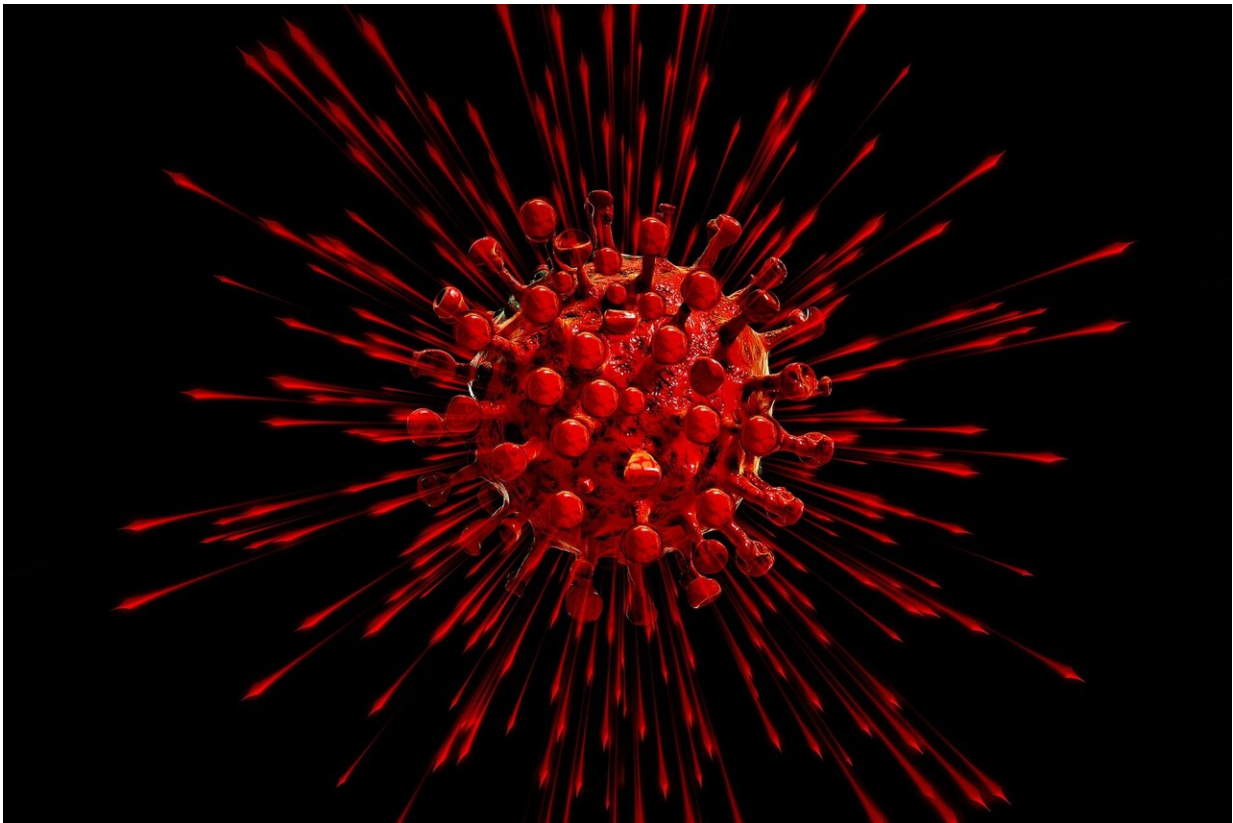


# Study examines severe breakthrough cases of COVID-19

September 8 2021, by Mallory Locklear

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A new Yale study provides important insights into breakthrough COVID-19 cases—instances where fully vaccinated individuals are infected by SARS-CoV-2—and who is particularly vulnerable to serious

illness.

In a study of hospitalized patients in the Yale New Haven Health System, researchers identified 969 individuals who tested positive for the SARS-CoV-2 [infection](#) during a 14-week period between March and July 2021. Of that group, 54 were fully vaccinated.

"These cases are extremely rare, but they are becoming more frequent as variants emerge and more time passes since patients are vaccinated," said Hyung Chun, associate professor of medicine (cardiology) at Yale and senior author of the study published Sept. 7 in *Lancet Infectious Diseases*.

As of Aug. 30, the Centers for Disease Control and Prevention had received reports of 12,908 patients with breakthrough infections who were hospitalized or died—less than 0.008% of fully vaccinated individuals in the United States. "Identifying who is more likely to develop severe COVID-19 illness after vaccination will be critical to ongoing efforts to mitigate the impact of these breakthrough infections."

While researchers in the new study observed a wide range of illness severity among the fully vaccinated patients who were hospitalized and tested positive for COVID-19, more than a quarter of this group were found to have severe or critical disease. All patients with severe or critical cases—14 in total—required supplementary oxygen support, four were admitted to the intensive care unit, and three died.

These patients tended to be older—between 65 and 95 years old with a median age of 80.5—and had preexisting comorbidities, such as cardiovascular disease and Type 2 diabetes. A subset of patients was also on immunosuppressive drugs that may affect vaccine efficacy.

"The majority of fully vaccinated patients experience mild or no

symptoms if infected with SARS-CoV-2," Chun said. "This research identifies those who suffered more severe disease, and we need a better understanding of how to best manage these patients."

Chun noted that many of the patients with severe breakthrough infections in the study were hospitalized before the Delta [variant](#) became the predominant variant of SARS-CoV-2 in the United States. Additional research will be needed to determine the impact of the Delta variant on the rate of breakthrough COVID-19, he said.

Chun and his colleagues are now investigating severe breakthrough cases to examine what is taking place at the molecular level. His team plans to study these patients to identify any unique mechanisms that may be driving [disease](#) severity in the breakthrough cases compared with COVID-19 infections in those yet to be vaccinated.

"It's clear that the vaccines are highly effective, and without them we would be facing a much deadlier pandemic," he said. "As effective as the vaccines are, with emerging variants and increasing cases of breakthrough infections, we need to continue to be vigilant in taking measures such as indoor masking and social distancing."

**More information:** Prerak V Juthani et al, Hospitalisation among vaccine breakthrough COVID-19 infections, *The Lancet Infectious Diseases* (2021). [DOI: 10.1016/S1473-3099\(21\)00558-2](https://doi.org/10.1016/S1473-3099(21)00558-2)

Provided by Yale University

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