



Addressing concerns about SARS-CoV-2 variants

The Issue

SARS-CoV-2—the coronavirus that causes COVID-19—was first identified in China in December 2019. Since then, multiple variants of the virus (SARS-CoV-2) have been identified around the globe. Some people may be concerned about the ability of currently available COVID-19 vaccines to protect against emerging variants. Others may view media reports of breakthrough infections as evidence of the limitations of current vaccines and question the need to be vaccinated (i.e., an additional reason not to get a COVID-19 vaccine).

Sound Bites

- > Many viruses—including SARS-CoV-2, the virus that causes COVID-19—constantly change over time through mutation. A virus with one or more new mutations is referred to as a “variant” of the original virus.
- > As expected, multiple variants of SARS-CoV-2 have been documented in the United States and globally throughout the COVID-19 pandemic.
- > The best way to slow the emergence of new variants is to reduce transmission (i.e., the spread of infection). The best way to reduce transmission is to get a COVID-19 vaccine and follow guidance for masking and physical distancing.
- > The Delta variant is currently the predominant strain of the virus in the United States.
- > The Delta variant is more contagious than previous variants. The greatest risk of transmission is among unvaccinated people, because they are much more likely to contract the virus. Fully vaccinated people with breakthrough infections from this variant appear to be infectious for a shorter period and their symptoms are less severe.
- > The Delta variant might cause more severe illness than previous strains in unvaccinated persons. The COVID-19 vaccines available in the United States continue to be highly effective at preventing hospitalization and death, including against this variant.



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What We Know

All viruses evolve over time. SARS-CoV-2, the virus that causes COVID-19, is no exception.

Viruses constantly change through mutation when they replicate. A virus with one or more new mutations is referred to as a “variant” of the original virus. Virus variants are both expected and normal.

Many variants emerge and disappear. In some cases, new variants persist; they survive better than, and can out-compete, the original virus. At this point, the original variant that caused the initial COVID-19 cases in December 2019 is no longer circulating. Some variants appear to spread more easily and quickly than other variants, which may lead to more cases of COVID-19.

The World Health Organization (WHO) has been working with its partners, expert networks, national authorities, institutions, and researchers since early 2020 to monitor and assess the evolution of SARS-CoV-2. Emerging variants are named using letters of the Greek alphabet to facilitate public discussion. SARS-CoV-2 variants also may be referred to by their Pango names, such as B.1.1.7. Pango nomenclature is a rule-based system for naming SARS-CoV-2 genetic lineages.

Both WHO and the U.S. government SARS-CoV-2 Interagency Group (SIG) use a variant classification scheme that defines three classes of SARS-CoV-2 variants:

- > Variants of Interest.
- > Variants of Concern.
- > Variants of High Consequence.

Variants are classified on the basis of how easily they spread, how severe their symptoms are, and how they are treated (e.g., Are existing treatments and vaccines effective against the variant?). U.S. SIG classifications may differ from [WHO classifications](#) because the importance of variants may differ by location.

A SARS-CoV-2 Variant of Interest has specific genetic markers that have been associated with changes to receptor binding, reduced neutralization by antibodies generated against previous infection or vaccination, reduced efficacy of treatments, potential diagnostic impact, or predicted increase in transmissibility or disease severity. The Centers for Disease Control and Prevention (CDC) maintains an updated list of Variants of Interest [here](#).

A SARS-CoV-2 Variant of Concern has evidence of an increase in transmissibility, more severe disease (e.g., increased hospitalizations or deaths), significant reduction in neutralization by antibodies generated during previous infection or vaccination, reduced effectiveness of treatments or vaccines, or diagnostic detection failures. There currently are four Variants of Concern in the United States:

- > The Alpha variant, first identified in the United Kingdom.
- > The Beta variant, first identified in South Africa.
- > The Gamma variant, first identified in Japan and Brazil.
- > The Delta variant, first identified in India.



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A SARS-CoV-2 Variant of High Consequence has clear evidence that prevention measures or medical countermeasures have significantly reduced effectiveness relative to previously circulating variants. There currently are no SARS-CoV-2 variants that rise to the level of high consequence.

Many issues related to SARS-CoV-2 variants and COVID-19 vaccines can be illustrated using the example of the Delta variant (as of September 2021, the predominant strain of the virus in the United States). For example, the Delta variant is highly contagious—more than twice as contagious as previous variants.¹ Increased transmission means increased replication, which creates more opportunities for SARS-CoV-2 to mutate and lead to the emergence of additional (and possibly more dangerous) variants. The greatest risk of transmission is among unvaccinated people, who are much more likely to contract (and therefore transmit) the virus.¹ Although it is possible for fully vaccinated people to develop breakthrough COVID-19 infections and transmit the virus to others, vaccinated people appear to be infectious for a shorter period.¹

Additionally, some data suggest that the Delta variant might cause more severe illness than previous strains in unvaccinated persons.¹ The COVID-19 vaccines available in the United States are highly effective at preventing severe disease and death. A *New York Times* analysis of data from 40 states and Washington, DC, showed that serious coronavirus infections among vaccinated people have been relatively rare since the start of the vaccination campaign: fully vaccinated people accounted for only 0.1%–5% of patients hospitalized with COVID-19 and 0.2%–6% of deaths from COVID-19.² The COVID-19 vaccines available in the United States continue to be highly effective against the Delta variant.¹

References

1. U.S. Centers for Disease Control and Prevention. Delta Variant: What We Know About the Science. August 26, 2021. <https://www.cdc.gov/coronavirus/2019-ncov/variants/delta-variant.html>. Accessed September 22, 2021.
2. The *New York Times*. See the Data on Breakthrough Covid Hospitalizations and Deaths by State. August 10, 2021. <https://www.nytimes.com/interactive/2021/08/10/us/covid-breakthrough-infections-vaccines.html>. Accessed September 22, 2021.

