COVID-19 Vaccines and Variants: What We Know So Far

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We respectfully acknowledge the University of Arizona is on the land and territories of Indigenous peoples. Today, Arizona is home to 22 federally-recognized tribes, with Tucson being home to the O'odham and the Yaqui. **Committed to diversity and inclusion, the University strives** to build sustainable relationships with sovereign Native Nations and Indigenous communities through education offerings, partnerships, and community service.



Webinar Notes

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The Central Dogma: DNA->RNA->protein





Life Cycle of SARS-CoV-2, the virus that causes COVID-19





The Moderna and Pfizer/BioNTech vaccines contain just 1 type of RNA





The immune system recognizes spike protein and responds





Antibodies are more concentrated in the lungs than in the nose and throat



SARS-CoV-2 enters through the nose and throat



Severe disease can be caused by unchecked viral replication in the lungs



Vaccine-induced antibodies in the nose and throat can prevent infections if the infectious dose is low



Antibodies and T cells can coordinate to prevent symptomatic infections if the virus is slow



How are safety and efficacy assessed in a Phase 3 trial?





Efficacy of the Moderna vaccine

B Modified Intention-to-Treat Analysis



LR Baden et al. N Engl J Med 2020. DOI: 10.1056/NEJMoa2035389



Delta: What has changed?



The Delta variant reaches much higher viral loads than previous variants



Reduced effectiveness of vaccines against Delta, but by how much???

How different estimates of vaccine efficacy against the Delta variant compare

Two-dose vaccine efficacy against infection and hospitalisation, by vaccine manufacturer, country and period of study



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What does reduced vaccine effectiveness really mean?

vaccinated



86% effective Delta

unvaccinated



Tipping the scales back in the favor of vaccines



Does vaccination reduce the chance that you will pass the virus on to someone else?

How different estimates of vaccine efficacy against the Delta variant compare

Two-dose vaccine efficacy against infection and hospitalisation, by vaccine manufacturer, country and period of study



Chia et al., MedRxiv, 2021

Is immunity waning? Do we need booster shots?



Vaccine inequity: a barrier to ending the global pandemic

Our World in Data

Daily new confirmed COVID-19 cases per million people Shown is the rolling 7-day average. The number of confirmed cases is lower than the number of actual cases; the main reason for that is limited testing.



Source: Johns Hopkins University CSSE COVID-19 Data





Share of people fully vaccinated against COVID-19 Share of people only partly vaccinated against COVID-19

Our World in Data

Source: Official data collated by Our World in Data. This data is only available for countries which report the breakdown of doses administered by first and second doses in absolute numbers. CC BY

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Who should get mRNA boosters?

Immunocompromised? YES, definitely, *right now*

³J&J recipients? Yes, but hoping for guidance from CDC/FDA soon

Over age of 60-70? Probably.

All others????



Why get an antibody test?

Help us learn more about the virus and immunity

- ✓ How long does immunity last?
- How many antibodies does it take to achieve protection against infection?
- How does age affect immune responses to infection or vaccination
- How do symptoms after infection or vaccination correlate with antibody levels?



Sign up for Antibody Testing

Statewide, for anyone in Arizona over age 18

Ongoing

Locations and registration: www.covid19antibodytesting. arizona.edu

Voluntary antibody testing is through a University of Arizona IRB-approved research study.

