

Covid-19 Disease Outbreak Outlook

Arizona State and Pima County

Updated May 7, 2021

Disclaimer: This information represents my personal views and not those of The University of Arizona, the Zuckerman College of Public Health, or any other government entity. Any opinions, forecasts, or recommendations should be considered in conjunction with other corroborating and conflicting data. Past updates can be accessed at <https://publichealth.arizona.edu/news/2020/covid-19-forecast-model>.

Note: This is the next-to-last regularly scheduled update. Barring unforeseen circumstances, the last report will be published on May 21, 2021. If you have found this report valuable and would like to send a note of appreciation, please e-mail my Department Chair, Dr. Kelly Reynolds at reynolds@arizona.edu.

For the week ending May 2nd, 4946 Covid-19 cases were diagnosed representing a 4% decrease from last week's initial tally of 5141 cases (Figure 1). This marks the first decline since March 21st. Case rates among those ≥65 years of age remain the lowest of any age group at 26 per 100K residents per week (Figure 2 following page). The highest rates are among those 15 – 24 years of age at 111 cases per 100K residents per week.

Overall, cases are being diagnosed at a rate of 68 per 100K residents per week. For reference, September 8th marked the fall nadir between the summer and winter outbreaks at 38 cases per 100K residents per week. The post-holiday nadir was 54 cases per 100K residents on March 23, 2021. Case rates will likely remain “stuck” above the threshold differentiating substantial and moderate risk, 50 cases per 100K residents per week, for the next 4 – 6 weeks owing to more transmissible variants (e.g., [B.1.1.7](#)) and continued normalization of behaviors.

According to the [CDC](#), vaccination rates continue to increase, albeit more slowly, with 39% of Arizona's adult population being fully vaccinated and another 14% having received one dose (53% with ≥1 doses). With only 65% of its ≥65 population being fully vaccinated, Arizona ranks 40th among the states. Unvaccinated adults who are at risk of developing severe disease (e.g., advanced age or comorbid conditions) or those who simply wish to remain uninfected should continue to follow recommended precautions as viral activity remains widespread.

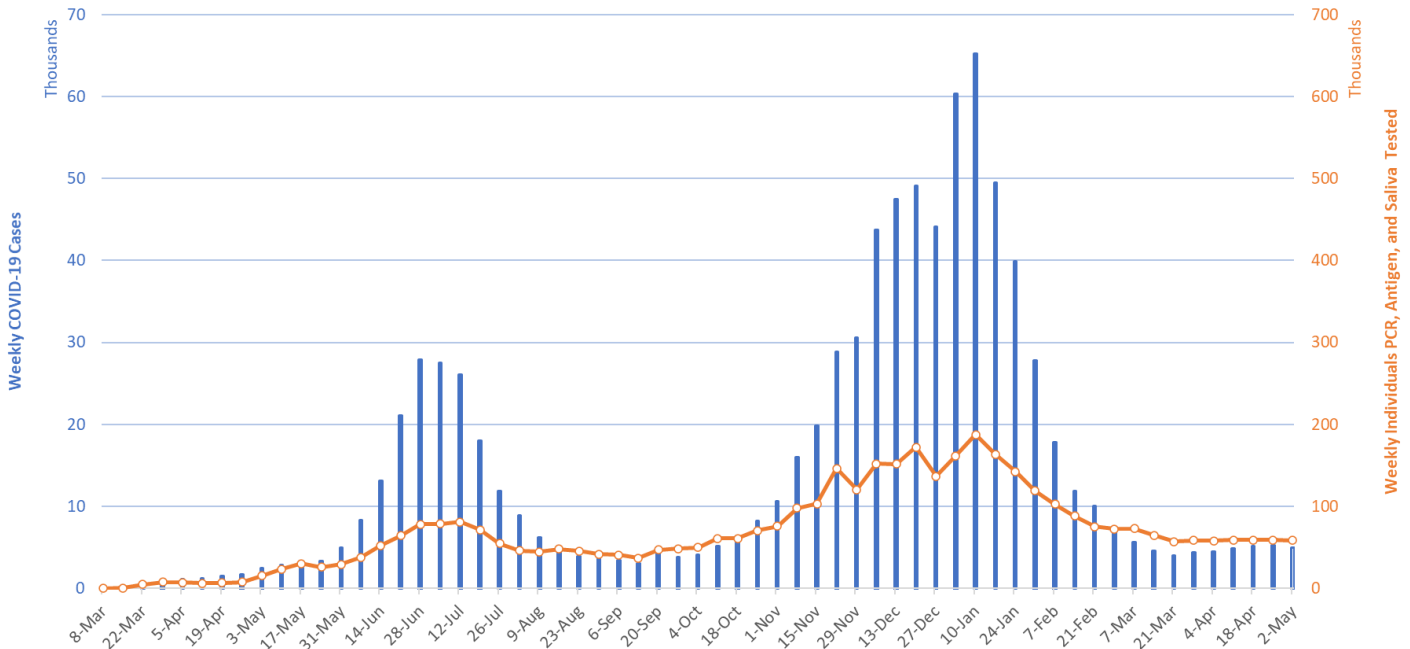


Figure 1. Newly Diagnosed Covid-19 Cases in Arizona and Number of Individuals Undergoing Covid-19 Diagnostic Testing March 1, 2020 through May 2, 2021.

Note: Data for this report was updated Friday, May 7 allowing 4 full days to adjudicate cases and keep week-over-week backfill low. All comparisons are week-over-week changes.

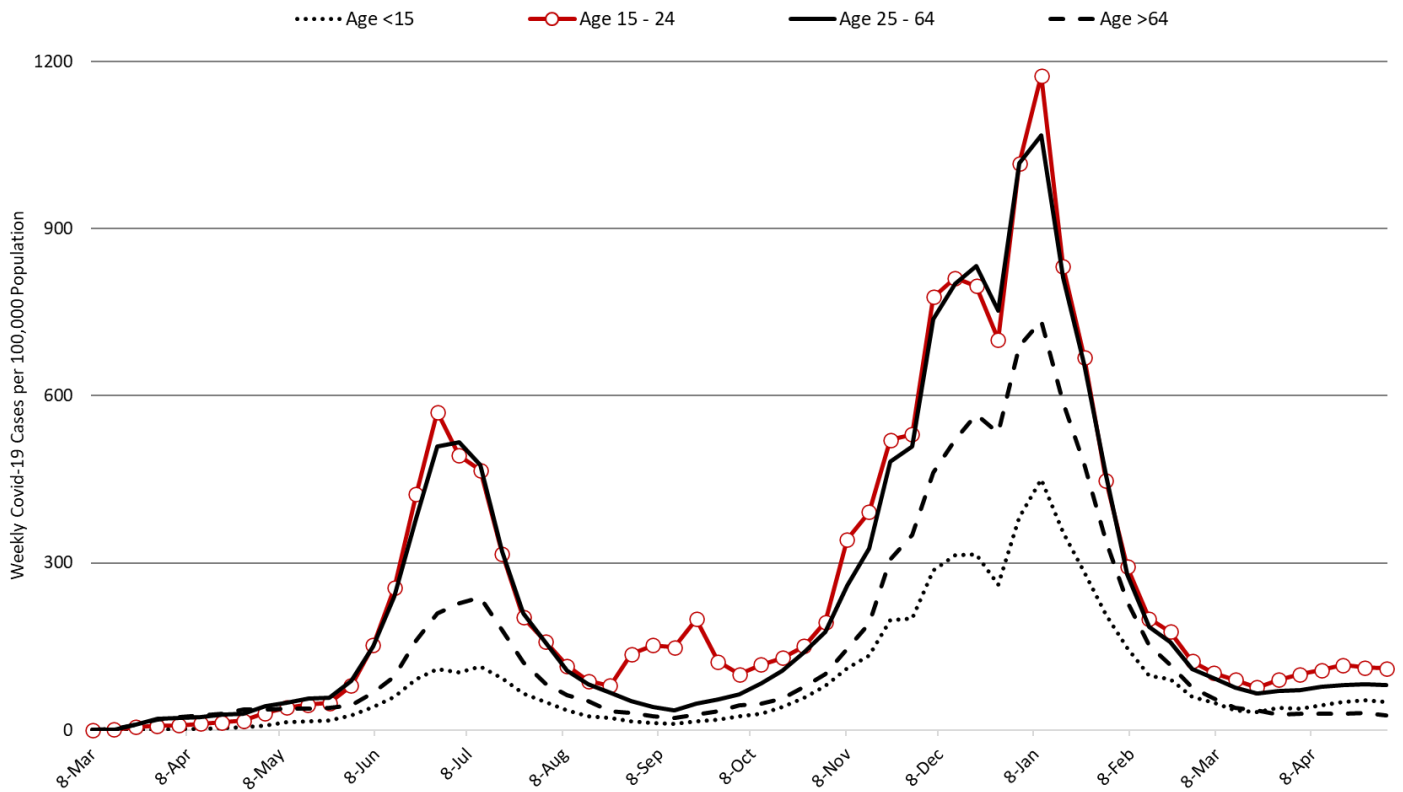


Figure 2. Newly Diagnosed Covid-19 Cases in Arizona by Age Group March 1, 2020 through May 2, 2021.

Test positivity among those undergoing traditional nasopharyngeal PCR testing has plateaued at 10%, remaining within the 5 – 10% window for optimal public health practice (Figure 3).

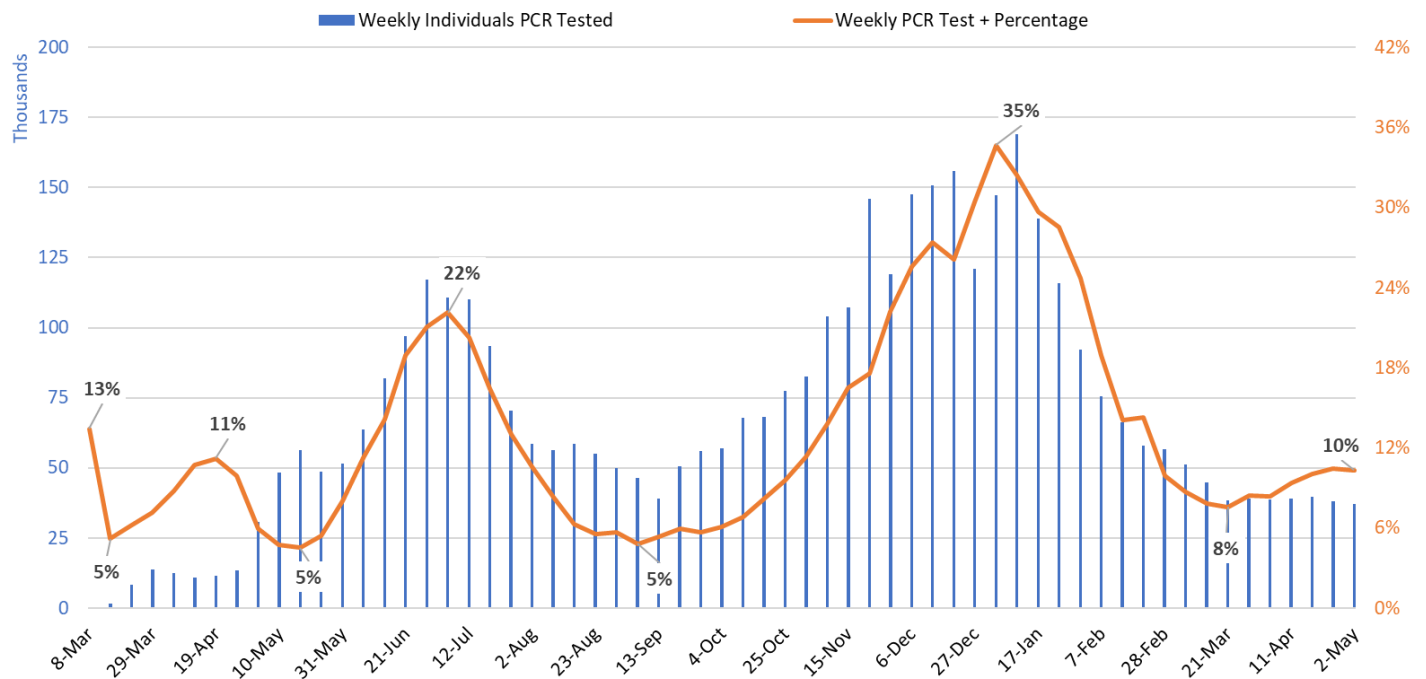


Figure 3. Weekly Number Patients Undergoing Traditional Nasopharyngeal PCR Testing and Associated Percent Positivity March 1, 2020 – May 2, 2021.

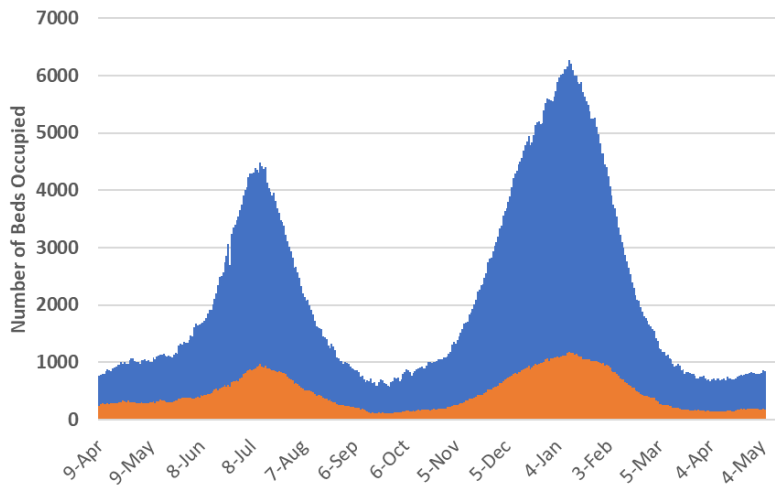


Figure 4. Arizona Daily Covid-19 General Ward and ICU Census April 9, 2020 – May 2, 2021.

As of May 6th, 666 (8%) of Arizona’s 8600 general ward beds were occupied by Covid-19 patients, an 8% increase from the previous week’s 618 occupied beds (Figure 4 and Figure 5 Panel A). Another 919 (11%) beds remained available for use. The number of available beds is lower than the previous week’s 984 beds.

The summer-fall nadir was 468 occupied beds on September 27th. The post-holiday nadir was 516 beds on April 4.

As of May 6th, 182 (11%) of Arizona’s 1731 ICU beds were occupied with Covid-19 patients, a small decrease from the prior week’s count of 189 patients (Figure 4 and Figure 5 Panel B). An additional 236 (15%) ICU beds remained available for use. This is

similar to the prior week’s 237 available beds. The summer-fall nadir was 114 occupied beds on September 22nd. The post-holiday nadir was 140 beds on April 7th.

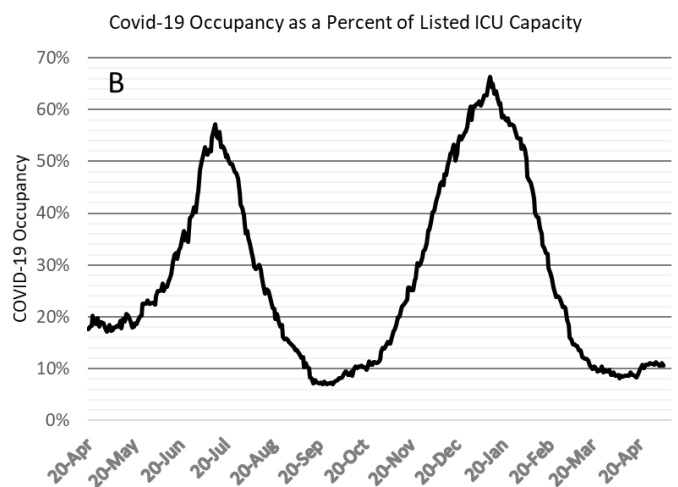
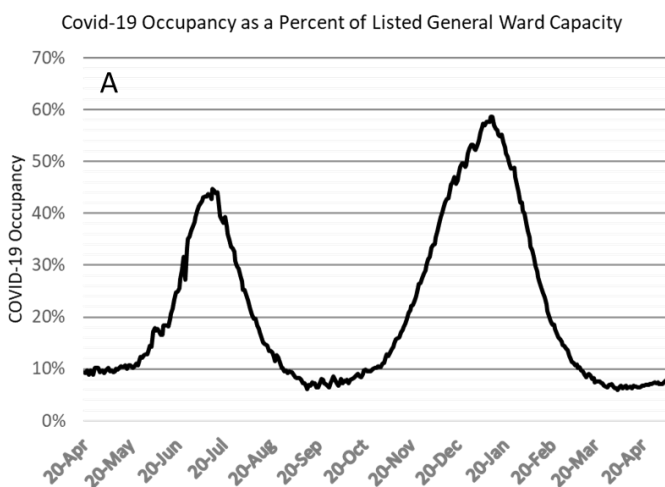


Figure 5. Covid-19 Occupancy as a Percent of Listed General Ward (A, left) and ICU (B, right) Capacity in Arizona April 20, 2020 – May 2, 2021.

Arizona hospital occupancy remains above seasonal levels. Improvements in ward and ICU occupancy have stalled at $\geq 85\%$ occupancy (Figure 6, following page). This indicates that medically necessary procedures that were previously postponed are being scheduled at higher than seasonal amounts to address the backlog of care. It will still take several more months to resolve. Occupancy will need to fall $< 70-75\%$ before conditions will be back to “normal.” As capacity constraints are lessened, care practices should return to those prior to the outbreak ensuring all patients will receive optimal care. Hospitals will remain crowded through May - June before returning to pre-outbreak levels.

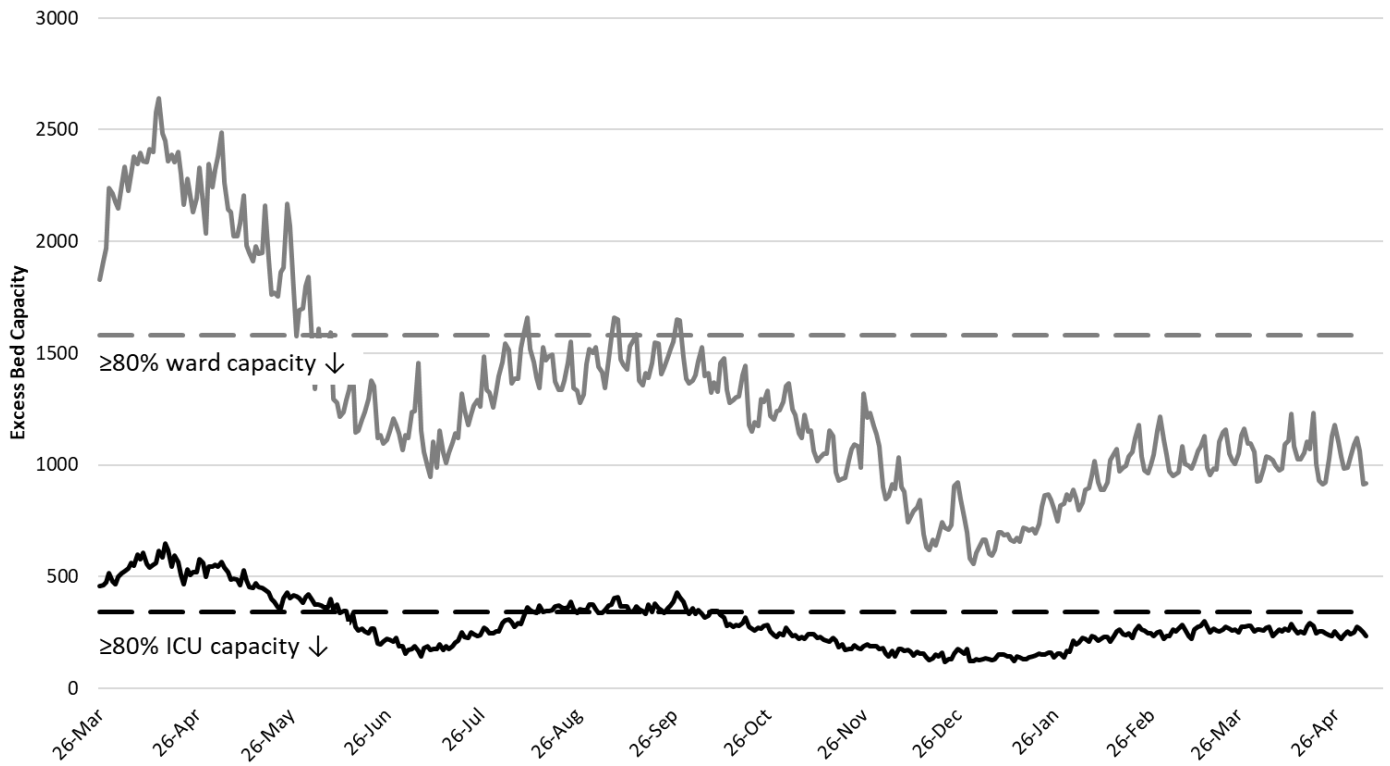


Figure 6. Observed Excess Non-Surge General Ward and ICU Capacity March 26, 2020 – May 2, 2021.

The week ending January 17th remains Arizona’s deadliest with 1089 deaths (Figure 7). With 73 deaths recorded on March 28th, it is the first week with <100 Covid-19 deaths since October. The summer – fall nadir was 51 deaths the week ending October 4th.

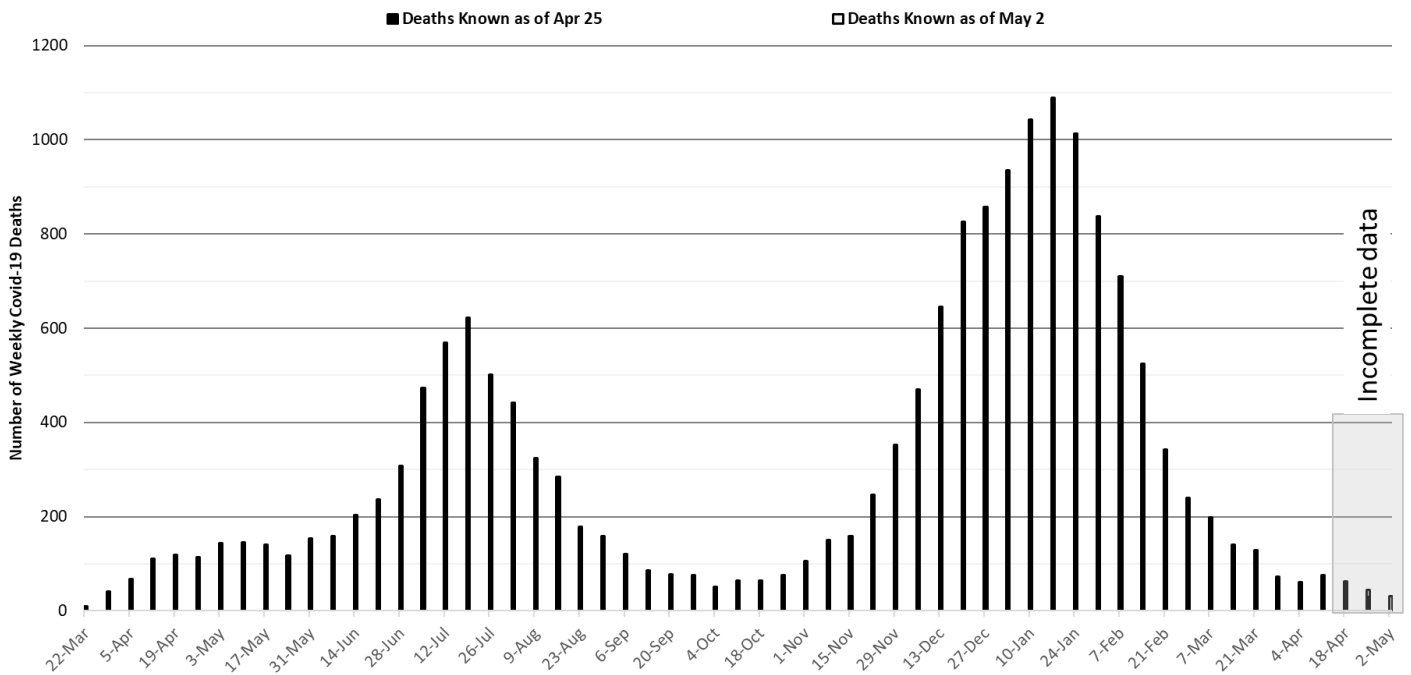


Figure 7. Weekly Arizona Covid-19 Deaths March 16, 2020 – May 2, 2021.

Pima County Outlook

For the week ending May 2nd, 430 Pima County residents were diagnosed with Covid-19 (Figure 8). This is a 1% increase from the 425 cases initially reported last week. New cases are being diagnosed at a rate of 41 cases per 100K residents per week, **the lowest rate since May 28th, 2020**. October 9th marked the summer - winter nadir at 46 cases per 100K residents per week and March 20th marked the prior post-holiday nadir at 44 cases per 100K residents per week. Trends across the various age groups appear in Figure 9.

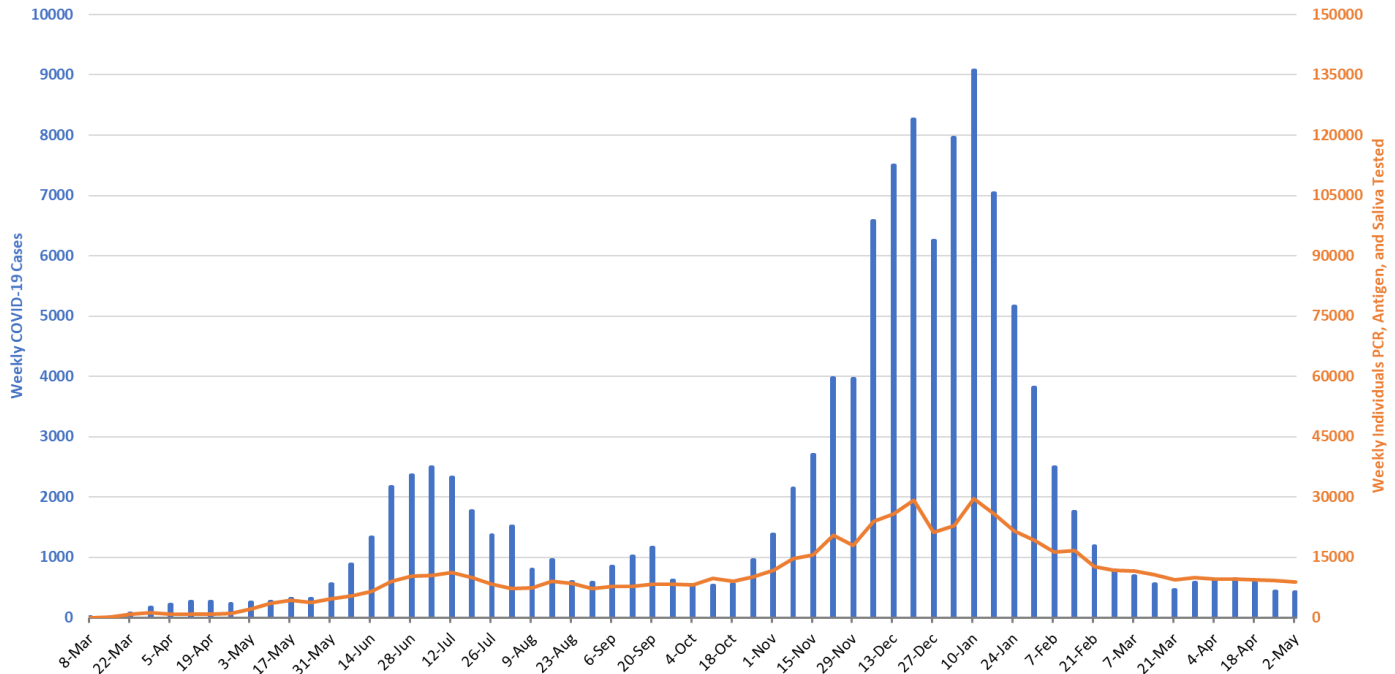


Fig 8. Covid-19 Cases and Individuals Undergoing Testing in Pima County Mar 1, 2020 – May 2, 2021

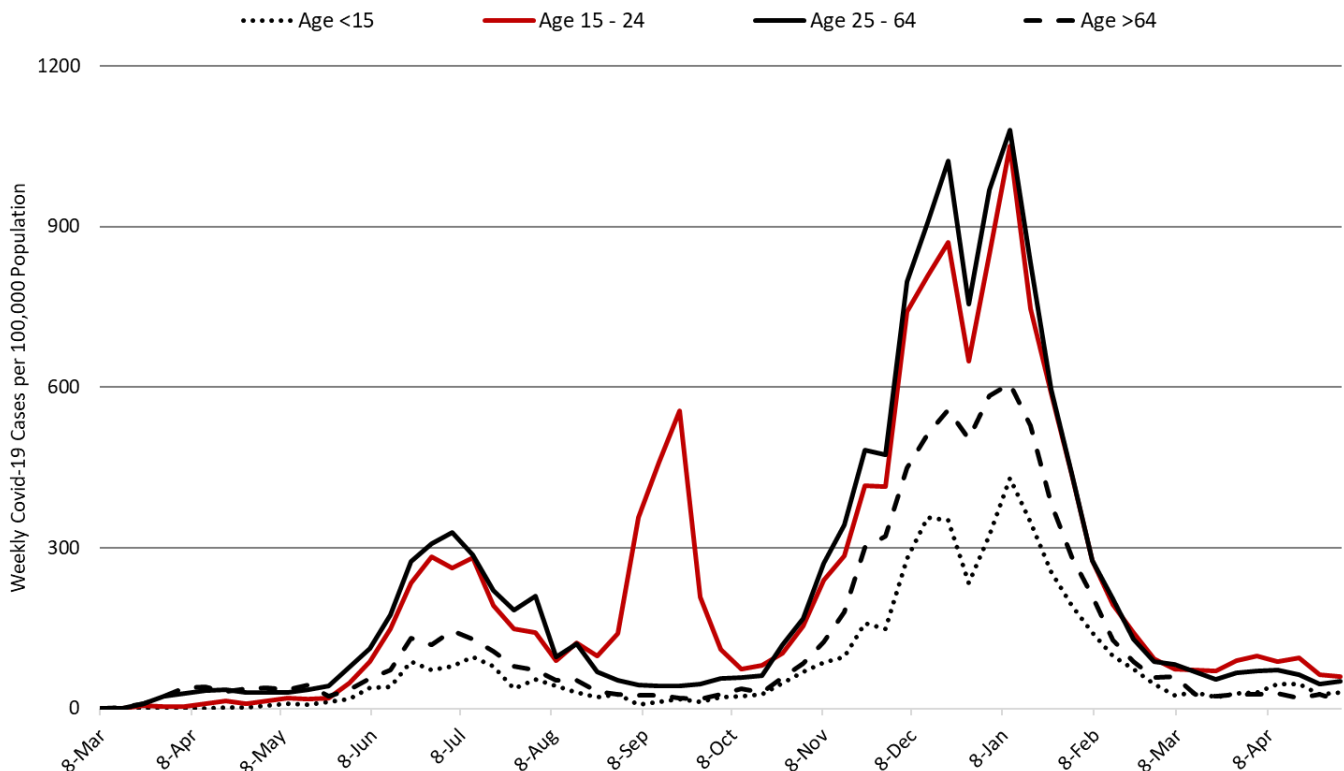


Figure 9. Covid-19 Cases by Age Group in Pima County from March 1, 2020 – May 2, 2021.

Created by: Joe K. Gerald, MD, PhD (Associate Professor, Zuckerman College of Public Health, geraldj@email.arizona.edu) with assistance from Patrick Wightman, PhD from the UA Center for Population Health Sciences.

Summary:

- Covid-19 cases and hospitalizations are little changed over the past two weeks. We can expect similar levels of viral transmission for the next 4 – 6 weeks before rates begin to substantially improve (see updated ASU COVID-19 model in Appendix).
 - As of May 2nd, new cases were being diagnosed at a rate of 68 cases per 100,000 residents per week. This rate is slowly decreasing by 2 - 3 cases per 100,000 residents per week.
 - Test positivity for traditional nasopharyngeal PCR testing is holding steady at 10% which is within the recommended 5 – 10% range for optimal public health practice.
- Hospital Covid-19 occupancy is slowly increasing in the ward and ICU. Access to care remains somewhat restricted as overall occupancy remains unseasonably high (85%) while the backlog of medically necessary non-Covid procedures is being addressed.
- Arizona Covid-19 fatality counts are now <100 deaths per week should hover ≤75 deaths per week (5000 weekly cases x a 1.5% case fatality rate) for the next 4 – 6 weeks.
- According to the [CDC](#), 39% of Arizona adults have received at least 2-doses of vaccine while another 14% have received 1-dose. Arizona passed peak vaccination rates in early April so progress towards our goal of >80% vaccinated is slowing.

Reading of Interest this Week:

- Abu-Raddad. Effectiveness of the BNT162b2 Covid-19 Vaccine against the B.1.1.7 and B.1.351 Variants. *New Engl J Med.* 2021; DOI: 10.1056/NEJMc2104974 (See [link](#))
- Borchering RK. Modeling of Future COVID-19 Cases, Hospitalizations, and Deaths, by Vaccination Rates and Nonpharmacological Intervention Scenarios – United States, April – September 2021. *MMWR.* 2021; May 5, Vol 70. (See [link](#))
- Sadoff J. Safety and Efficacy of Single Dose Ad26.COV2.S Vaccine Against Covid-19. *New Engl J Med.* 2021; DOI: 10.1056/NEJMoa2101544. (See [link](#))
- See I. US Case Reports of Cerebral Venous Sinus Thrombosis with Thrombocytopenia after Ad26.COV2.S Vaccination, March 2 to April 21,2021. *JAMA.* 2021; oi:10.1001/jama.2021.7517. (See [link](#))
- MacNeil JR. Updated Recommendations from the Advisory Committee on Immunization Practices for Use of the Janssen (Johnson & Johnson) COVID-19 Vaccine After Reports of Thrombosis with Thrombocytopenia Syndrome Among Vaccine Recipients – United States, April 21. *MMWR.* 2021; 70 (17, April 30): 651 - 656. (See [link](#))

Next (and last) update scheduled for May 21st.

County data appear in the Appendix along with updated ASU COVID-19 model.

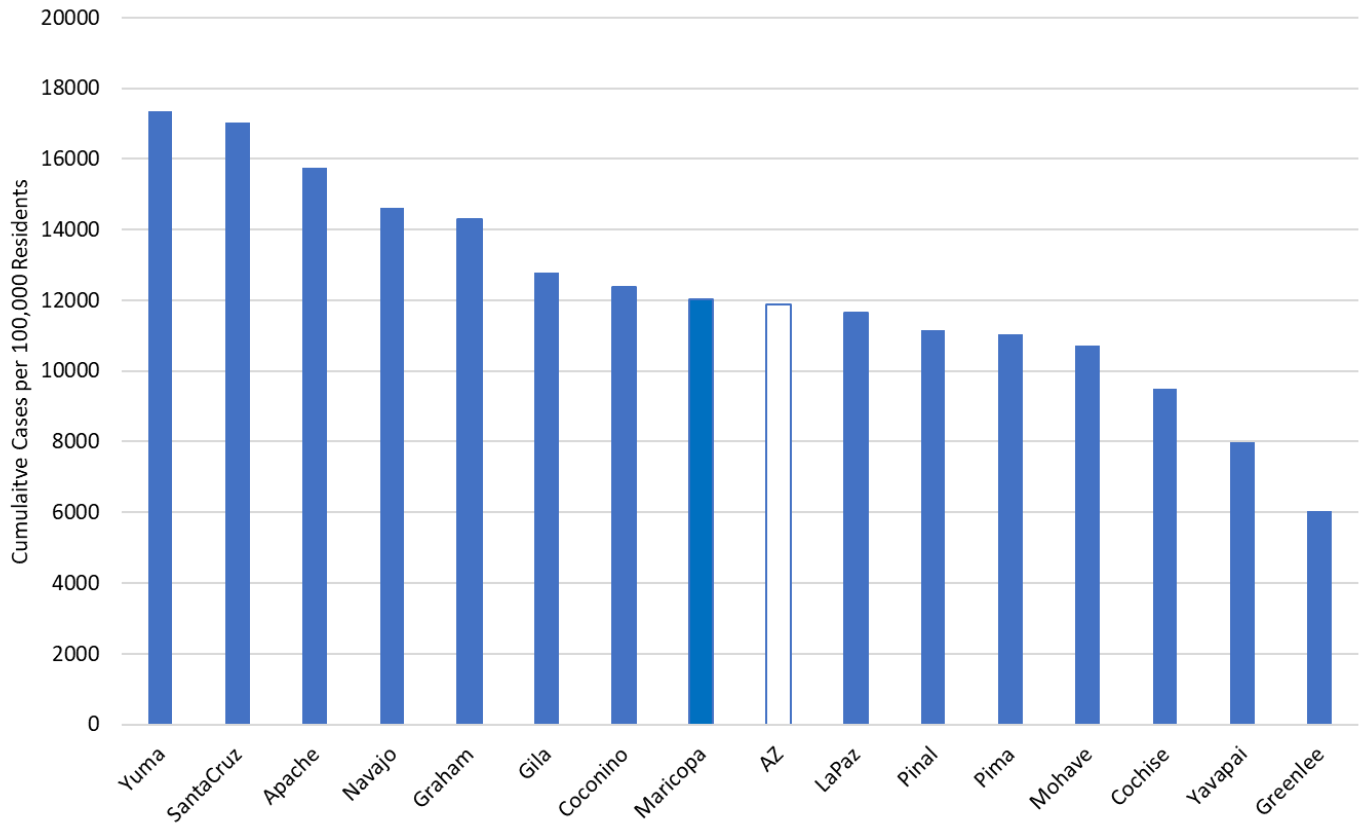


Figure 1A. Cumulative Covid-19 Incidence in Arizona by County March 1, 2020 – May 2, 2021.

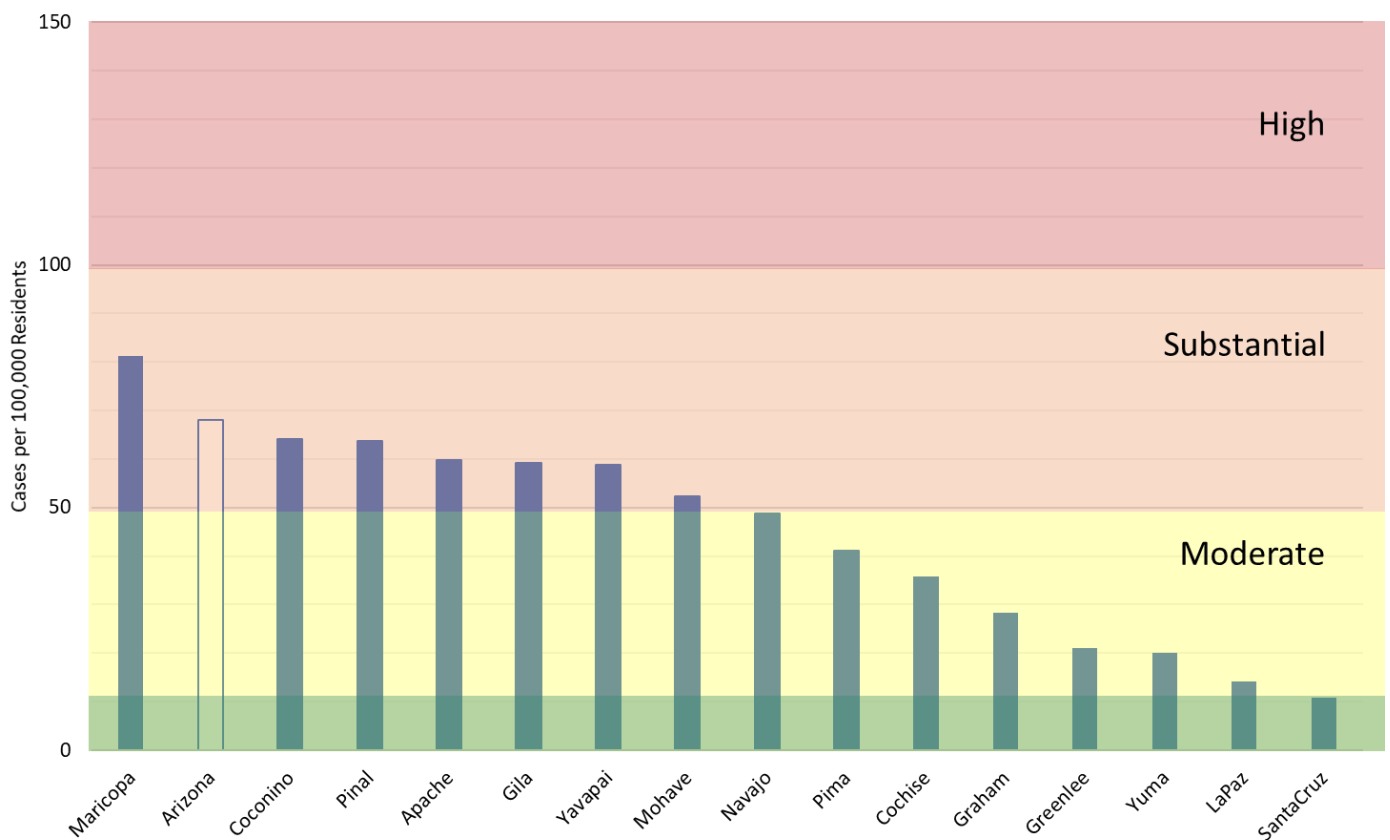


Figure 2A. Covid-19 Weekly Cumulative Incidence in Arizona by County April 25 – May 2, 2021 (Risk bands coincide with CDC recommendations for K – 12 schools’ instructional mode).

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Summer COVID-19 Forecast in Arizona – The ASU COVID-19 Modeling Group

The ASU COVID-19 Modeling Group recently updated their model (April 29, 2021) to incorporate vaccination efficacy and increasing prevalence of the B117 variant. This model is based on their prior work charting the course of the COVID-19 outbreak using a traditional SEIR epidemiological model. To incorporate the impact of vaccines, the model accounts for a differential effectiveness attributable to the first and second dose, 50% and 95% respectively. Vaccination data are derived from the ADHS dashboard at the state-level and does not account for differential rates or outcomes by age. The model assumes a single homogenous risk pool throughout the state. Furthermore, their model assumes a B117 variant dominance by the end of May with its associated 60% increase in transmission. No changes due to increased behavioral interactions are modeled.

Figure 3A shows their best-case scenario (gold line) where COVID-19 vaccinations continue at a pace of 50,000 vaccinations per day. Under this scenario, case rates will peak and then begin to decline towards the end of May. Clearly, there is little-to-no risk of a no summer resurgence. Under their worst-case scenario (blue line) where no new vaccinations are initiated after April 28th, case rates will slowly trend upwards and remain in the substantial category (50 – 100 cases per 100K residents per week) through much of the summer. However, even under this pessimistic scenario, there is little-to-no risk of a summer resurgence on par with June 2020. Altogether, this is really good news.

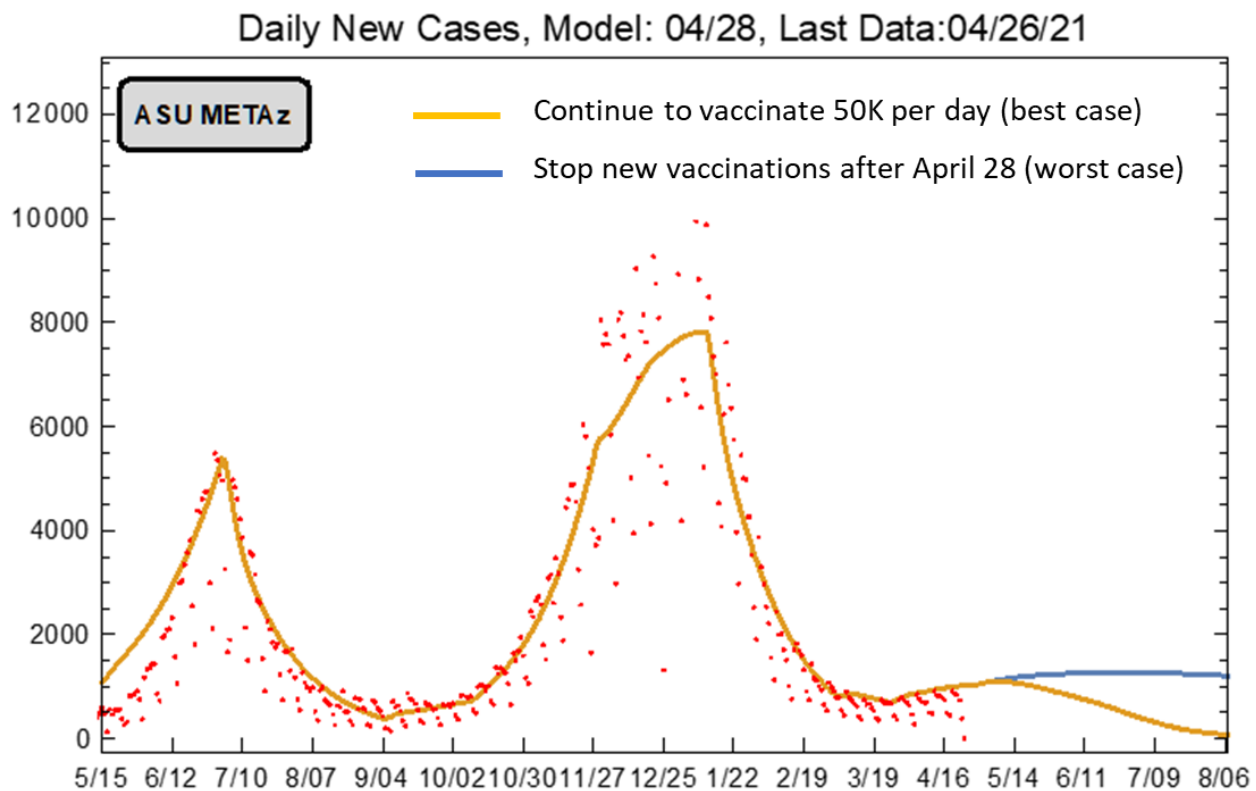


Figure 3A. Projected COVID-19 Cases in Arizona under Best-Case (orange) and Worst-Case (gold) Scenarios through August 6, 2021. Data graciously provided by the ASU COVID-19 Modeling Group (Esma Gel, PhD; Megan Jehn, PhD; Anna Muldoon, MPH; Samantha Sokol, Jordy Rodriguez, Heather Ross, PhD, NDP, ANP-BC, and Tim Lant, PhD, MAS).