# Addressing COVID-19 Vaccine Misunderstandings

## The Issue

Misinformation about COVID-19 vaccines continues to circulate. When the vaccines were first authorized, much misinformation could be categorized as myths: unfounded or false notions that are simply not true (e.g., "receiving a COVID-19 vaccine can make you magnetic").

Now, much misinformation can be thought of as misunderstandings: beliefs not supported by current evidence. Misunderstandings can be addressed with factual information presented in a way that the listener can accept.

## Common COVID-19 Vaccine Misunderstandings

**Misunderstanding:** You don't need a vaccine if you've already had COVID-19.

**Fact:** An increasing proportion of the U.S. population has had SARS-CoV-2 infection and might be at risk for SARS-CoV-2 reinfection leading to hospitalization. COVID-19 vaccination following infection provides additional protection against severe disease and hospitalization.

One of the challenges of the rapidly evolving COVID-19 pandemic has been characterizing the human immune response to SARS-CoV-2, including the duration and level of protection antibodies may provide against reinfection. Previous infection with SARS-CoV-2 had been estimated to confer high (~90%) protection against reinfection.[1] This high level of protection continued to be true for the Alpha, Beta, and Delta variants, and reinfections remained rare. However, protection against reinfection was substantially lower for the Omicron variant (~60%) and even lower for Omicron subvariants.[2,3] Data from Denmark confirmed that reinfection with the Omicron BA.[2] subvariant occurred as soon as 20 days after infection with Omicron BA.1.[4]

COVID-19 vaccination after SARS-CoV-2 infection confers what is known as hybrid immunity. There is mounting evidence that hybrid immunity is superior to infection- and vaccine-induced immunity.[5,6]

COVID-19 vaccination after SARS-CoV-2 infection is especially important—and effective—for preventing reinfection-associated hospitalization. In a Centers for Disease Control and Prevention (CDC) analysis of data from adult patients with a previous SARS-CoV-2 infection, the estimated vaccine effectiveness against hospitalization associated with COVID-19 was 47.5% after a two-dose primary series and 57.8% after a booster dose during the Delta-predominant period (June 20–December 18, 2021).[1] During the Omicron-predominant period (December 19, 2021–February 24, 2022), vaccine effectiveness was 34.6% after the primary series and 67.6% after a booster dose.

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The CDC recommends that everyone 6 months of age and older—including those with a history of symptomatic or asymptomatic SARS-CoV-2 infection—stay up to date with COVID-19 vaccination.[7] People with COVID-19 should wait to receive any vaccine, including a COVID-19 vaccine, until they recover and complete the recommended isolation period. Additionally, people who recently had COVID-19 may consider delaying their next vaccine dose (primary dose or booster) by 3 months from when their symptoms started (or from when they first received a positive test, if they had no symptoms). Increased time between infection and vaccination may result in an improved immune response to vaccination.

**Misunderstanding:** The "natural" immunity you get from being sick with COVID-19 is better than the immunity you get from COVID-19 vaccination.

**Fact:** Getting a COVID-19 vaccination and staying up to date with the recommended vaccines is a safer and more dependable way to build immunity to COVID-19 than getting sick with COVID-19.

Both infection with SARS-CoV-2 and vaccination against COVID-19 induce a robust humoral and cellular immune response that initially confers high levels of protection against symptomatic COVID-19 illness.6 The immune response produced by COVID-19 vaccination is widely accepted as more predictable and consistent than the immune response produced by SARS-CoV-2 infection (sometimes referred to as "natural immunity"). The degree of immune response following infection may vary depending on factors such as viral load, the presence and severity of COVID-19 symptoms, the patient's age, and underlying medical conditions.

Vaccination also is a much safer way than infection with SARS-CoV-2 to build immunity to COVID-19. Hundreds of millions of people in the United States have received COVID-19 vaccines during the most intense safety monitoring program in U.S. history. Serious adverse events and reports of death following COVID-19 vaccination are rare. In contrast, more than 5 million Americans have been hospitalized with COVID-19, and more than 1 million have died. Nearly 1 in 5 American adults who have had COVID-19 report having "long COVID" symptoms.

If the concept of "better" is defined in terms of protection against SARS-CoV-2 and hospitalization, neither infection-induced immunity nor vaccination-induced immunity has a clear edge, especially as SARS-CoV-2 variants continue to emerge. In one analysis of data from California and New York covering the period May to November 2021, COVID-19 case rates and hospitalizations initially were higher among unvaccinated persons with a previous COVID-19 diagnosis (i.e., infection-induced immunity) than among vaccinated persons without a previous diagnosis (i.e., vaccination-induced immunity).8 This relationship changed after the Delta variant became predominant in late June and July 2021. By the week beginning October 3, case rates were higher in the vaccination-induced immunity group than in the infection-induced immunity group. But as the authors noted, this was a time when vaccination-induced immunity declined for many persons because of immune evasion and immunologic waning. The analysis was conducted before many persons were eligible or had received additional or booster vaccine doses.

The Omicron subvariants BA.4 and BA.5 that became dominant in July 2022 appeared to be the most capable versions of the virus yet at evading *both* infection-induced immunity and vaccination-induced immunity. Staying up to date with recommended COVID-19 vaccines offers the best protection against severe illness, hospitalization, and death. The recommendations will continue to reflect the latest data related to safety and how well vaccines work, including over time and against new variants. COVID-19 bivalent booster vaccines became available in fall 2022.

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**Misunderstanding:** COVID-19 vaccines cause variants.

**Fact:** COVID-19 vaccines do not create or cause variants of the virus that causes COVID-19. Instead, COVID-19 vaccines can help prevent new variants from emerging.

New variants are an expected part of the evolution of a virus, including SARS-CoV-2. Viruses continuously evolve as changes occur in the genetic code during the replication of the genome. The changes may be caused by genetic mutations or viral recombination.

As a virus spreads, it has more opportunities to change. High vaccination coverage in a population reduces viral transmission and helps to prevent new variants from emerging.9 The CDC recommends COVID-19 primary series vaccines for everyone ages 6 months and older and COVID-19 boosters for all eligible persons.

**Misunderstanding:** The widespread availability of treatments for COVID-19, such as antiviral medications and monoclonal antibodies, eliminates the need to be vaccinated.

**Fact:** COVID-19 treatments are a complement to vaccines. They are not a substitute for vaccination, which remains the most effective strategy for preventing severe disease, hospitalization, and death.

Currently authorized treatments for COVID-19 fall into two categories:

- *Antiviral medications* target specific parts of the virus to stop it from multiplying in the body. Examples include the oral agents nirmatrelvir with ritonavir (Paxlovid) and molnupiravir (Lagevrio). Another example is remdesivir (Veklury), which is administered by intravenous infusion over multiple consecutive days.
- *Monoclonal antibodies* help the immune system recognize and respond more effectively to the virus. Bebtelovimab is an example; it is administered as a single intravenous injection.

These treatments are approved or authorized to treat mild to moderate COVID-19 in people at high risk for progression to severe disease, including hospitalization or death.

One of the axioms of health care is that it is far better to prevent disease than to treat people after they get sick. Just as the availability of influenza antiviral drugs does not remove the need for annual flu vaccination, COVID-19 treatments cannot replace vaccination. Instead, the treatments are an important and valuable addition to the arsenal of options against SARS-CoV-2.

COVID-19 treatments have some important drawbacks. Remdesivir and bebtelovimab must be administered intravenously. Oral antiviral medications are available only by prescription to individual patients with positive results from a direct SARS-CoV-2 viral test. The prescriber must consider the patient to be at high risk for progression to severe COVID-19; there is no evidence of benefit in patients at average risk. The window for treatment is short: antiviral therapy must be initiated within 5 days of the onset of symptoms. Paxlovid is not recommended for people with serious kidney or liver disease, and Lagevrio is not recommended for use during pregnancy. Adverse effects and drug interactions are possible.

In contrast, it is safe for most people to get vaccinated against COVID-19. The main contraindication to vaccination is a history of severe allergic reactions or anaphylaxis to any of the ingredients of the COVID-19 vaccine. The CDC recommends COVID-19 primary series vaccines for everyone ages 6 months and older, and COVID-19 boosters for all eligible persons.

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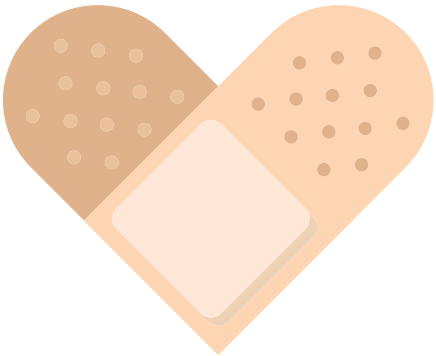

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