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Hard Work Pays Off

The local omicron surge has peaked, infections are on the downturn and campus pandemic protocols that have been in place since last summer have proven highly effective, prompting reasonable expectations for a return to in-person classes at UC Santa Barbara at the end of the month.

“It’s probably the safest place in the county as far as COVID transmission goes,” said Dr. Scott Grafton, M.D., professor in the Department of Psychological & Brain Sciences and the Campus COVID-19 mitigation program manager.

As with many university campuses across the country, UC Santa Barbara delayed the return of students to in-person instruction after the winter break to deal with logistical issues related to testing, vaccination and possible absences brought on by the omicron variant, which by mid-December had become the dominant COVID variant. Now that we know more about the variant’s behavior and its response to vaccines, Grafton said, it’s possible to get a better sense of how protected students would be as they return to classrooms on campus.

“Looking forward, we see that by January 31, up to 90% of the campus will be immune to omicron because they have either had it or are protected by vaccines,” Grafton said. “Stop and think about what that means for the campus as a whole. The risk of omicron transmission becomes very small if there are so few people to give it or to get it.”

High Level of Immunity

This bit of positive news is the result of modeling that incorporates the latest scientific knowledge about omicron's behavior, and data from the state and Santa Barbara County Public Health Department reflecting when the variant arrived and how quickly it spread among vaccinated people. Add to that the success the campus had in fending off classroom transmission during the delta variant wave in the fall session.

"Omicron is different than delta for a number of reasons," said UCSB chemical engineering professor Todd Squires, who conducted the classroom-level transmission modeling. "It appears to be more transmissible, and it seems to be avoiding the immunity that many of us have." Indeed, some who are vaccinated have reported breakthrough infections, though those cases are typically milder and of shorter duration than infections in unvaccinated people, who also make up the majority of those infected.

Fortunately the steep rise in local cases seems already to have peaked earlier this month — likely around Jan. 14, according to California state's ensemble estimate, and seven-day averages of county case rates peaked around Jan. 7.



Seven-day average of COVID-19 case rates peaked around Jan. 7

Photo Credit: TODD SQUIRES

"I think the hard intuition for everyone is to recognize that case rates can't go up forever," Grafton said. A virus with high transmission like this variant is going to run out of people to infect, he explained. By the end of the month, the researchers estimate that up to 40% of the campus will have gained immunity to omicron via infection.

Meanwhile, recent studies published in the Journal of the American Medical Association and by the Centers for Disease Control and Prevention point to the importance of vaccinations and boosters: According to those studies, vaccinated people are less likely to get omicron infections than unvaccinated people. And because immunity to COVID wanes with time, those with booster shots receive even more protection than from vaccination alone, making vaccination plus a booster the

safest way to gain good protection from the variant.

“If we follow the vaccine efficacy information we have for omicron, it looks like about half the campus is immune because their vaccine is still working,” Grafton said. “That leaves a really small fraction of campus who are susceptible or could be transmitters, which puts us in a good position.”

Layers of Protection

On the UCSB campus, where vaccination is already high — over 95% — and booster rates will be similarly high by Jan. 31, the community’s collective efforts to protect themselves and others helps significantly. In addition to requiring vaccinations, the campus, since near the beginning of the pandemic, has implemented safety measures including masking, social distancing and hand hygiene in addition to regular testing and strategies to reduce or eliminate any lingering virus-laden aerosols by promoting airflow through enclosed spaces.

“Every step you take helps to reduce the likelihood of infection in a multiplicative manner,” Squires said. Immunity reduces the chances of catching and carrying the SARS-CoV-2 virus, while social distancing and masks further reduce transmission by preventing it from jumping from host to host. What virus particles might be lingering in the air can be taken care of with good ventilation, he said.

Individual Risk of Transmission

“We worked very hard to assess transmission risk in all classrooms – which required a detailed look at all ventilation systems – and to identify classrooms that might need a little bit of an extra boost,” said Squires — an expert in fluid mechanics — of efforts undertaken in anticipation of the students’ return to campus last fall. They worked to ensure all air handling units were set to deliver full outside air, and installed portable HEPA filters in instructional spaces that did not have a direct, forced-supply of fresh air, and issued guidance regarding safest-practices regarding doors and windows.

Campus policy and practice regarding masking, ventilation and vaccination led to no in-class transmission of COVID throughout the fall quarter, even as the wider community underwent the onslaught of the delta variant, which at that time was the most infectious variant. It didn’t mean that no one had COVID — according to

Grafton, it meant that even if someone showed up to class with COVID, the protections in place prevented it from spreading to others during the lecture.

“There were 89 cases where an individual had COVID and attended class, which worked out to nearly 25,000 exposure events,” Squires said. “Of all of those, there was not one conventional in-person classroom transmission.” One known transmission did occur — during a theater arts rehearsal, involving actors that were unmasked and in prolonged, close physical proximity.

The classroom COVID transmission model allows the researchers to calculate the risk for individuals more precisely, given factors such as the size of the room, the length of time spent in that room, the number of people in the room, the room’s ventilation performance and emerging information on the behavior of the omicron variant. Assuming everyone is boosted and masked, for instance, the number of transmissions predicted in a full Campbell Hall auditorium would be about one for every 50 classes of 50 minutes in duration, and will become less probable each day.

“For more typical classrooms, that number drops by a factor of 17, or one per 850 lectures,” Grafton said. “For lab-based classes, one per 2,450.”

The classroom transmission rate may be low and the community case rates are expected to drop as sharply as they rose, but, said the researchers, the campus’s success at keeping COVID transmissions low will rely on continued vigilance, compliance, and care.

About UC Santa Barbara

The University of California, Santa Barbara is a leading research institution that also provides a comprehensive liberal arts learning experience. Our academic community of faculty, students, and staff is characterized by a culture of interdisciplinary collaboration that is responsive to the needs of our multicultural and global society. All of this takes place within a living and learning environment like no other, as we draw inspiration from the beauty and resources of our extraordinary location at the edge of the Pacific Ocean.