Omicron Variant and COVID-19 Vaccines

Deepta Bhattacharya, Ph.D. Professor, Immunobiology

January 20, 2022



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

- Please submit your questions in the Q&A tab at the bottom of your screen.
- The Chat function allows you to send chat messages to your colleagues in the meeting.
- The webinar Recording, the Q&A feed, the Chat feed, and any presentation materials will be available after the webinar at https://provost.arizona.edu/content/campus-webinars.



COVID-19 Updates

- Updated COVID-19 mitigations protocols, including the <u>face coverings</u> <u>requirement</u> on all campus locations.
- COVID-19 testing program <u>Cats TakeAway Testing</u> allows students, employees, and DCCs to pick up a PCR saline gargle test kit and drop off a sample at one of the <u>designated locations</u> in Tucson, Phoenix, Oro Valley, Sierra Vista and Yuma.
- <u>Campus Health</u> offers COVID-19 vaccines including first, second and booster doses of Pfizer and Moderna. If you're in Tucson, you can also receive your Pfizer, Moderna and Johnson & Johnson vaccine at <u>several locations</u> across Pima County.
- We continue to strongly encourage employees to get vaccinated and <u>verify</u> <u>their vaccination status</u>.



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





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

Moderna/Pfizer vaccine	RNA	spike protein	
	DNA		



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



What has changed? Omicron has rapidly taken over.



Source: GISAID, via CoVariants.org – Last updated 17 January 2022, 20:00 (London time) CC BY Note: This share may not reflect the complete breakdown of cases, since only a fraction of all cases are sequenced. Recently-discovered or actively-monitored variants may be overrepresented, as suspected cases of these variants are likely to be sequenced preferentially or faster than other cases.

Proportion of Omicron Genomes



Source: TGEN (https://pathogen.tgen.org/covidseqtracker/index.html)

Omicron: What has changed? A lot.



https://sars2.cvr.gla.ac.uk/cog-uk/

A 3rd vaccine dose helps improve the quality and quantity of virus-neutralizing antibodies





I Nemet et al. N Engl J Med 2021. DOI:

Three doses of vaccines provide strong protection against hospitalization—less so against symptomatic illness

 Table 2. Hazard ratios and vaccine effectiveness against hospitalisation (all vaccine brands combined). OR = odds ratio, HR = hazards ratio, VE = vaccine effectiveness

Dose	Interval after dose (weeks)	OR v symptomatic disease	HR vs hospitalisation	VE vs hospitalisation
1	4+	0.74 (0.72-0.76)	0.57 (0.38-0.85)	58% (37-72)
2	2 to 24	0.81 (0.8-0.82)	0.45 (0.36-0.56)	64% (54-71)
2	25+	0.94 (0.92-0.95)	0.6 (0.49-0.74)	44% (30-54)
3	2 to 4	0.32 (0.31-0.33)	0.26 (0.19-0.35)	92% (89-94)
3	5 to 9	0.42 (0.41-0.43)	0.29 (0.23-0.37)	88% (84-91)
3	10+	0.5 (0.49-0.51)	0.34 (0.26-0.44)	83% (78-87)

What does reduced vaccine effectiveness really mean?

vaccinated



86% effective Omicron

unvaccinated



Is Omicron milder? *If* it runs into pre-existing immunity, yes.



🛑 Cases 🛛 🔵 Deaths 👘 Hospitalizations

Source: Washington Post

Tipping the scales back in the favor of vaccines



Who should get boosters?

Everyone over age 12 who hasn't already done so

How about a 4th dose? No data surrounding this yet. Worth considering for vulnerable groups (elderly or immunocompromised *and* 3rd dose over 10 weeks ago



If you are vulnerable and get infected, what are the current options?

Editor's Note: This article was published on October 27, 2021, at NEJM.org.

ORIGINAL ARTICLE

Early Treatment for Covid-19 with SARS-CoV-2 Neutralizing Antibody Sotrovimab

Anil Gupta, M.D., Yaneicy Gonzalez-Rojas, M.D., Erick Juarez, M.D., Manuel Crespo Casal, M.D., Jaynier Moya, M.D., Diego R. Falci, M.D., Ph.D., Elias Sarkis, M.D., Joel Solis, M.D., Hanzhe Zheng, Ph.D., Nicola Scott, M.Sc., Andrea L. Cathcart, Ph.D., Christy M. Hebner, Ph.D., <u>et al.</u>, for the COMET-ICE Investigators^{*} 85% reduction in hospitalization s or death

Health

FDA authorizes Pfizer's anti-covid pill as omicron surges

The supply of Paxlovid will be limited initially, even as demand is expected to soar

88% reduction in hospitalization s or death

A few glimmers of hope on the horizon

HEALTH AND SCIENCE

Pfizer CEO says omicron vaccine will be ready in March

PUBLISHED MON, JAN 10 2022-8:38 AM EST | UPDATED MON, JAN 10 2022-10:49 AM EST

Spencer Kimball @SPENCEKIMBALL share 🛉 У in 🖂



Facilities Battles COVID-19 in the Air and on the Ground

From MERV 13 filters to an Oxivir disinfectant station, Facilities Management has made significant changes to mitigate the spread of COVID-19 on campus.

Healthcare & Pharmaceuticals

Pfizer to supply U.S. with 10 mln more courses of COVID-19 pills

By Manojna Maddipatla and Trevor Hunnicutt

New Government Website for Ordering Covid Tests Is Up and Running

Visitors can go to covidtests.gov and click through to a Postal Service web page where they can order four tests per household, free of charge.