

COVID-19 Variants and Vaccine Boosters — Where Are We?

SARS-CoV-2 Variants

The first reports of a possible new outbreak of viral pneumonia emerged in late 2019. The virus responsible was quickly identified: SARS-CoV-2, a member of a family of viruses that target the respiratory system (airways and lungs) called coronaviruses. The disease caused by SARS-CoV-2 was named COVID-19 (coronavirus disease of 2019).

The genetic blueprint (genome) of SARS-CoV-2, sampled from a person in China, was mapped out by scientists and published online on January 10, 2020. A map of a genome consists of a sequence of code that can be deciphered to understand how the virus is structured.

As the COVID-19 pandemic has spread around the world, scientists have been very busy mapping the genome of over two million more SARS-CoV-2 viruses sampled from people in different locations.

As the virus replicates and spreads, small changes can occur in its genetic makeup. Most of the time these changes have no effect, but occasionally they may alter the virus in ways that allows it to spread more easily and/or cause more severe disease. SARS-CoV-2 viruses with genetic changes that appear to worsen its effects are classified as “variants of concern.”

Over the course of the pandemic, multiple variants of concern have emerged. At first, they were given complex codenames consisting of letters and numbers, but this was eventually changed to use letters from the Greek alphabet to name different variants (Alpha, Beta, etc.).

The Alpha variant was first identified in the United Kingdom and is estimated to be around 50% more

transmissible than the original SARS-CoV-2. The major variant of concern that is currently circulating is Delta, which is estimated to be a further 40–60% more transmissible than the Alpha variant. There is some evidence that Delta is associated with a greater risk of severe disease and may be affecting children more than the previous SARS-CoV-2 variants.

Scientists continue to track for the emergence of new variants. While there are concerns regarding what the future may hold, SARS-CoV-2 does not have limitless options to mutate—many mutations are crippling to the virus and cannot be sustained.

Vaccines and Variants

For the most part, available vaccines show strong protection against severe disease and death caused by any current SARS-CoV-2 variant. The greatest risk is to unvaccinated individuals.

However, the Delta variant is associated with a greater risk of milder symptomatic disease in fully vaccinated people. Asymptomatic infection with the Delta variant (the presence of the virus without causing illness) also occurs more frequently in fully vaccinated people compared to previous SARS-CoV-2 variants. This means that the Delta variant can be spread by fully vaccinated people for a short time, prompting a return of recommendations to use facemasks indoors in areas where there is substantial or high transmission of SARS-CoV-2.

Vaccine Boosters

As a strategy to bolster immunity against SARS-CoV-2 variants, it is likely that additional booster vaccinations will be recommended for people who have previously received authorized COVID-19

vaccines in the United States. This is based on evidence that levels of vaccine-induced antibodies against SARS-CoV-2 fall slowly over time, which is associated with reduced protection against infection and symptomatic COVID-19.

Additional vaccine doses have already been recommended for immunocompromised people in the United States.¹

The U.S. Food and Drug Administration (FDA) and Centers for Disease Control and Prevention (CDC) are currently considering whether to approve and recommend additional vaccine doses for everyone, so be alert for new recommendations.

Vanquishing Variants

While the emergence of SARS-CoV-2 variants has caused a setback for efforts to end the COVID-19 pandemic, it's important to appreciate that there are still steps that everyone can take to minimize their impact. Chief among them is getting vaccinated. The first vaccine to receive emergency authorization, made by Pfizer/BioNTech, has now received full FDA approval due to impressive long-term information demonstrating safety and efficacy. Vaccines

manufactured by Moderna and Johnson & Johnson that are currently available under emergency authorization will likely soon progress to full approval.

Additional recommendations to stem the spread of SARS-CoV-2 should also continue to be followed. The CDC advises that “everyone who is able, including fully vaccinated people, should wear masks in public indoor places in areas of substantial or high transmission.”² Information on local SARS-CoV-2 transmission rates is available on the CDC website.³

Scientific knowledge about COVID-19 is growing rapidly and recommendations may change as more is learned. The U.S. Department of Health and Human Services (HHS), National Institutes of Health (NIH) and the CDC all offer information resources via their websites:

- <https://www.hhs.gov/coronavirus/index.html>
- <https://covid19.nih.gov/>
- <https://www.cdc.gov/coronavirus/2019-ncov/index.html>

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¹ U.S. Centers for Disease Control and Prevention. COVID-19 vaccines for moderately to severely immunocompromised people. August 20, 2021. <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/recommendations/immuno.html>

² U.S. Centers for Disease Control and Prevention. Delta variant. August 26, 2021. <https://www.cdc.gov/coronavirus/2019-ncov/variants/delta-variant.html>

³ U.S. Centers for Disease Control and Prevention. COVID data tracker. <https://covid.cdc.gov/covid-data-tracker/#county-view>