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 face coverings requirement on all campus locations.

• COVID-19 testing program Cats TakeAway Testing allows students, employees, and DCCs to pick up a PCR saline gargle test kit and drop off a sample at one of the designated locations in Tucson, Phoenix, Oro Valley, Sierra Vista and Yuma.

• Campus Health 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 several locations across Pima County.

• We continue to strongly encourage employees to get vaccinated and verify their vaccination status.
Omicron Variant and COVID-19 Vaccines

Deepta Bhattacharya, Ph.D.
Professor, Immunobiology

January 20, 2022
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.
What has changed? Omicron has rapidly taken over.

Source: TGEN
(https://pathogen.tgen.org/covidseq-tracker/index.html)
Omicron: What has changed? A lot.

Delta

Omicron

Antibody ‘escape’ mutations

https://sars2.cvr.gla.ac.uk/cog-uk/
A 3\textsuperscript{rd} 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

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

Source: UK Health Security Agency
What does reduced vaccine effectiveness really mean?

80% effective
Omicron

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

The previous case peak was on Jan. 11, 2021, with a 248,128 7-day average. As of Jan. 10, 2022, the average was 761,081 cases, 307 percent of the previous peak.

Numbers for deaths and hospitalizations tend to show a delay compared to cases. Both may still rise as a result of higher case rates.

Source: Washington Post
Tipping the scales back in the favor of vaccines

- Booster shots
- Outdoor activities
- Indoor ventilation
- High-quality masks
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?

85% reduction in hospitalizations or death

88% reduction in hospitalizations or death

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., et al., for the COMET-ICE Investigators

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
A few glimmers of hope on the horizon

Pfizer CEO says omicron vaccine will be ready in March

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

New Government Website for Ordering Covid Tests Is Up and Running

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