



## Public Health Brief

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## The Great Race\*: Vaccines and Variants

(\*See <https://www.youtube.com/watch?v=pmD1cAO2tJg> for a trailer for the 1965 movie "The Great Race")

We are perhaps approaching the finish line in this race or war against COVID-19, but there is still a storm on the horizon in the name of **variants**. The only thing that can calm the storm is **vaccination** of as many people as possible. ([COVID cases: US faces a 4th surge amid rising infections \(usatoday.com\)](#)) Here are some questions and answers that are pertinent in this crucial next few months that will decide the outcome.

Q: What are variants?

A: When a virus replicates or makes copies of itself, it sometimes changes a little bit, which is normal for a virus. These changes are called "mutations". A virus with one or more new mutations is referred to as a "variant" of the original virus. This is a natural process of evolution, and most variants are harmless. The concern develops when variants are found that cause the virus to spread more easily, or to kill a higher percentage of those infected.

[Coronavirus variants, viral mutation and COVID-19 vaccines: The science you need to understand \(theconversation.com\)](#)

Q: Why the rush to get everyone vaccinated?

A: Because many newly discovered variants appear to be resampling the mutations found in other established variants, we can speculate that the virus is beginning to run out of new, major adaptations. But this doesn't mean that the forces of evolution will stop as we begin to approach herd immunity and loosen restrictions. History tells us that viruses can evolve rapidly to evade barriers to transmission, especially when infections remain numerous. We must remember that the more infections there are, the more chance mutations will occur, and those that best help the virus to survive will proliferate. This is why stopping new infections is key.

<https://www.scientificamerican.com/article/the-coronavirus-variants-dont-seem-to-be-highly-variable-so-far>

Q: Are the vaccines effective against the variants?

A: Of the three "variants of concern" recognized by the World Health Organization and Centers for Disease Control and Prevention, studies have shown that the mRNA vaccines created by Pfizer/BioNTech and Moderna remain highly effective against the B.1.1.7 variant, which was first recognized in the United Kingdom.



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The mRNA vaccines are 4- to 7-fold less effective against the P.1 variant, which was first discovered in Brazil, but they still appear to be within an important "cushion of protection," particularly after two doses, and should prevent disease, according to Anthony Fauci, MD, director of the National Institute of Allergy and Infectious Diseases. The B.1.351 variant is more troublesome. Studies have shown that the AstraZeneca vaccine was 86 times less effective against this variant, which was first detected in South Africa. The mRNA vaccines are 6- to 8-fold less effective against this variant, suggesting a significant waning of protection. In clinical trials in South Africa, the Johnson & Johnson vaccine also had less efficacy in populations where this variant was surging. Johnson & Johnson, Moderna, and Pfizer are all exploring options to make their vaccines more effective against the variants.

<https://www.nejm.org/doi/full/10.1056/NEJMc2100362>

Q: Are the vaccines safe?

A: None of the vaccine trials have reported any serious safety concerns. Trials for the vaccines — from Pfizer and Moderna and Johnson and Johnson — have had fully independent safety monitoring boards, and safety data are continuously reviewed by the FDA and expert panels. Almost 150,000,000 doses have been given.

<https://www.hopkinsmedicine.org/health/conditions-and-diseases/coronavirus/is-the-covid19-vaccine-safe>

Q: Do the vaccines work to block infection and spread as well as disease?

A: Although we have up until recently said, "We do not know", evidence now says yes! Messenger RNA (mRNA) COVID-19 vaccines have been shown to be effective in preventing symptomatic SARS-CoV-2 infection in randomized placebo-controlled Phase III trials. Cohorts of 3,950 health care personnel, first responders, and other essential and frontline workers completed weekly SARS-CoV-2 testing for 13 consecutive weeks. Under real-world conditions, mRNA vaccine effectiveness of full immunization ( $\geq 14$  days after second dose) was 90% against SARS-CoV-2 infections regardless of symptom status; vaccine effectiveness of partial immunization ( $\geq 14$  days after first dose but before second dose) was 80%. Authorized mRNA COVID-19 vaccines are effective for preventing SARS-CoV-2 infection in real-world conditions.

Vaccination also lessens the asymptomatic carriage of SARS-CoV-2, as has been demonstrated in some phase III clinical studies, which provides a reasonable explanation behind the observed drop in transmission.

[CDC Real-World Study Confirms Protective Benefits of mRNA COVID-19 Vaccines | CDC Online Newsroom | CDC](#)

Q: What about the effect of vaccine on "long-haulers"?

A: This is intriguing, with early data showing improvement in some persons. Stay tuned!

[How The Coronavirus Vaccines Affect Long-Haul COVID-19 Patients : NPR](#)

[Can COVID-19 Vaccines Prevent Long COVID? - The Atlantic](#)

Centers for Disease Control and Prevention: [Coronavirus Disease 2019 \(COVID-19\) | CDC](#)

California Department of Public Health: [Main Page \(ca.gov\)](#)

Alpine County: [COVID-19 | Alpine County, CA - Official Website](#)

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