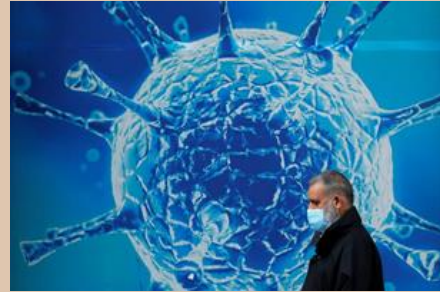


# Vaccine Breakthrough

## Are there cracks in the vaccine wall?

*There has been a lot of media attention regarding “breakthrough” infections in vaccinated people. What is a breakthrough infection? Should this be of concern to people who are vaccinated? Is it still worth getting vaccinated? What about masks?*

*According to the CDC “a vaccine breakthrough infection is defined as the detection of SARS-CoV-2 RNA or antigen in a respiratory specimen collected from a person  $\geq 14$  days after receipt of all recommended doses of an FDA-authorized COVID-19 vaccine.” A recent CDC review reported 10,262 breakthrough infections for an overall rate of 0.008%. Cases tended to be female (63%), older (median age 58), and 73% were symptomatic. About 10% of cases were hospitalized (71% were related to COVID-19 symptoms) and 2% died (82% were related to COVID-19 infection). In cases where genomic sequencing data was available, 64% were variants of concern but the rate of variants was rising over the last 2 weeks of the analysis.*



## Abstract

- COVID-19 vaccines are a critical tool for controlling the ongoing global pandemic. The Food and Drug Administration (FDA) has issued Emergency Use Authorizations for three COVID-19 vaccines for use in the United States. In large, randomized-controlled trials, each vaccine was found to be safe and efficacious in preventing symptomatic, laboratory-confirmed COVID-19 (1–3). Despite the high level of vaccine efficacy, a small percentage of fully vaccinated persons (i.e. received all recommended doses of an FDA-authorized COVID-19 vaccine) will develop symptomatic or asymptomatic infections with SARS-CoV-2, the virus that causes COVID-19 (2–8).
- CDC is working with state and territorial health departments to investigate SARS-CoV-2 infections among persons who are fully vaccinated and to monitor trends in case characteristics and SARS-CoV-2 variants identified from persons with these infections. For this surveillance, a vaccine breakthrough infection is defined as the detection of SARS-CoV-2 RNA or antigen in a respiratory specimen collected from a person  $\geq 14$  days after receipt of all recommended doses of an FDA-authorized COVID-19 vaccine. State health departments voluntarily report vaccine breakthrough infections to CDC.<sup>†</sup> When possible, genomic sequencing is performed on respiratory specimens that test positive for SARS-CoV-2 RNA (9).
- A total of 10,262 SARS-CoV-2 vaccine breakthrough infections had been reported from 46 U.S. states and territories as of April 30, 2021. Among these cases, 6,446 (63%) occurred in females, and the median patient age was 58 years (interquartile range = 40–74 years). Based on preliminary data, 2,725 (27%) vaccine breakthrough infections were asymptomatic, 995 (10%) patients were known to be hospitalized, and 160 (2%) patients died. Among the 995 hospitalized patients, 289 (29%) were asymptomatic or hospitalized for a reason unrelated to COVID-19. The median age of patients who died was 82 years (interquartile range = 71–89 years); 28 (18%) decedents were asymptomatic or died from a cause unrelated to COVID-19. Sequence data were available from 555 (5%) reported cases, 356 (64%) of which were identified as SARS-CoV-2 variants of concern,<sup>§</sup> including B.1.1.7 (199; 56%), B.1.429 (88; 25%), B.1.427 (28; 8%), P.1 (28; 8%), and B.1.351 (13; 4%).

*No vaccine is perfect, working 100% of the time with no side effects. Vaccine breakthrough cases are expected. This is magnified since we are still doing a lot of testing of asymptomatic people (hospital procedures, surgeries, etc.) as well as people with very mild symptoms. At the time of this analysis, there were over 130 million people in the US who were fully vaccinated. The numbers reported are undoubtedly low especially since asymptomatic (and mildly symptomatic) people who don't need to be tested will never know they “had” it. Even if these numbers are 100X what is reported (and they aren't), the number of breakthrough infections would still be 0.8%. If you are vaccinated, the risk of contracting COVID-19 is very low (well under 1%). The chance of a severe infection is at least 90% less than the overall risk of getting the virus.*

*There is strong evidence that the vaccine protects from severe infection even if the virus is contracted. Are variants a concern? Yes, it seems most of the breakthrough cases will involve variants. At this point, there is no evidence that the vaccines are anything but greatly effective against all of the variants of COVID-19. Additionally, more evidence that natural infection and vaccines induce long-term immunity and that transmission from the small number of vaccinated people who contract the virus is greatly inhibited.*

*It drives me crazy to see comments on media articles from people stating that the vaccine doesn't keep you from getting or spreading the virus. WRONG - THAT'S EXACTLY WHAT IT DOES! If you are vaccinated your risk of contracting and then spreading is extremely low, so no, you don't need a mask. We need to stop focusing on cases and look at the public health impact of our policies. Our immune system + effective vaccines are amazing!*

COVID-19 Vaccine Breakthrough Infections Reported to CDC — United States, January 1–April 30, 2021. MMWR Morb Mortal Wkly Rep 2021;70:792–793.