Covid-19 Disease Outbreak Outlook
Arizona State and Pima County

Last Scheduled Update May 21, 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 last regularly scheduled update. If circumstances meaningfully change, then future updates will be resumed. 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 16th, 4084 Covid-19 cases were diagnosed representing a 14% decrease from last week's initial tally of 4674 cases (Figure 1). This marks a 3rd straight week of decline. 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 88 cases per 100K residents per week.

Overall, cases are being diagnosed at a rate of 57 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. Over the next 1 – 3 weeks, case rates may fall below the 50 cases per 100K residents per week threshold that differentiates substantial and moderate risk.

According to the CDC, vaccination rates continue to increase, albeit more slowly; 43% of Arizona's adult population is fully vaccinated and another 12% have received one dose. With only 68% of its ≥65 population fully vaccinated, Arizona ranks 42nd among the 50 states. The 400,000 or so unvaccinated or partially vaccinated Arizonans >65 years of age will remain at risk of developing severe COVID-19 disease and death through the summer months given that many Arizonans <65 years of age remain unvaccinated.

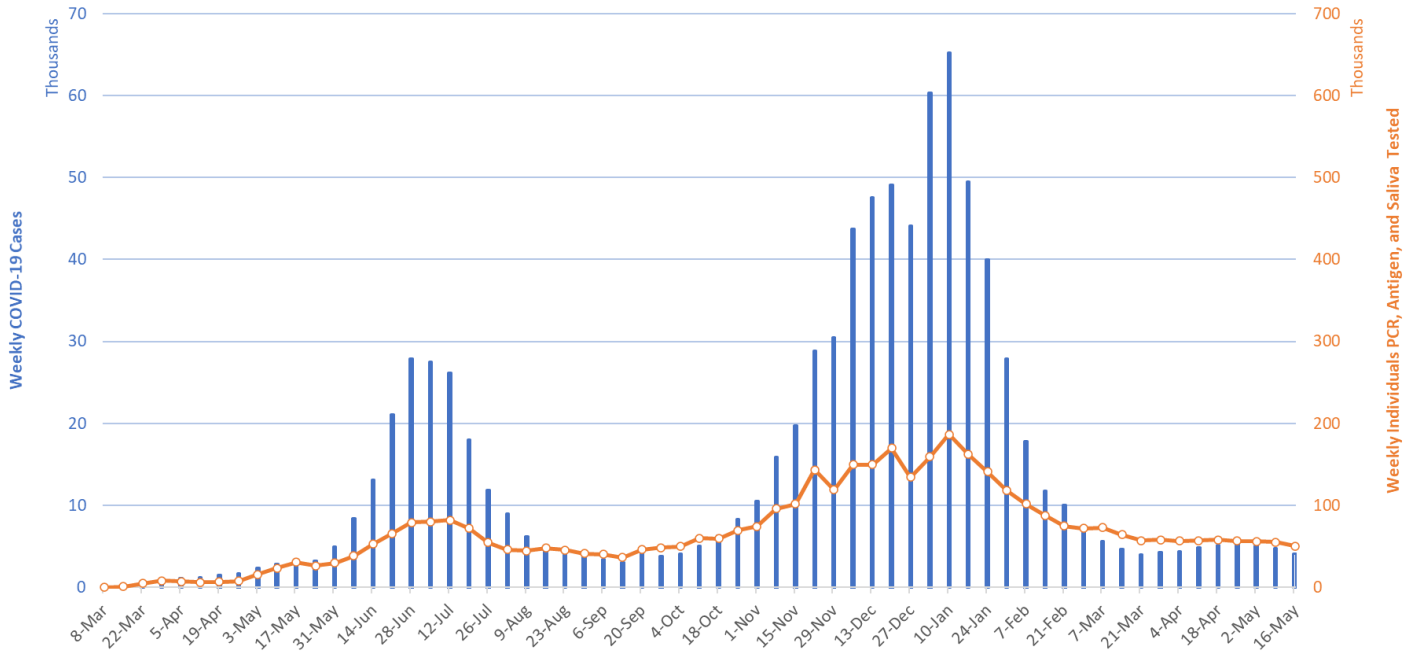

Figure 1. Newly Diagnosed Covid-19 Cases in Arizona and Number of Individuals Undergoing Covid-19 Diagnostic Testing March 1, 2020 through May 16, 2021.

Note: *Data for this report was updated Friday, May 21 allowing 4 full days to adjudicate cases and keep week-over-week backfill low. All comparisons are week-over-week changes.*

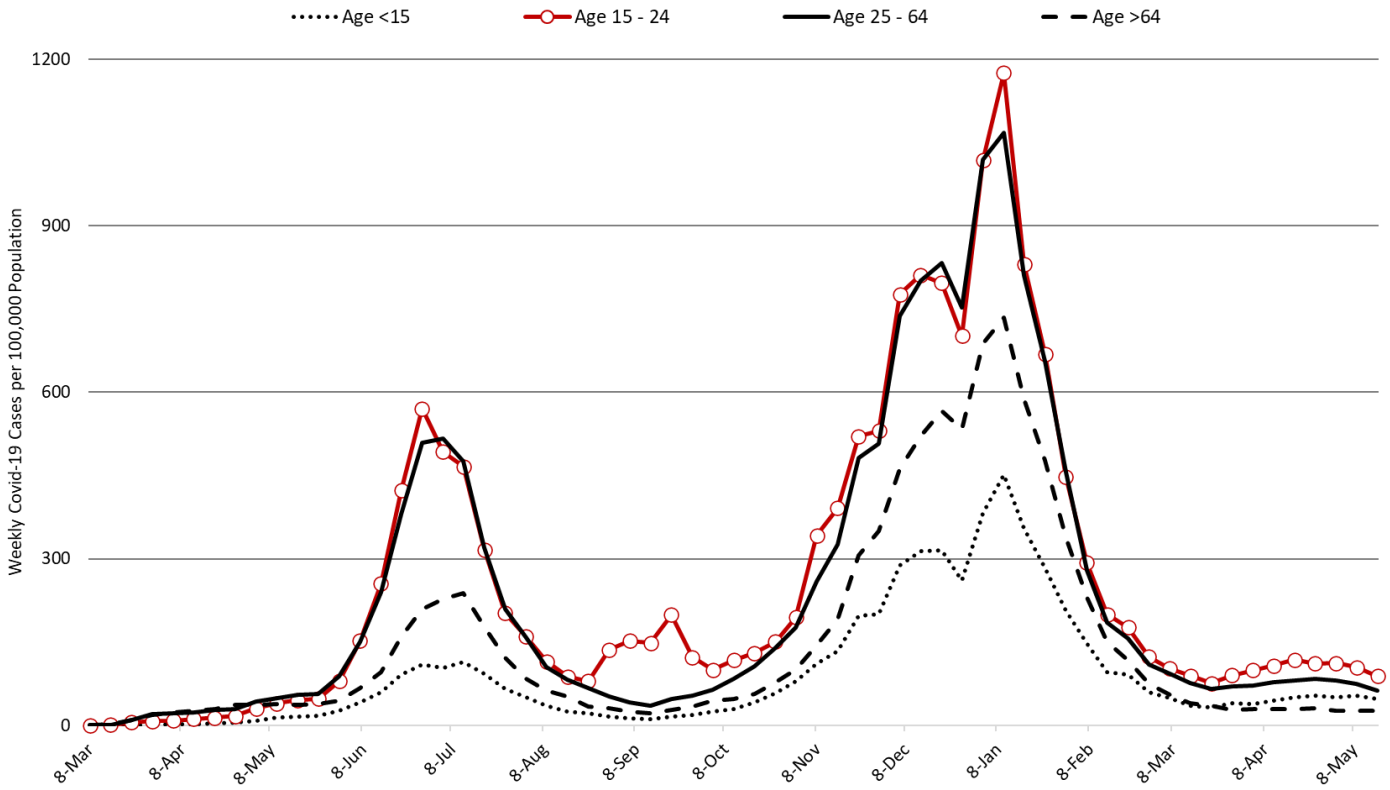

Figure 2. Newly Diagnosed Covid-19 Cases in Arizona by Age Group March 1, 2020 through May 16, 2021.

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

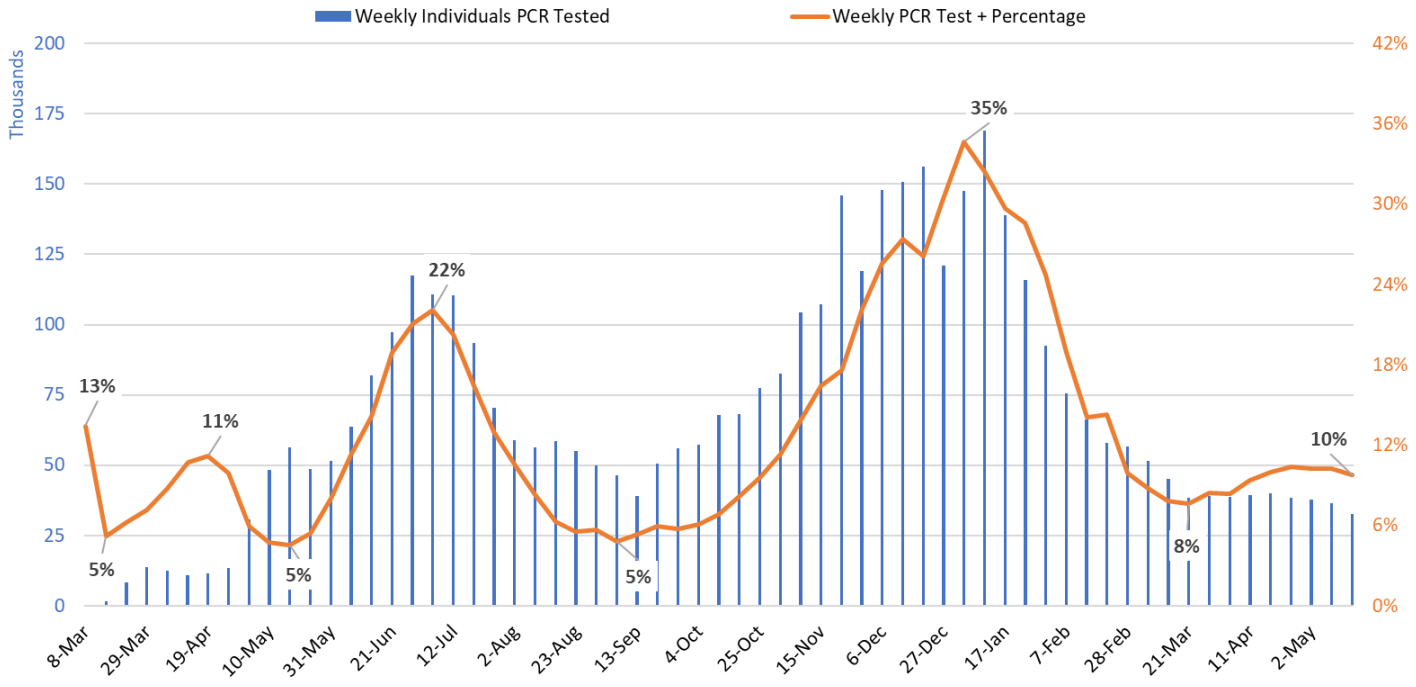

Figure 3. Weekly Number Patients Undergoing Traditional Nasopharyngeal PCR Testing and Associated Percent Positivity March 1, 2020 – May 16, 2021.

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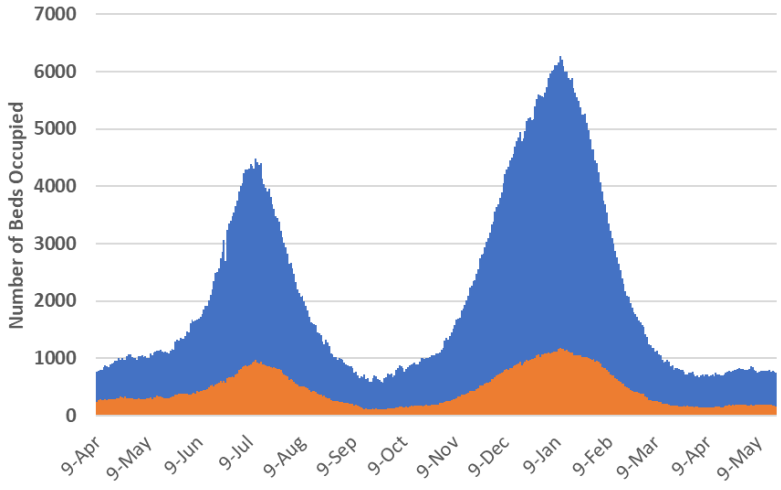

Figure 4. Arizona Daily Covid-19 General Ward and ICU Census April 9, 2020 – May 20, 2021.

As of May 20th, 581 (8%) of Arizona's 8607 general ward beds were occupied by Covid-19 patients, a 2% decrease from the previous week's 594 occupied beds (Figure 4 and Figure 5 Panel A). Another 1004 (12%) beds remained available for use. The number of available beds is higher than the previous week's 977 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 20th, 167 (11%) of Arizona's 1746 ICU beds were occupied with Covid-19 patients, a 13% decrease from the prior week's count of 193 patients (Figure 4 and Figure 5 Panel B). An additional 269 (15%) ICU beds remained available for use. This is similar to the prior week's 259 available beds. The summer-fall nadir was 114 occupied beds on September 22nd. The post-holiday nadir was 140 beds on April 7th.

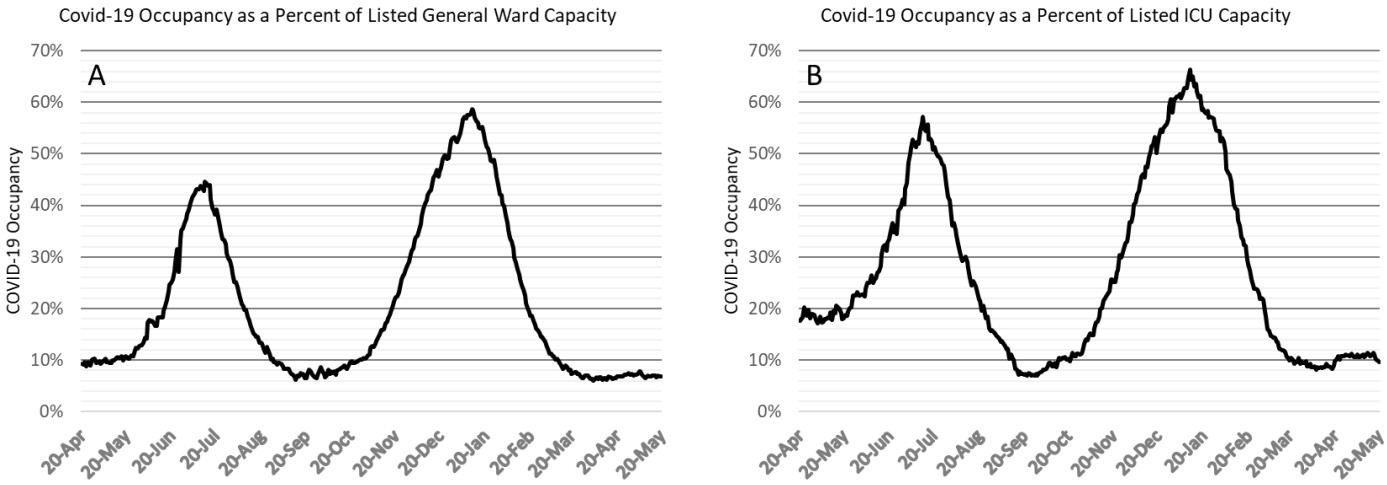

Figure 5. Covid-19 Occupancy as a Percent of Listed General Ward (A, left) and ICU (B, right) Capacity in Arizona April 20, 2020 – May 20, 2021.

Arizona hospital occupancy remains above seasonal levels. Improvements in ward and ICU occupancy have stalled at ≥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.

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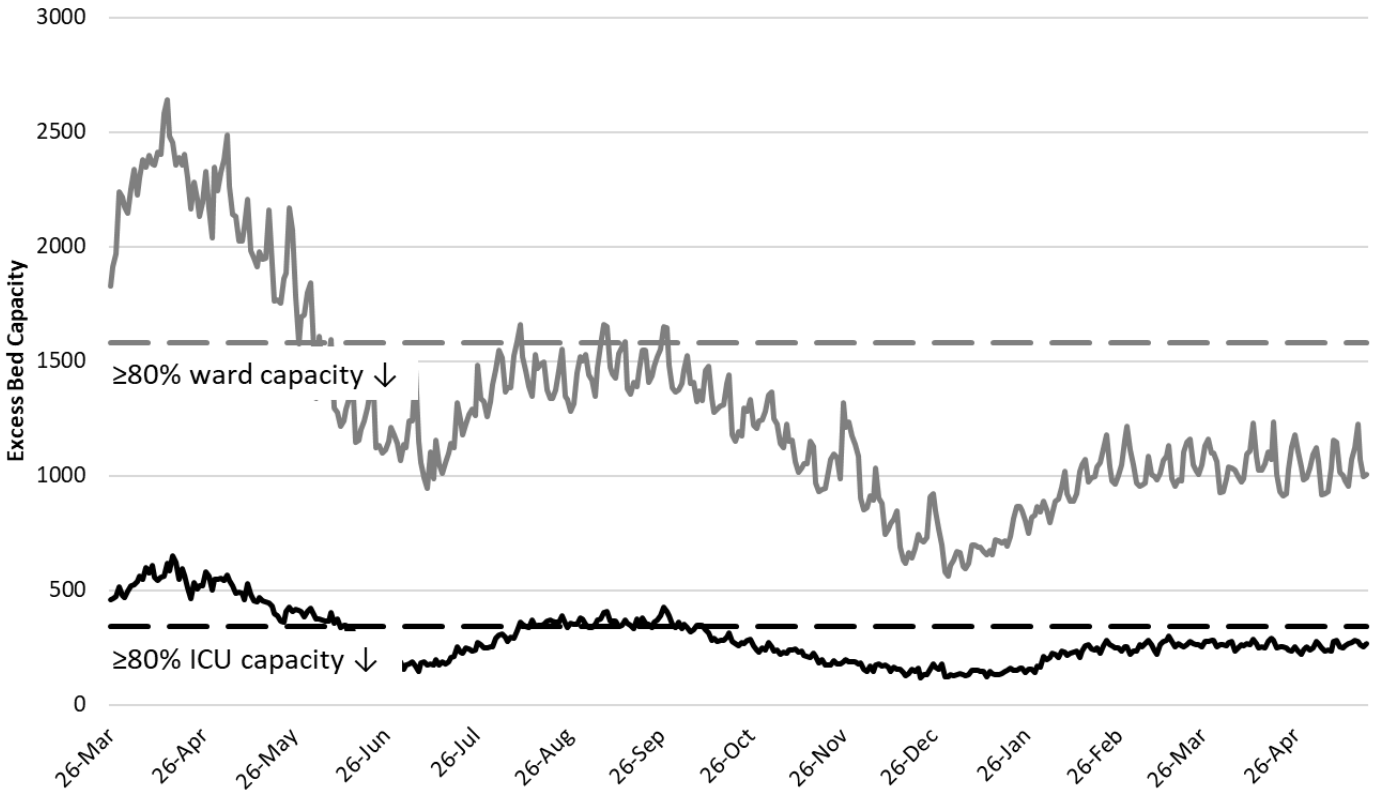

Figure 6. Observed Excess Non-Surge General Ward and ICU Capacity March 26, 2020 – May 20, 2021.

The week ending January 17th remains Arizona's deadliest with 1089 deaths (Figure 7). With 73 deaths recorded on March 28th, it marks the first week with <100 Covid-19 deaths since October. Weekly deaths remain at or above the summer – fall nadir of 51 deaths per week (October 4th) for several more weeks unless case rates meaningfully decline.

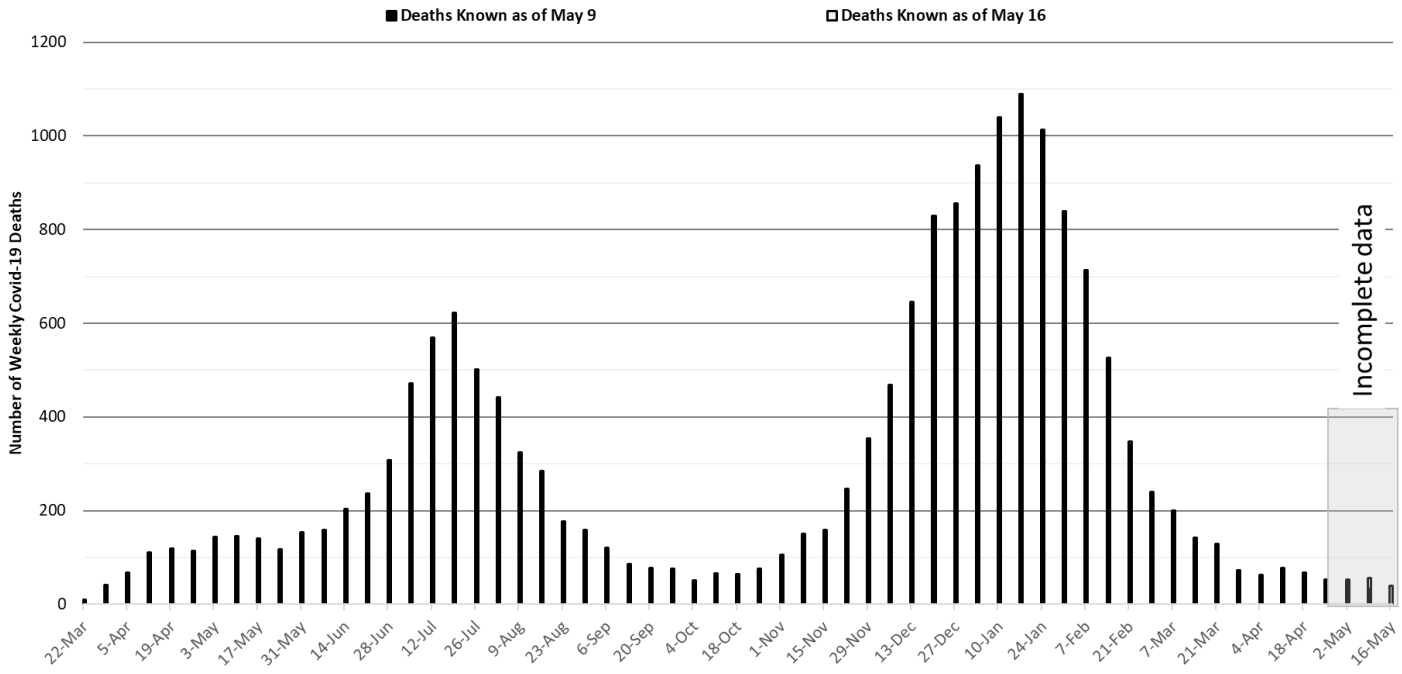

Figure 7. Weekly Arizona Covid-19 Deaths March 16, 2020 – May 16, 2021.

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Pima County Outlook

For the week ending May 16th, 400 Pima County residents were diagnosed with Covid-19 (Figure 8). This is an 11% decrease from the 449 cases initially reported last week. New cases are being diagnosed at a rate of 38 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.

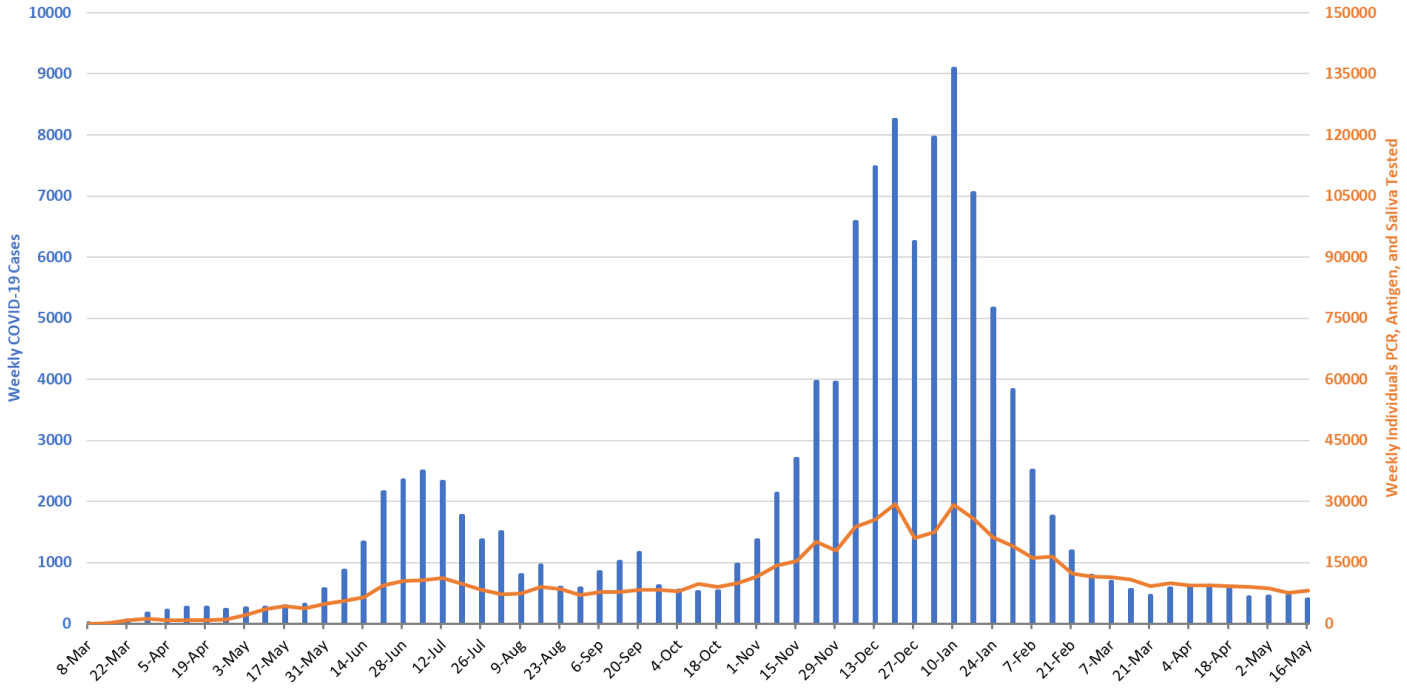

Fig 8. Covid-19 Cases and Individuals Undergoing Testing in Pima County Mar 1, 2020 – May 16, 2021

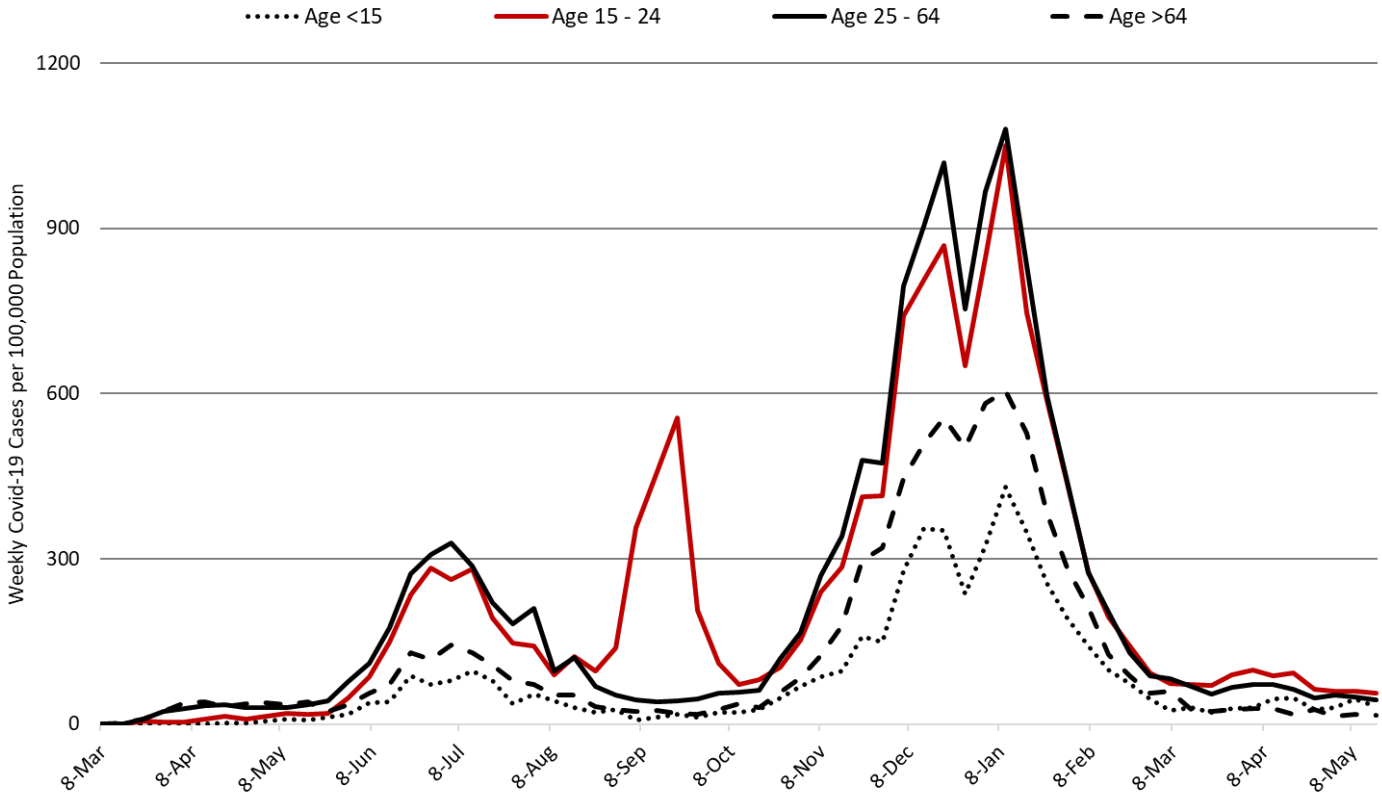

Figure 9. Covid-19 Cases by Age Group in Pima County from March 1, 2020 – May 16, 2021.

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Summary:

- Covid-19 cases and hospitalizations are little changed over the past month. We can expect similar levels of viral transmission throughout early-to-mid summer (see updated ASU COVID-19 model in Appendix). Continued normalization of behavior, additional penetration of more transmissible variants, and declining vaccination rates will leave a substantial reservoir of susceptible individuals who are capable of sustaining moderate levels of community transmission throughout the summer.
    - As of May 16th, new cases were being diagnosed at a rate of 57 cases per 100,000 residents per week. This rate is slowly decreasing by 8 - 10 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 holding mostly steady 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 <75 deaths per week should hover just above 50 deaths per week for the next 2 – 4 weeks or more.
- According to the CDC, 43% of Arizona adults have received at least 2-doses of vaccine while another 12% have received 1-dose. Arizona passed peak vaccination rates in early April so progress towards our goal of >80% vaccinated is slowing.

This is the last regularly scheduled update.

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

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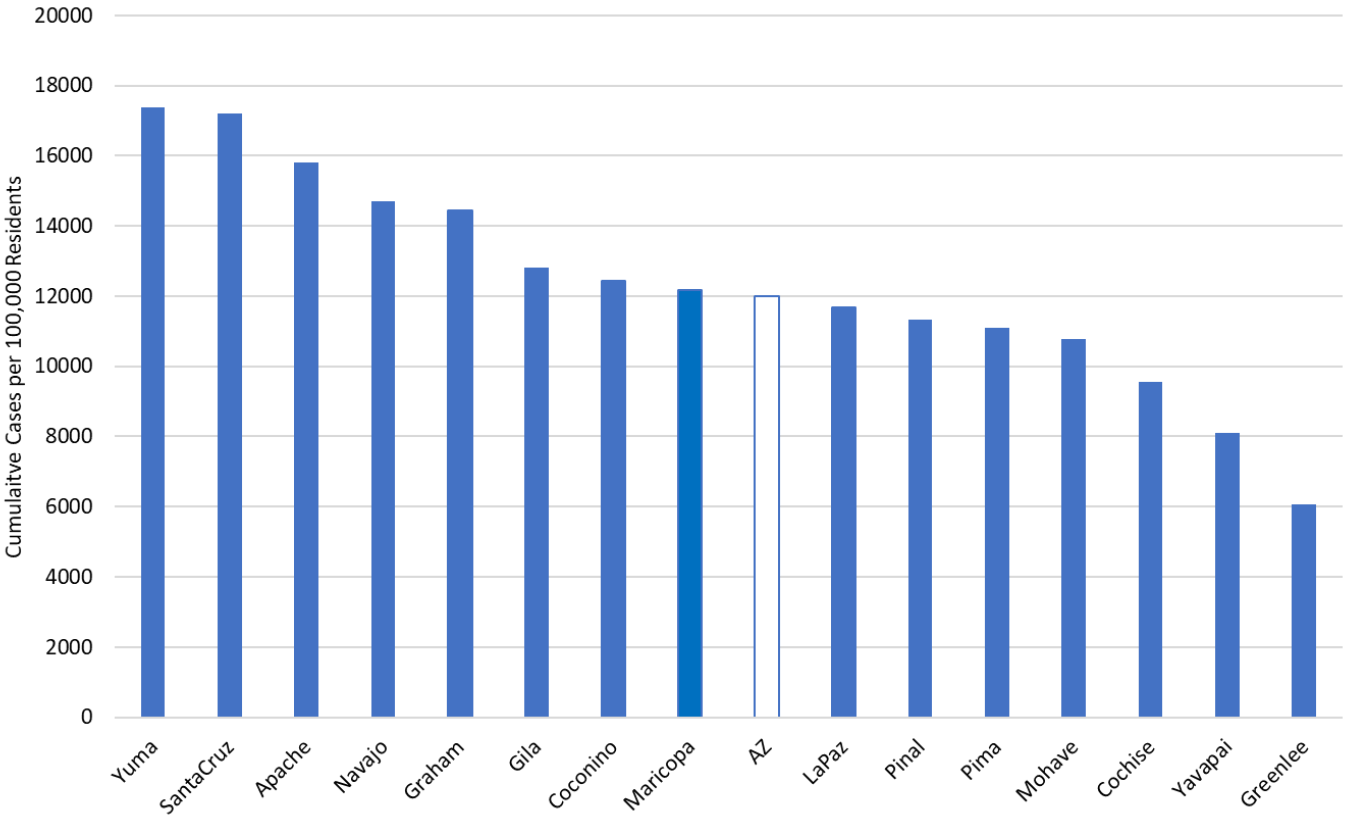

Figure 1A. Cumulative Covid-19 Incidence in Arizona by County March 1, 2020 – May 16, 2021.

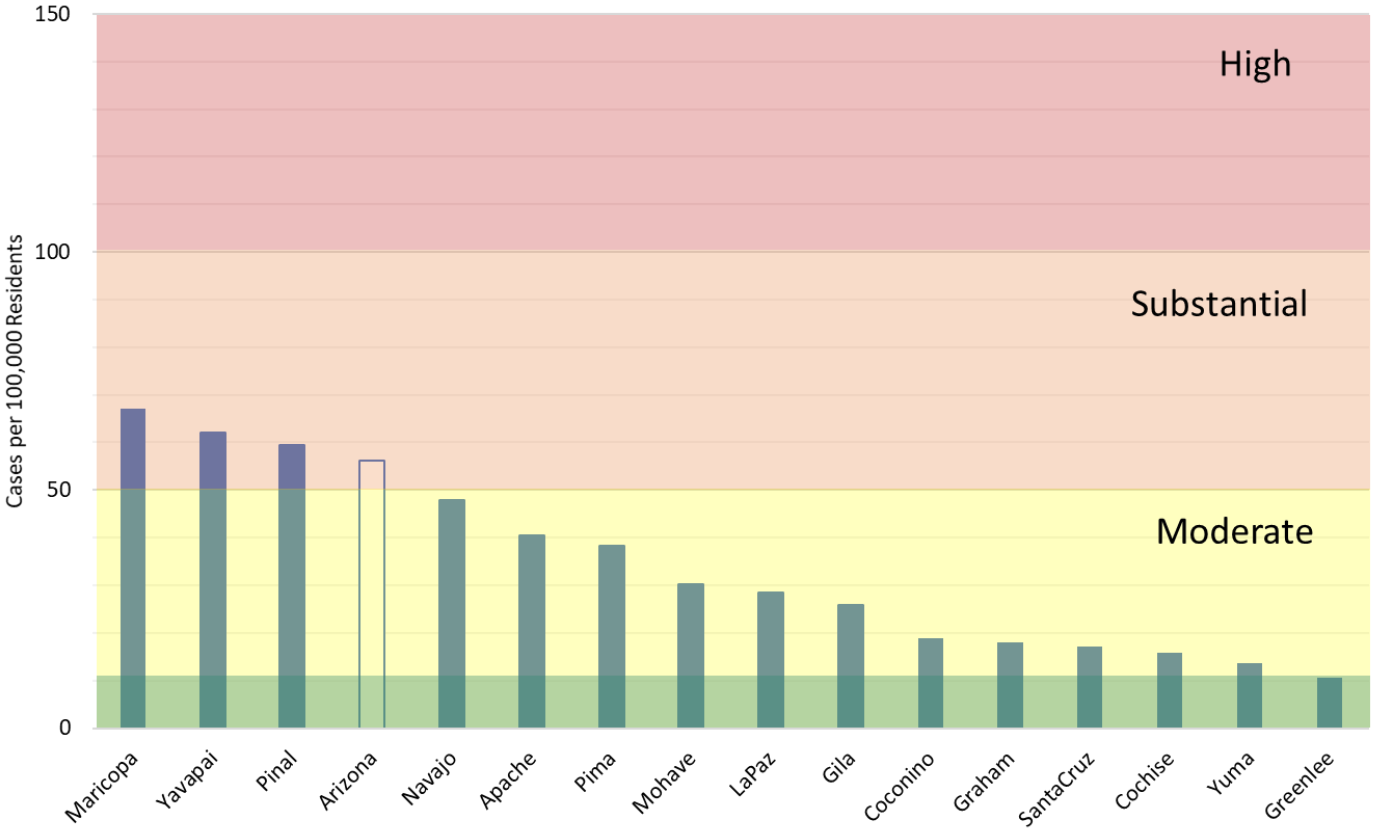

Figure 2A. Covid-19 Weekly Cumulative Incidence in Arizona by County May 9 – May 16, 2021 (Risk bands coincide with CDC recommendations for K – 12 schools' instructional mode).

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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 ADSH 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.

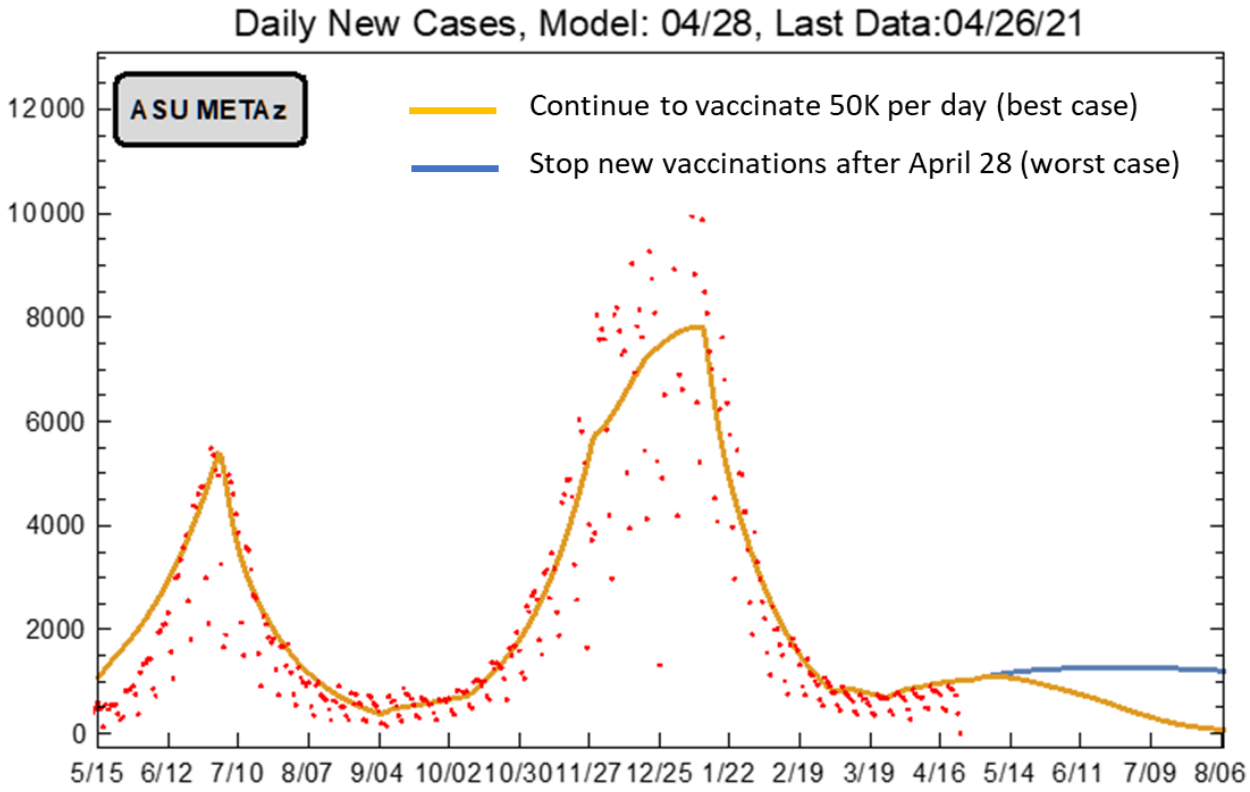

Figure 3A. Projected COVID-19 Cases in Arizona under Best-Case (orange) and Worst-Case (gold) Scenarios through August 6, 2021. Data graciously provided by the ASU COVID-19 Modeling Group (Esma Gel, PhD; Megan Jehn, PhD; Anna Muldoon, MPH; Samantha Sokol, Jordy Rodriguez, Heather Ross, PhD, NDP, ANP-BC,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

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