

Does COVID-19 lead to immunity?

After natural infection or vaccination, the immune system produces antibodies against the virus; this usually happens within a couple of weeks. But studies that only measure antibody levels don't tell the whole story. Antibody levels in the blood normally decline over time, but the long-lived memory B cells that make antibodies remain on guard and ready to resume antibody production if they encounter the virus again. T cells, [a different type of immune cell](#), also play a role in maintaining long-lasting protection.

People with compromised immunity—such as people receiving certain types of cancer treatment, people with untreated or advanced HIV and organ transplant recipients—may have a weaker immune response.

Studies have shown that people who recover from COVID-19 or who have been vaccinated appear to be protected for several months and possibly much longer. Receiving two doses of the [Pfizer/BioNTech](#) and [Moderna](#) vaccines provide stronger and longer-lasting protection than a single dose. The [Johnson & Johnson vaccine](#) only requires a single dose. Although antibody levels naturally decline over time, memory B cell and T cell responses continue to provide protection. Further follow-up is needed to see how long this protection lasts.

SARS-CoV-2 reinfection and breakthrough infection after vaccination can occur, but the risk is much lower compared with people who did not previously have COVID-19 or who are unvaccinated. People who are reinfected or who contract the virus after vaccination typically have milder disease. This offers real-world evidence that past infection confers protection.

[Population or herd immunity](#) occurs when enough people are immune that the virus cannot spread easily. Experts do not know the herd immunity threshold for SARS-CoV-2—or even whether it can be achieved at all.

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