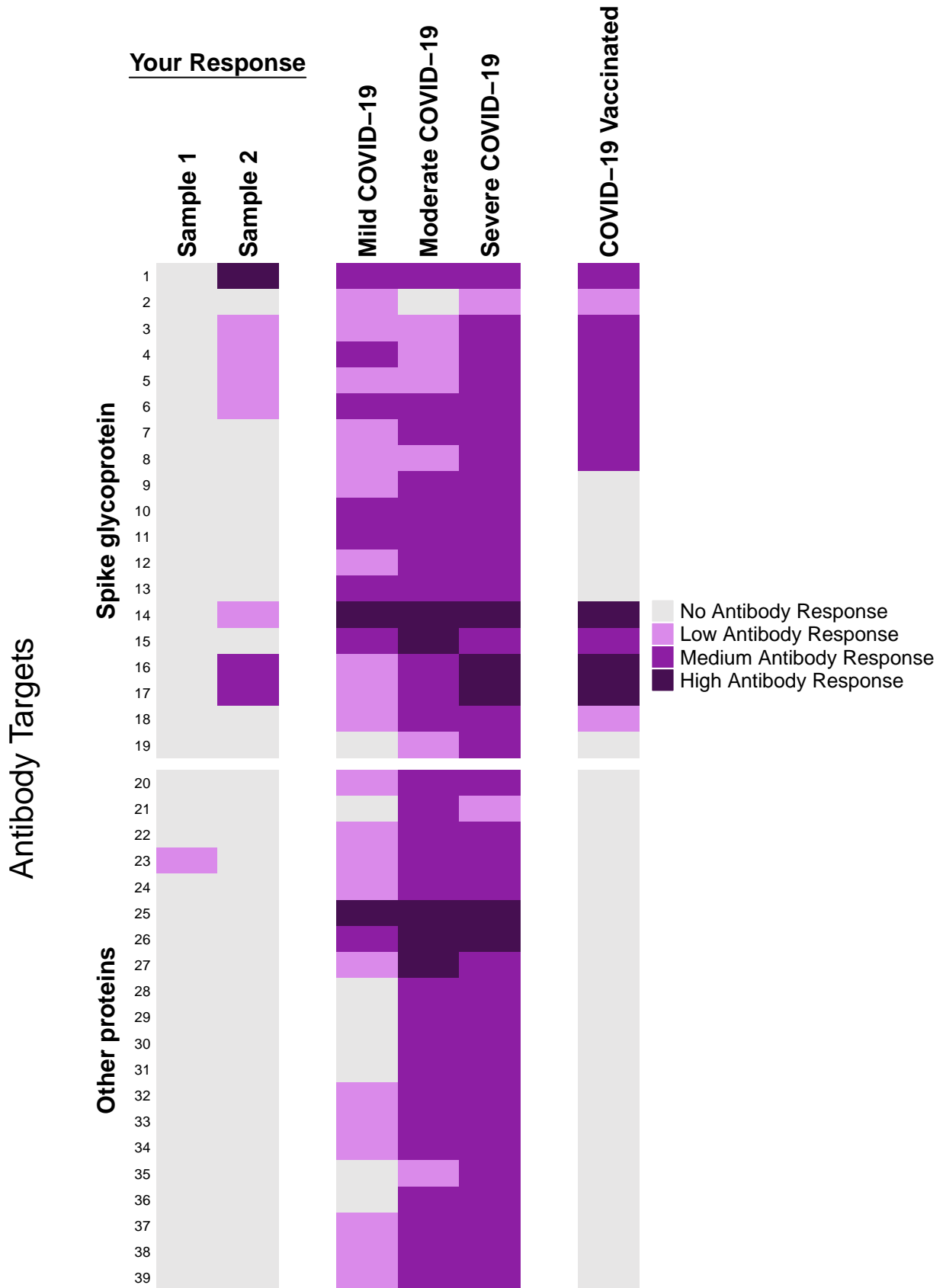


Immune Map

The graph on the next page provides a visual depiction of your antibody response to specific targets (epitopes or unique regions) on the SARS-CoV-2 virus from either natural infection or vaccination. Over the course of the study, with each sample you provide to us, you will see how your immune map changes over time. There are 39 rows in the graph, and each row represents a target that is recognized by a distinct antibody. Each row (target) is colored according to the level of response (or amount of antibodies) detected, which is reported as high, medium, low, or absent.

Each person's antibody response is unique and the purpose of this graph is to demonstrate how **your** response changes over time.

Additionally, as a reference, we show the range of antibodies that can be elevated in people who received a vaccine for COVID-19 and those who experienced mild, moderate, or severe cases of COVID-19, showing increased antibody response correlating with increased severity of illness. These do not represent profiles of individuals, but show the diversity and prevalence of antibodies within that group.



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 a 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 been 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-CoV-2.
- This test does not detect all antibodies related to COVID-19. The absence of antibodies to SARS-CoV-2 in this study does not mean that you lack immune response to the virus. Likewise, the presence

of antibodies corresponding to epitopes on SAR-CoV-2 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-CoV-2 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.
Epitope	A specific region on the surface of a virus that an antibody recognizes and binds to, similar to a lock and key.
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.).

Glossary

Term	Definition
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).
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 measuring 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.