

How can being sick with COVID-19 in the past protect you in the future?



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Abstract

Did you have COVID-19? Maybe you are better protected than you think! COVID-19 has changed a lot during the past three years. This makes it harder to fight. To try to stop the virus from spreading, scientists created vaccines. And many people got vaccinated! But some people who had COVID-19 might not need a vaccine because they are already protected. We wanted to know if this is true. We looked at 65 studies

and found out that a past infection offers good protection. This is especially true for older variants of the virus. The protection against the newest variant, Omicron, is weaker. It also declines faster with time. But the good news is that a past infection will still protect you from getting really sick!

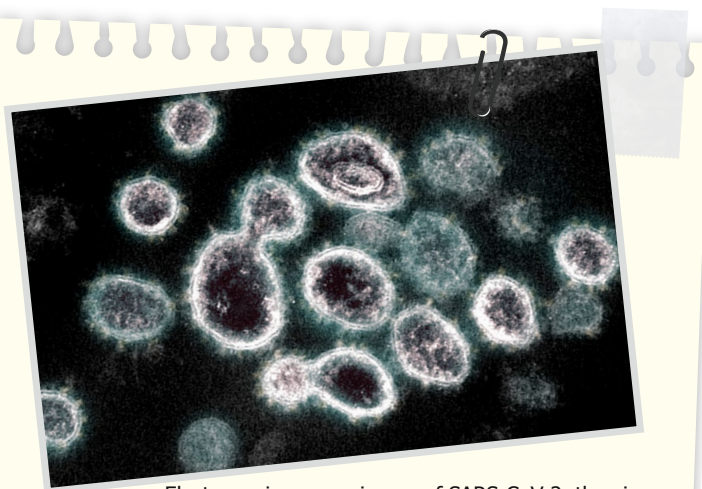
Introduction

COVID-19 has been around for three years now. The virus that causes it, **SARS-CoV-2**, has changed a lot during this time. So, there are many different **variants** of the virus. This makes it harder to fight it. Sadly, COVID-19 has taken the lives of millions of people. And many more got very sick.

People have tried different things to stop the virus from spreading. At first, we were on lockdowns. We had to stay away from other people and wear masks in public places. Then, scientists invented several **vaccines**. So, many places required proof of vaccination or a negative test to allow people to travel. In some countries, people could only go to restaurants or gyms if they were vaccinated.

Yet many people got protection (**immunity**) against the virus by catching COVID-19. Their body produces **antibodies** which help them recover. This is sometimes called **natural immunity**. Some of these people might not get any extra protection from the vaccine. Should they follow all the same rules? Many governments and employers still struggle with how to deal with that. Fortunately, there have been a lot of studies on COVID-19 in the last few years. Many of them try to figure out how getting COVID-19 in the past protects

you in the future. We decided to combine all these studies to answer some questions about past infection and future protection.



Electron microscope image of SARS-CoV-2, the virus that causes COVID-19.

Photo: Courtesy of the National Institute of Allergy and Infectious Diseases

Methods

We looked through studies published up until September 30, 2022. We searched scientific journals and news articles.

We wanted to compare studies on two groups:

1. people who did not have the vaccine but who had COVID-19, and
2. people who did not have the vaccine and had no COVID-19 infection.

We explored all the studies and made a statistical analysis.

This would help us see the bigger picture and find answers to some of the questions we had:

- How often can people who have had COVID-19 get reinfected?
- Are they less likely to get infected again compared to people who have never had COVID-19?
- Does a past infection protect against a more severe one?
- Does a reinfection happen shortly after the first infection?
- Are people reinfected with the same variant or a different one?

Results

We found a total of 65 studies that talk about these topics. They found that people in the first group were better protected than people in the second. Altogether, the studies showed that previous infection with COVID-19:

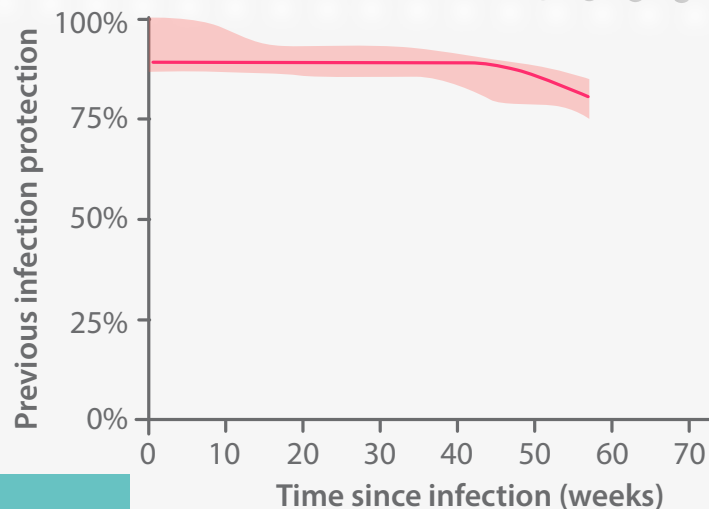
- gives you 82% protection against reinfection with Alpha, Beta, and Delta variants.
- gives you 45% protection against Omicron reinfection.
- would protect you against severe disease 78% of the time.

The protection declines over time but remains strong for several months. For re-infection with Alpha, Beta, and Delta variants it stays at 78% even after 10 months. The protection declines quicker for Omicron and drops to 36% after 10 months. Yet the protection against a severe disease remains high for all variants, including Omicron! (See Figure 1.)

Figure 1:

How a previous infection with COVID-19 protects against a severe infection by the Omicron variant over time. The shaded area represents an estimation of the variation in the data.

At least how long does the protection against severe infection by the Omicron variant last?



Discussion

Our results show that people who have had COVID-19 are quite protected! This is especially true for the older variants of the virus. For Omicron, the protection is weaker and lasts for less time. But people will not get very sick and they will

avoid going to hospital! Their protection should be enough so that they can still go to events or work.

These results don't mean that people should not get vaccinated. Vaccination can offer better and more lasting

protection. It is better at protecting older people and people with weaker **immune systems**. Not to mention, it's a lot safer than getting sick! Plus, if you are sick, chances are you will infect other people.

It's also important to continue to research protection after infection. This would help with predicting the future impact of COVID-19 on us.

Conclusion

COVID-19 is just one of many infectious diseases out there. And it's not the most dangerous one! You can do a lot to help protect yourselves and others from infections.

- Follow your vaccination calendar – it's truly important! Having your vaccination is the safest way to get immunity.

- Wash your hands often. You never know what you may have touched.
- Don't go to school if you are sick.
- Avoid contact with people who seem sick.

Glossary of Key Terms

Antibodies – proteins produced by our bodies that can recognize a part of a virus or a bacteria. Antibodies can kill them directly or tag them for further attack by other parts of the immune system.

COVID-19 – Coronavirus disease 2019, a disease caused by the SARS-CoV-2 coronavirus. Symptoms may include fever and dry cough in milder cases or difficulty breathing and death in more severe cases.

Immune system – your body's defense system against disease.

Immunity – the ability of your immune system to fight off disease. We gain immunity either by being exposed to the disease or by vaccination.

Natural immunity – when you get infected with a virus (or bacteria, etc.), your body fights it off and produces antibodies. They help protect you from getting infected again.

Reinfection – getting infected with a disease (i.e. COVID-19) after you have already had it.

SARS-CoV-2 – the coronavirus that causes COVID-19 in humans.

Vaccine – a substance given to a person which helps the immune system to develop antibodies. The immune system now knows how to fight this type of infection. For instance, most children receive the Measles, Mumps, and Rubella vaccine (MMR) to prevent getting these diseases in the future.

Variant – a version of a virus that has slightly different genes from the first/main type but is not different enough to be called a new virus. SARS-CoV-2 has several variants, such as Alpha, Delta, and Omicron. Delta spreads faster than Alpha. Omicron spreads even faster than Delta but it doesn't make people as sick.

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CDC: What is COVID-19 reinfection?

<https://www.cdc.gov/coronavirus/2019-ncov/your-health/reinfection.html>

Johns Hopkins Medicine: COVID natural immunity – what you need to know

<https://www.hopkinsmedicine.org/health/conditions-and-diseases/coronavirus/covid-natural-immunity-what-you-need-to-know>

Check your understanding

1 What is the difference between COVID-19 and SARS-CoV-2? Can you think of other such pairs?

2 In what ways can you get protection against COVID-19 (or other diseases)?

3 What factors impact COVID-19 natural immunity?

4 We compared studies on two groups: people who did not have the vaccine but who had COVID-19 and people who did not have the vaccine and had no COVID-19 infection. Why do you think that is?

5 As a class or group, carry out your own statistical analysis. How many people in your class got COVID-19? (You could also include all of your parents and siblings if you like.) Did they get reinfected? How many were vaccinated? Did they get infected? Write the answers in a table and calculate the percentages. What was better at protecting all of you – vaccines or past infection?

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