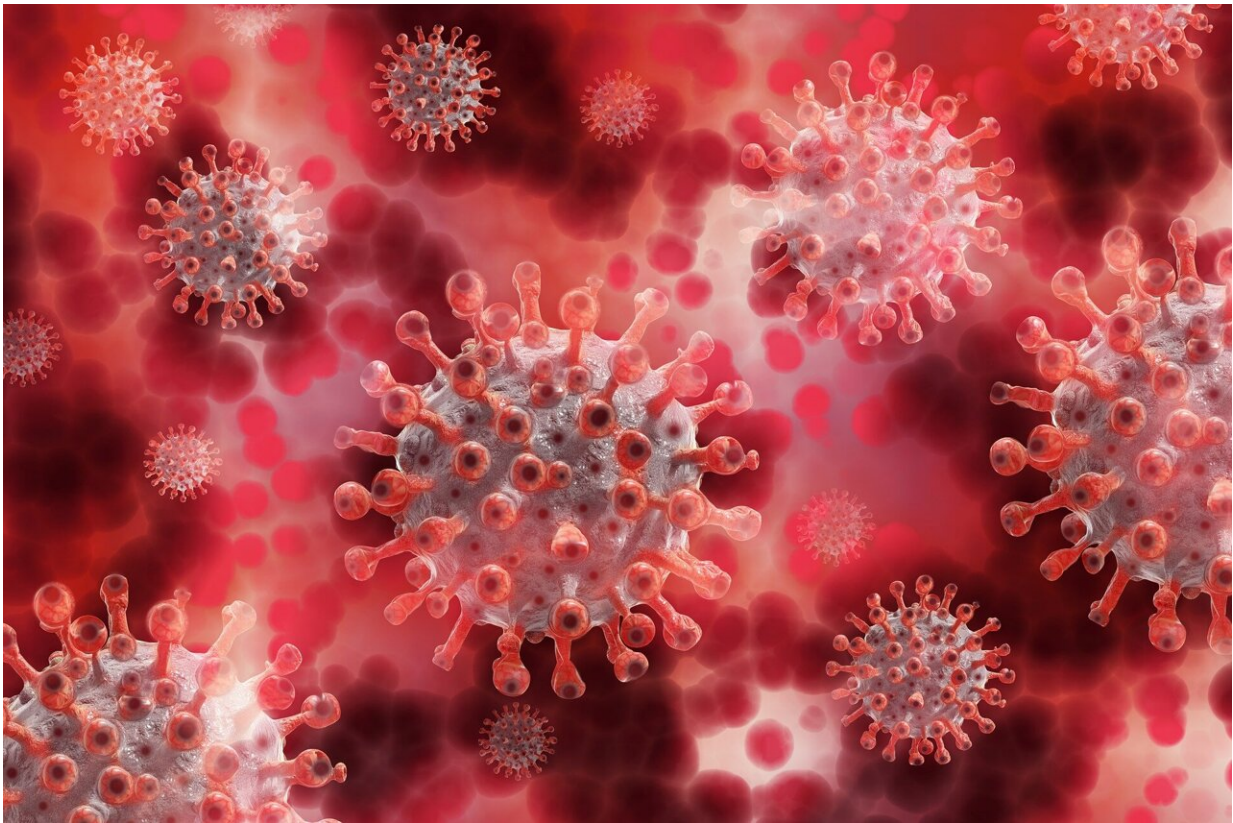


High vaccination rates blunted delta variant surge in some US states

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SARS-CoV-2, the virus that causes COVID-19. Credit: Public domain

US states with low vaccination rates bore the brunt of the COVID-19 surge caused by the delta variant during the summer of 2021, says a study published today in *eLife*.

The study reaffirms the importance of high vaccination rates in preventing COVID-19 illness and deaths during variant-driven surges. The results may also help improve future modeling of COVID-19 surges.

To help [public health officials](#) plan and mitigate the potential effects of COVID-19, modeling teams from across the US joined forces to create the COVID-19 Scenario Modeling Hub in December 2020. The teams worked together to provide six to twelve-month nationwide and state-by-state projections of COVID-19 cases, hospitalizations and deaths.

"This study details the projections we made as the more transmissible delta variant emerged in the United States in the spring of 2021," explains co-lead author Shaun Truelove, Assistant Scientist at the Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, US. "Using nine different models and four defined scenarios, each team assessed how virus control measures, such as mask wearing or vaccination availability and uptake might change the trajectory of COVID-19 as the delta variant spread at state and national levels."

The models projected that cases would begin to rise in July 2021 and peak in mid to late September 2021, with the number of hospitalizations and deaths also rising. They also predicted that states with the lowest vaccination rates would see the most cases, hospitalizations and deaths.

"While the timing of these projected surges was accurate, the real numbers during the delta surge far surpassed what we projected," says co-lead author Claire Smith, Doctoral Student at Johns Hopkins Bloomberg School of Public Health. "For example, in the [worst-case scenario](#), the models projected about 516,000 cases during the first four weeks of the projection period (July 4 to July 31, 2021), but about 1.2 million occurred during this period."

While their predictions about which states would see the worst surges were accurate, even these states saw more cases than anticipated. "We have learned a lot about this virus since the delta variant, especially about waning of immunity and immune escape variants. The lack of these in the models had a major impact on our expectations of how large the resurgence could be," says Truelove. In their projections, most models did not include waning of natural or vaccine-derived immunity; this and other incorrect assumptions about the virus or [human behavior](#) during the surge likely contributed to these underestimations. These results highlight the challenges of modeling an ongoing epidemic and may help improve future modeling efforts.

States that met higher goals for vaccination early in the delta surge averted more than 1.5 million cases and 21,000 deaths, the teams suggest. "These estimates should be treated with caution however, because they do not include the impact of waning which reduces vaccine effectiveness, particularly against symptomatic disease. Our estimates of vaccine protection against severe disease (hospitalizations and deaths) are more robust. Overall, because of the underestimation of deaths associated with the [delta](#) wave, the actual numbers of lives saved are likely much higher," says Cécile Viboud, a senior research scientist at the Division of International Epidemiology and Population Studies, Fogarty International Center, National Institutes of Health, US.

"Efforts to increase vaccination rates are critical and will save lives before and during future resurgences," she concludes.

More information: Shaun Truelove et al, Projected resurgence of COVID-19 in the United States in July-December 2021 resulting from the increased transmissibility of the Delta variant and faltering vaccination, *eLife* (2022). [DOI: 10.7554/eLife.73584](https://doi.org/10.7554/eLife.73584)

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