



COVID-19

can and wear a mask indoors in public if you are in [an area of substantial or high transmission](#).

The Possibility of COVID-19 after Vaccination: Breakthrough Infections

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The bottom line: COVID-19 vaccines protect people against severe illness, including disease caused by Delta and other variants circulating in the U.S.

- COVID-19 vaccines protect people from getting infected and severely ill, and significantly reduce the likelihood of hospitalization and death.
- The best way to slow the spread of COVID-19 and to prevent infection by Delta or other variants is to get vaccinated.
- For people who are vaccinated and still get infected (i.e., “breakthrough infections”), there is a risk of transmission to others.
- That is why, if you are vaccinated or unvaccinated and live or work in an area with [substantial or high transmission](#) of COVID-19, you – as well as your family and community – will be better protected if you wear a mask when you are in indoor public places.
- People who are [immunocompromised](#) may not always build adequate levels of protection after an initial 2-dose primary mRNA COVID-19 vaccine series. They should continue to take all precautions recommended for unvaccinated people, until advised otherwise by their healthcare provider. Further, CDC recommends that moderately to severely [immunocompromised people receive an additional dose](#).

COVID-19 vaccines are effective at preventing infection, serious illness, and death. Most people who get COVID-19 are unvaccinated. However, since vaccines are not 100% effective at preventing infection, some people who are [fully vaccinated](#) will still get COVID-19. An infection of a fully vaccinated person is referred to as a “breakthrough infection.”

What We Know about Vaccine Breakthrough Infections

- Breakthrough infections are expected. COVID-19 vaccines are effective at preventing most infections. However, like most vaccines, they are not 100% effective.
- Fully vaccinated people with a breakthrough infection are less likely to develop serious illness than those who are unvaccinated and get COVID-19.
- Even when fully vaccinated people develop symptoms, they tend to be less severe symptoms than in unvaccinated people. This means they are much less likely to be hospitalized or die than people who are not vaccinated.
- People who get vaccine breakthrough infections can be contagious.

CDC is collecting data on vaccine breakthrough infections and closely monitors the safety and effectiveness of all Food and Drug Administration (FDA)-authorized COVID-19 vaccines. Because vaccines are not 100% effective, as the number of people who are fully vaccinated goes up, the number of breakthrough infections will also increase. However, the risk of infection

remains much higher for unvaccinated than vaccinated people. Vaccines remain effective in protecting most people from COVID-19 infection and its complications.

Vaccine Breakthroughs and Variants


CDC continues to actively monitor vaccine safety and effectiveness against new and emerging variants for all FDA-authorized COVID-19 vaccines. Research shows that the FDA-authorized vaccines offer protection against severe disease, hospitalization, and death against currently circulating variants in the United States. However, some people who are fully vaccinated will get COVID-19.

The Delta variant is more contagious than previous variants of the virus that causes COVID-19. However, studies indicate that the vaccines used in the United States work well against the Delta variant, particularly in preventing severe disease and hospitalization. Overall, if there are more infections with SARS-CoV-2 (the virus that causes COVID-19) there will be more vaccine breakthrough infections. However, the risk of infection, hospitalization, and death are all much lower in vaccinated compared to unvaccinated people. Therefore, everyone aged 12 years and older should get vaccinated to protect themselves from severe disease and death.

How CDC Monitors Breakthrough Infections

CDC has multiple surveillance systems and ongoing research studies to monitor the performance of vaccines in preventing infection, disease, hospitalization, and death. CDC also collects data on breakthrough infections through outbreak investigations. One important system that CDC uses to track breakthrough infections is COVID-NET ([the Coronavirus Disease 2019 \[COVID-19\]-Associated Hospitalization Surveillance Network](#)). This system provides the most complete data on vaccine breakthroughs in the general population. COVID-NET is a population-based surveillance system that collects reports of lab-confirmed COVID-19-related hospitalizations in 99 counties in 14 states. COVID-NET covers approximately 10% of the U.S. population. [One recent COVID-NET publication](#) assessed the effectiveness of COVID-19 vaccines in preventing hospitalization among adults ≥ 65 years. More information on COVID-NET vaccine breakthrough data will be published as it becomes available.

Examples of CDC's systems for monitoring include:

Outcome monitored	Population monitored	Monitoring system
Infection	Long-term care facility residents	NHSN
Infection and symptomatic illness	Healthcare providers and frontline workers	HEROES/RECOVER
Hospitalization and deaths	Hospitalized adults	IVY
Hospitalization and deaths	Hospitalized people (all ages)	COVID-NET
Urgent care, emergency care, hospitalization and deaths	Urgent care, emergency departments, and hospitalized people (all ages)	VISION 

Voluntary Reporting by State Health Departments

When the United States began widespread COVID-19 vaccination, CDC put in place a system where state health departments could report COVID-19 breakthrough infections to CDC. After collecting data on thousands of breakthrough infections, CDC changed the reporting system (on May 1, 2021) to improve data quality on breakthrough infections, and primarily focus on those among people who are hospitalized or die. This shift helped maximize the quality of the data collected on infections of greatest clinical and public health importance. Currently, [49 states are reporting data](#).

By monitoring breakthrough infections that result in hospitalization or death, CDC can focus on identifying:

- Unexpected patterns, such as trends in age or sex.
- The specific types or brands of vaccine involved.
- Underlying health conditions in these persons.
- Which SARS-CoV-2 variants are observed in persons who are hospitalized or who die.
- Demographic cohorts (e.g., essential workers, health care workers, elderly).

So far, CDC has not observed any unexpected patterns in these reported breakthrough infections.

Related Pages

- › [Effectiveness of COVID-19 Vaccines](#)
- › [What We Know about How Well COVID-19 Vaccines Are Working](#)

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