

## Transmission Delta Variant

- Preliminary research in China shows the viral load of delta infections was about 1,000 times higher than the strains of earlier infections.
- Researchers said that the data suggests “more infectiousness of the delta variant at the early stage of the infection.”
- Some American scientists have extrapolated that one second of exposure to the delta variant is equivalent to 15 minutes of exposure to the original SARS-CoV-2.

The delta variant now represents more than 83% of new coronavirus cases in the U.S., the Centers for Disease Control and Prevention said. And a new study in China says that people infected with the delta variant have a viral load of about 1,000 times higher than patients earlier in the pandemic.

"The delta variant is more aggressive and much more transmissible than previously circulating strains," said Dr. Rochelle Walensky, the head of the CDC.

Céline Gounder, a clinical assistant professor of medicine and infectious disease at NYU's Grossman School of Medicine, said, "At the beginning of the pandemic, the CDC said that a close contact was somebody that you're indoors with unmasked for 15 minutes or more. The equivalent of that with the delta variant is not 15 minutes, it's 1-10 seconds."

### Study in China about viral load

Researchers this month at the Guangdong Provincial Center for Disease Control and Prevention in China released a preprint version of a study that found that the viral load of the first positive test of delta infections was about 1,000 times higher than the strains of infections in 2020 in China. The data, they wrote, suggest "the potential faster viral replication rate and more infectiousness of the delta variant at the early stage of the infection." The research has not yet been peer-reviewed, which allows authors to gather feedback from other scientists to evaluate the rigor and validity of the research.

Researchers compared about 60 cases of the initial epidemic to about 60 of the delta variant identified between May 21 and June 18. Their results showed that the time from exposure to the first PCR positive test was six days in the 2020 epidemic and four days in the recent delta cases. The study doesn't address how much exposure time could cause someone to catch the delta variant.

Gounder, who served on President Joe Biden's transition COVID-19 task force, said she used the Chinese research to deduce that close contact for the delta variant can be reduced to one second: Fifteen minutes equals 900 seconds. Exposure equals dose times the amount of time. If the dose increased by 1,000 times, then the time equivalent for exposure is decreased by 1,000 times. It's difficult to truly quantify someone's chances of catching COVID-19 in a one-second interaction. Factors include ventilation levels in various indoor settings.

Similar calculations have been made at UC San Diego, Weill Cornell Medical College, Yale, University of Maryland, CDC, WHO, NIH, and Harvard, calling the possibility of fleeting exposure leading to a delta variant infection "certainly possible", but also noting that the most important message is that if everyone is wearing masks, the chance of infection plummets. Scientists studying the virus agree that

the delta variant is more contagious than COVID-19 was earlier in the pandemic, but it's tricky to pinpoint how likely it is that an unvaccinated person will catch it, including through brief exposure.

In 2020, scientists warned that the CDC's guidance about exposure in 15 minutes was not a magic number, and that someone could catch the disease in less than 15 minutes.

Jing Lu, one of the authors of the China study, noted that for the delta variant the "most quick transmission event we identified from epidemiological investigation is about 15 seconds."

Extrapolating from the study about how much exposure time would lead to someone getting infected is nuanced. Different factors affect whether someone gets infected including the ventilation of indoor spaces, peoples' different immune systems, and peoples' individual behavior, including whether they wear a mask. The dynamics of infection don't allow perfect extrapolation from the data in the preprint study about the odds of getting infected within a certain amount of time of exposure. There are several emerging reports that delta infections are associated with unusually high nasal viral load compared to earlier variants.

### **Vaccinations help protect against COVID-19**

CDC data shows that vaccinated people are far more likely to avoid hospitalization or death.

As of July 19, 2021, more than 161 million people in the United States had been fully vaccinated against COVID-19. During the same time, CDC received reports from 49 U.S. states and territories of 5,914 patients with COVID-19 vaccine breakthrough infection who were hospitalized or died.

White House COVID-19 coordinator Jeff Zients said July 22: "Unvaccinated individuals account for virtually all — 97 percent — of the COVID hospitalizations and deaths in the U.S."

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