

COVID-19 Disease Outbreak Outlook Arizona and Pima County

Updated December 3, 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 corresponding recommendations should be considered in conjunction with other corroborating and conflicting data. Past updates can be accessed at <https://publichealth.arizona.edu/news/2021/covid-19-forecast-model>.

For the week ending November 28th, 21963 Arizonans were diagnosed with COVID-19, a spurious decline from last week's initial tally of 27846 cases (Figure 1). Like last Thanksgiving, testing was significantly disrupted during Thanksgiving with 25000 fewer individuals being testing than the week before. Therefore, case counts and resulting rates meaningfully underestimate transmission (Figure 2a following page). As typical testing patterns resume, case rates should return to prior levels and then some as underlying transmission is almost certainly increasing. Arizona's new case ranking has fallen from 9th to 22nd. The nation's current leaders are New Hampshire (540), Minnesota (535), Michigan (518), Vermont (484), and North Dakota (441).

STILL TRUE → Arizona continues to experience a high number of cases, hospitalizations, and deaths. With [waning vaccine efficacy](#) and a [potentially short duration of acquired immunity](#), [herd immunity is not achievable](#). As winter approaches, [more individuals will become susceptible](#). While the [previously vaccinated](#) and [previously infected](#) will remain mostly protected from severe outcomes, they will contribute to community transmission. Unvaccinated Arizonans will not be able to avoid infection by "free riding" on high levels of community immunity. The [decision to remain unvaccinated carries a much greater risk](#) than getting vaccinated. For the vaccinated, [third-shot boosters provide considerable additional protection](#) and should be a priority for anyone >50 years to ward off existing *Delta* infection and provide a hedge against the new *Omicron* variant.

According to the [CDC](#), only 22% of Arizona adults and 42% of seniors are fully vaccinated with a third dose booster, 37th and 41st national ranking, respectively. Vermont is winning the booster race at 39% and 65%, respectively. As winter approaches, [waning immunity among those without a booster](#) will place them at risk. The [CDC guidance on boosters](#) has widened eligibility to all adults. The [ADHS Vaccine Dashboard](#) shows weekly doses delivered fell a bit from 180K to 140 doses.

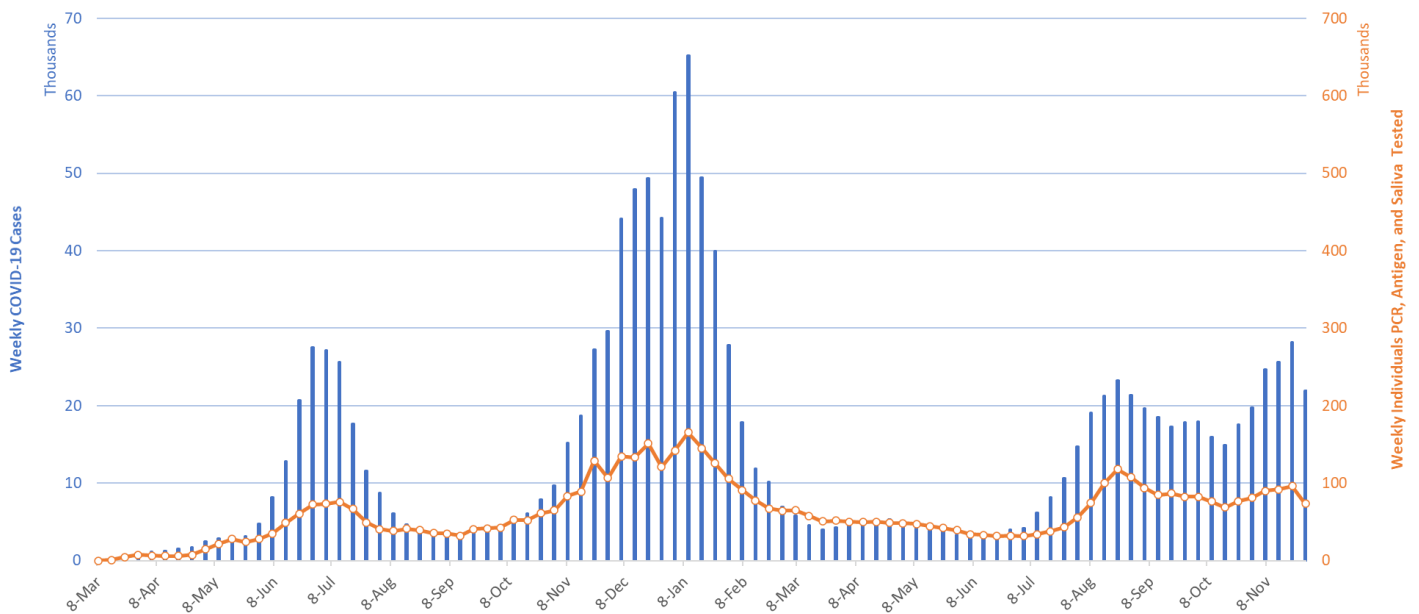


Figure 1. Weekly COVID-19 Cases in Arizona and Number of Individuals Undergoing COVID-19 Diagnostic Testing March 1, 2020 – November 28, 2021.

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.

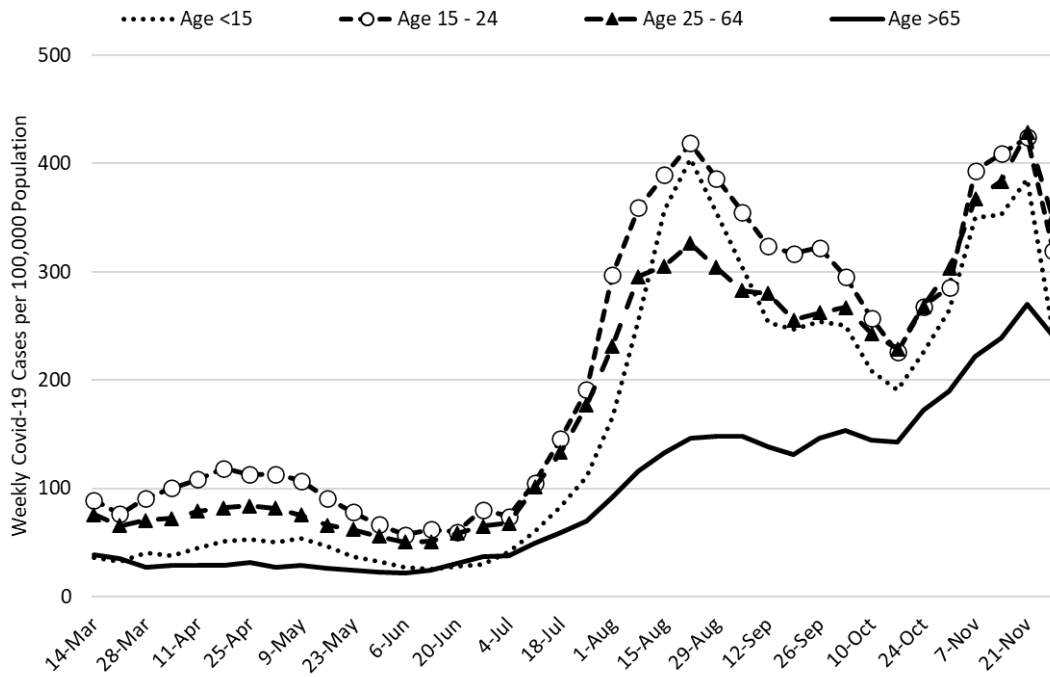


Figure 2a. COVID-19 Cases in Arizona by Age Group March 7 – November 28, 2021.

Figure 2a shows marked declines among children and working-age adults, almost certainly due to less testing. A similar decline is evident among children (Figure 2b). As mentioned last week, testing disruptions will make viral transmission seem to increase in fits and spurts as Thanksgiving and Christmas holidays bring major changes to work and social life. For the next several weeks, hospital COVID-19 occupancy will give a more consistent, although lagged, indicator of what is happening with viral transmission in the community.

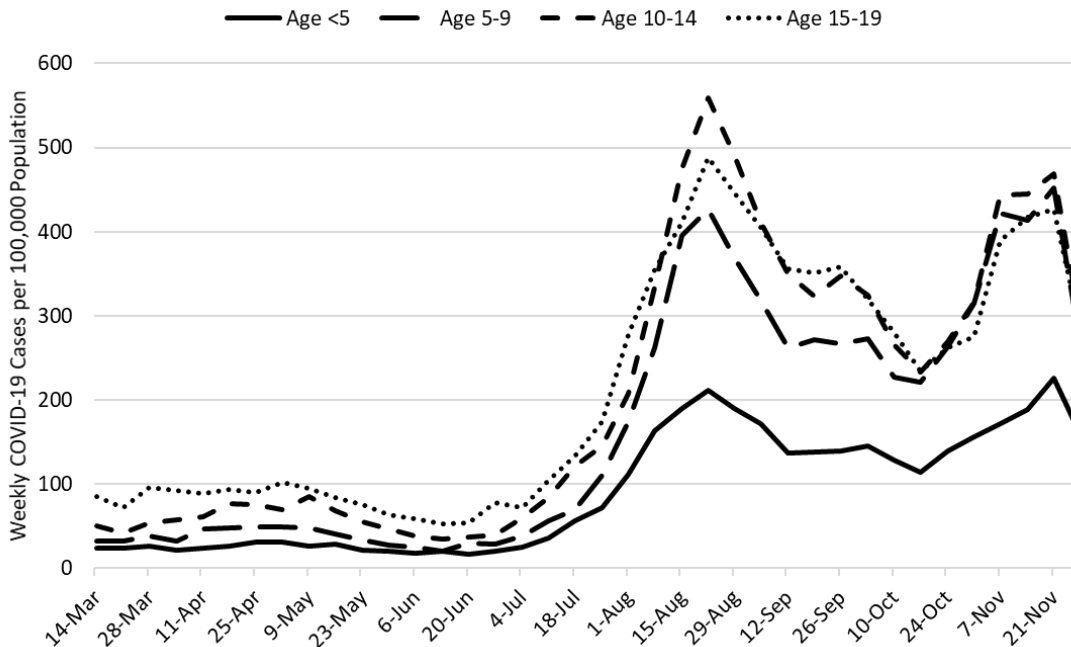


Figure 2b. COVID-19 Cases in Arizona among Children by Age Group March 7 – November 28, 2021.

Test positivity, at 32%, continues to rise with markedly fewer tests being conducted last week. Testing remains inadequate for public health practice and many cases are going undiagnosed (Figure 3).

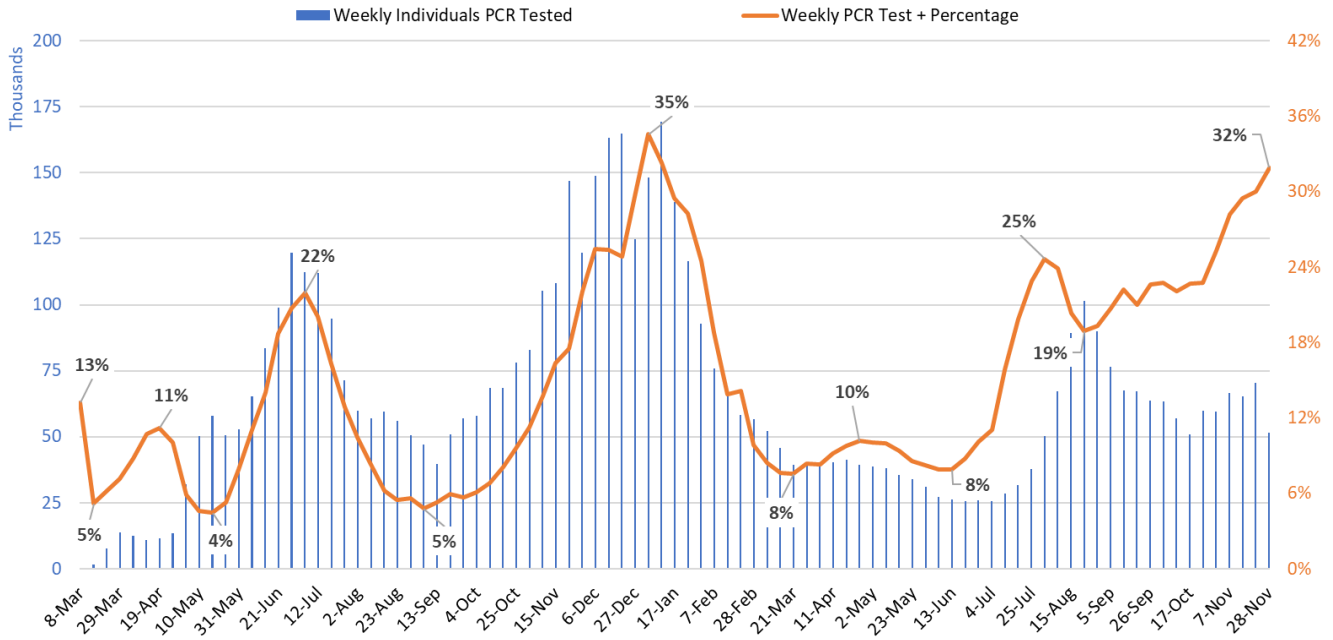


Figure 3. Weekly Number of Patients Undergoing Traditional Nasopharyngeal PCR Testing and Associated Percent Positivity March 1, 2020 – November 28, 2021.

As of December 1st, 2681 (31%) of Arizona’s 8789 general ward beds were occupied by COVID-19 patients, a 5% increase from last week’s 2550 occupied beds (Figure 4 and Figure 5 Panel A). Another 464 (5%) beds remained available for use which sets a new all-time low. Six-hundred sixty-eight (668, 37%) of Arizona’s 1784 ICU beds were occupied by COVID-19 patients, a 6% increase from last week’s 633 occupied beds (Figure 4 and Figure 5 Panel B). An additional 116 (7%) ICU beds remained available for use, lower than last week’s 126 beds. Hospital occupancy lags case counts by 5 -10 days; so, we are essentially driving I-10 through a haboob.

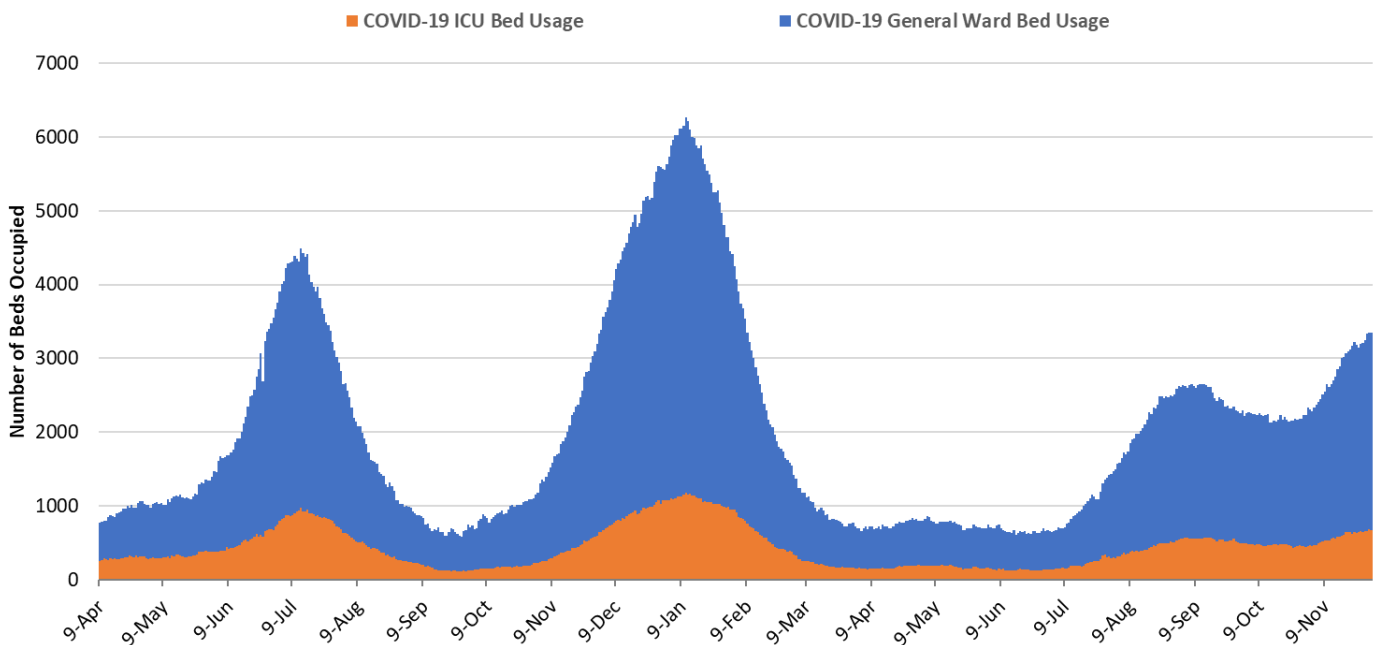


Figure 4. Arizona Daily COVID-19 General Ward and ICU Census April 9, 2020 – December 1, 2021.

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While peak occupancy is unlikely to reach prior levels, the base of the *Delta* wave is broader. **The *Delta* wave has seen 111 days with a combined occupancy >2000 patients** whereas the summer 2020 and winter 2021 waves saw 57 and 98 days, respectively. We have now had >3000 combined occupancy for 14 days whereas the summer 2020 and winter 2021 waves saw 35 and 78 days, respectively.

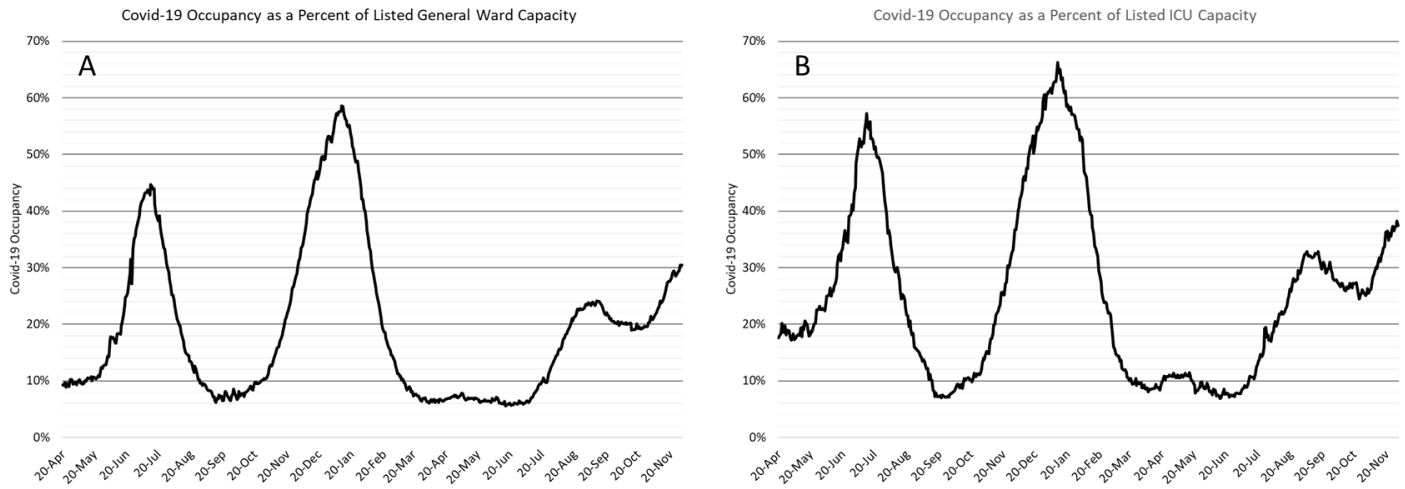


Figure 5. COVID-19 Occupancy as a Percent of Listed General Ward (A, left) and ICU (B, right) Capacity in Arizona April 20, 2020 – December 1, 2021.

Hospital occupancy remains far above seasonal levels. Safety margins, as measured by available beds, remain near historical lows (Figure 6). In fact, the number of available ward beds fell below 500 beds for the second time this week and ICU beds will at least briefly fall below 100 in next week’s report. Hospitals should prepare for >25% ward occupancy and >30% ICU occupancy for some time to come.

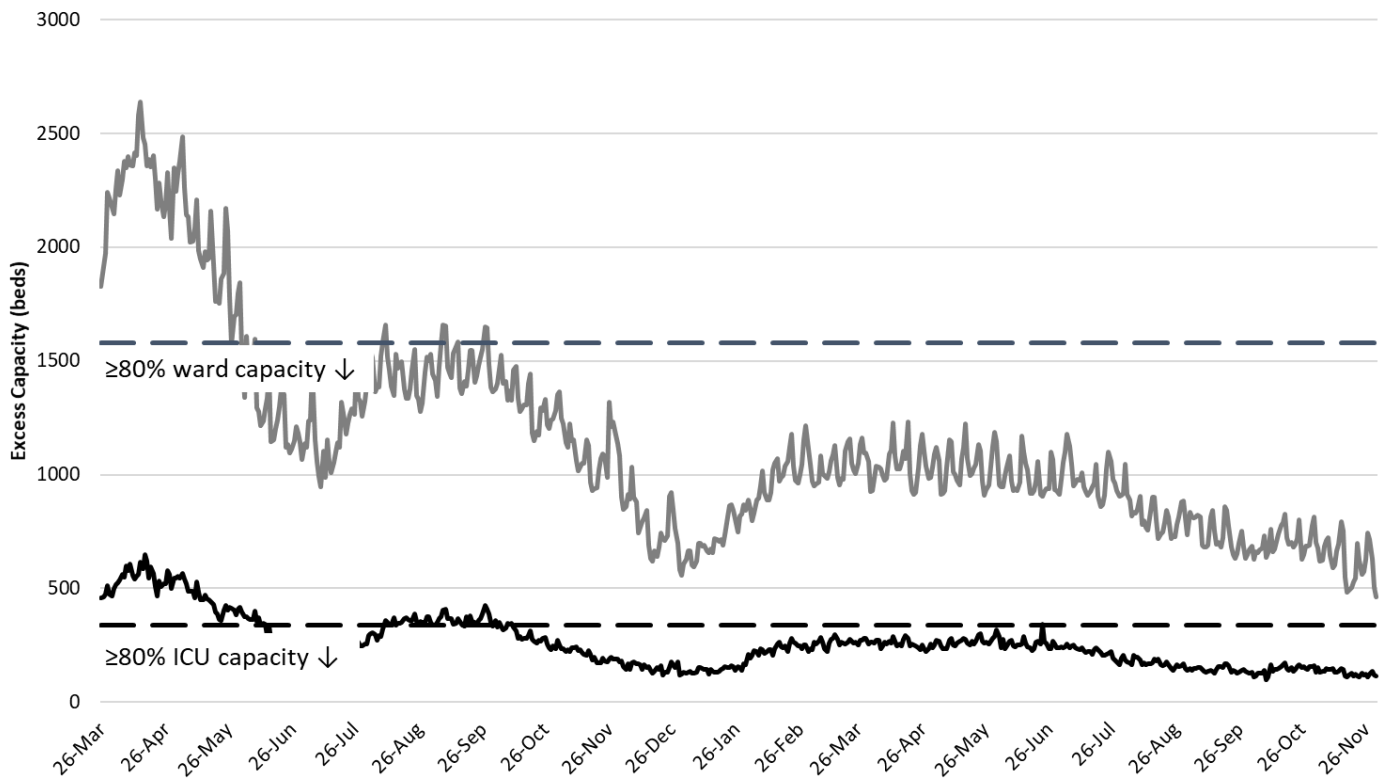


Figure 6. Observed Excess Non-Surge General Ward and ICU Capacity in Arizona March 26, 2020 – Dec 1, 2021.

Arizona has been experiencing >200 COVID-19 deaths per week since August 22nd; and, beginning the week ending November 14th are once again >300 deaths a week (Figure 7). So far, 22561 Arizonans have lost their lives to COVID-19 making it Arizona's [leading cause of death](#), the [only state to achieve such a distinction](#). A [new analysis from Texas](#), shows COVID-19 as the 2nd leading cause of death among adults 24 – 44 years of age overall but with substantial disparities; it was the leading cause of death among Hispanics but only 6th among whites.

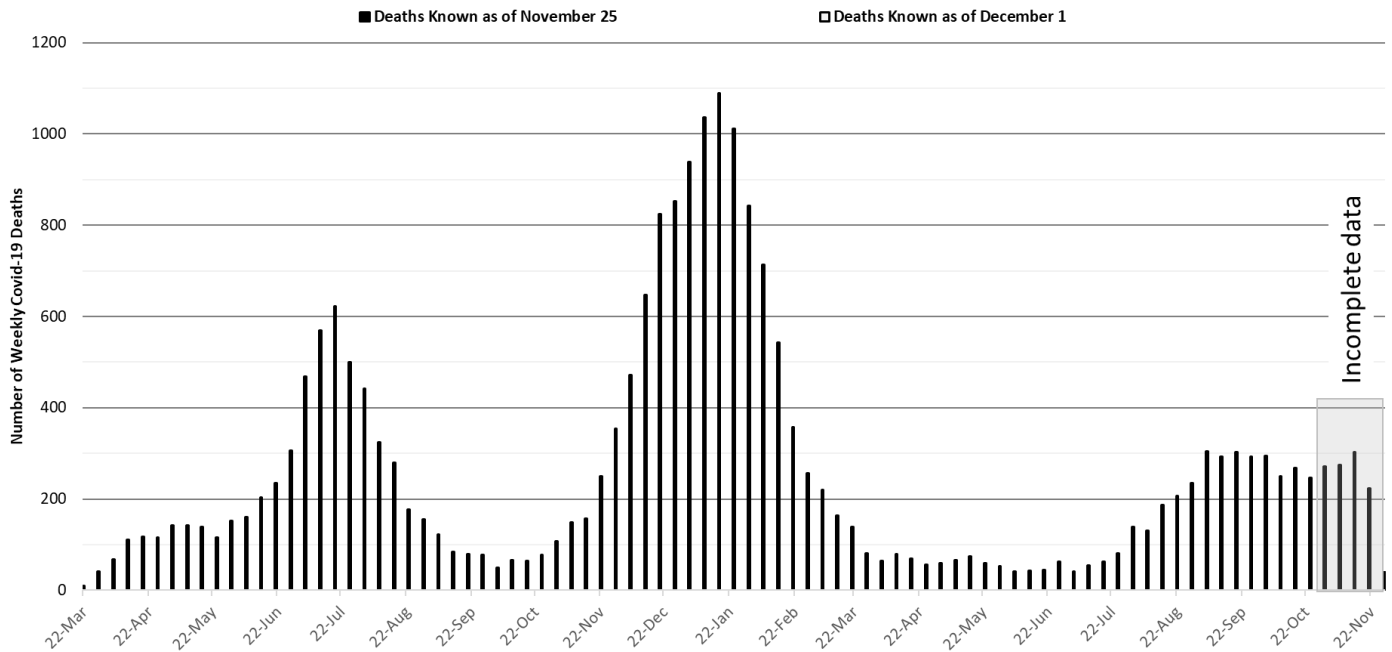


Figure 7. Weekly Arizona COVID-19 Deaths March 16, 2020 – November 28, 2021.

[Seasonal influenza cases in Arizona](#) (blue line) remain below the 5-year historical average (grey bars) suggesting that the feared ‘twindemic’ has yet to materialize (Figure 8). Fingers crossed that it stays that way as it one factor keeping hospitals from imploding.

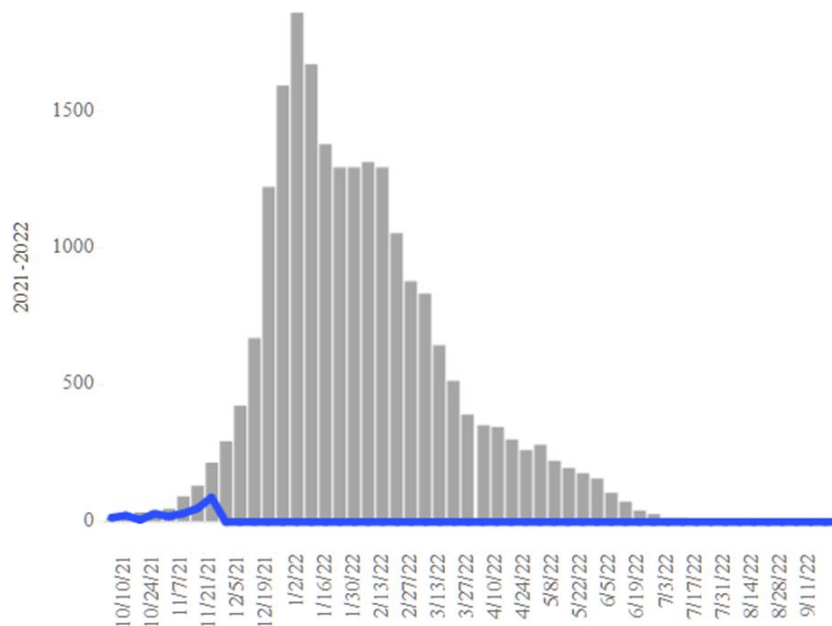


Figure 8. Arizona Influenza Cases in 2021 (blue) versus 5-Year Historical Average (grey)

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Pima County

For the week ending November 28th, 3059 Pima County residents were diagnosed with COVID-19, also a spuriously low number due to reduced testing (Figure 9). Trends across the various age groups appear in Figure 10.

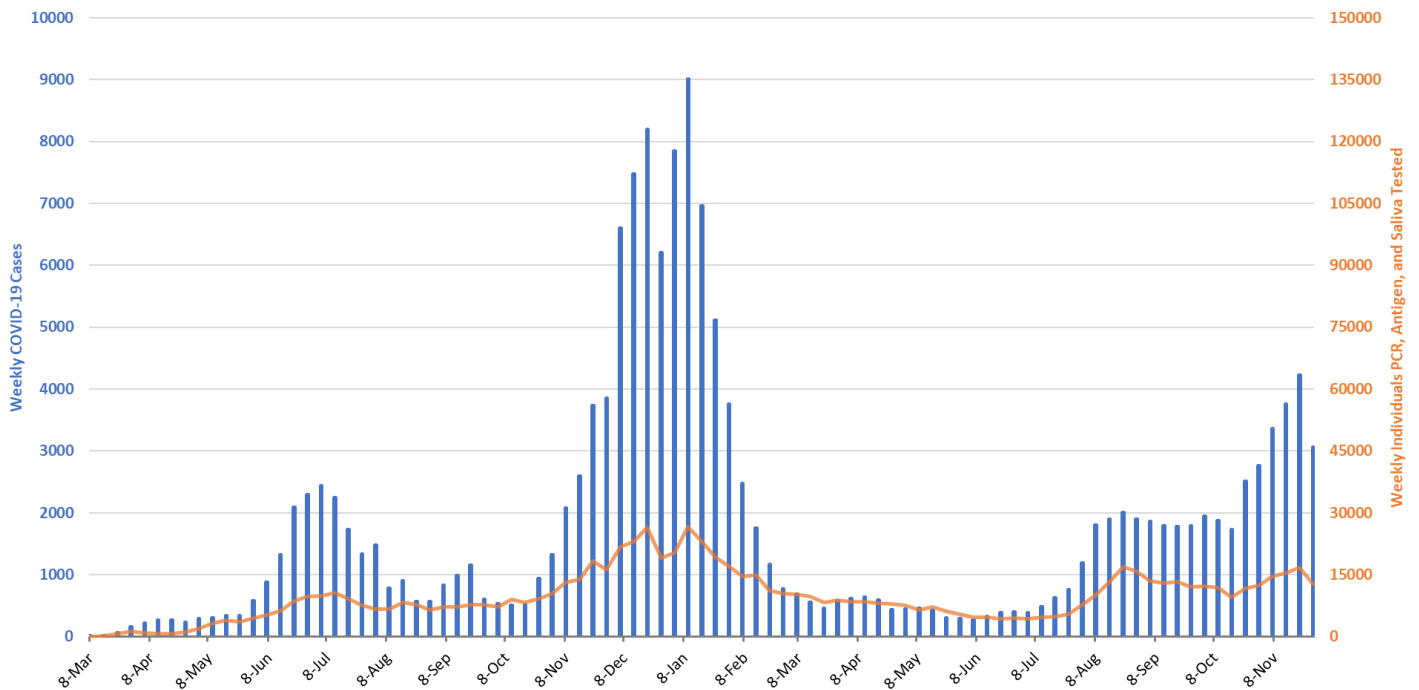


Figure 9. Weekly COVID-19 Cases in Pima County and Number of Individuals Undergoing COVID-19 Diagnostic Testing March 1, 2020 – November 28, 2021.

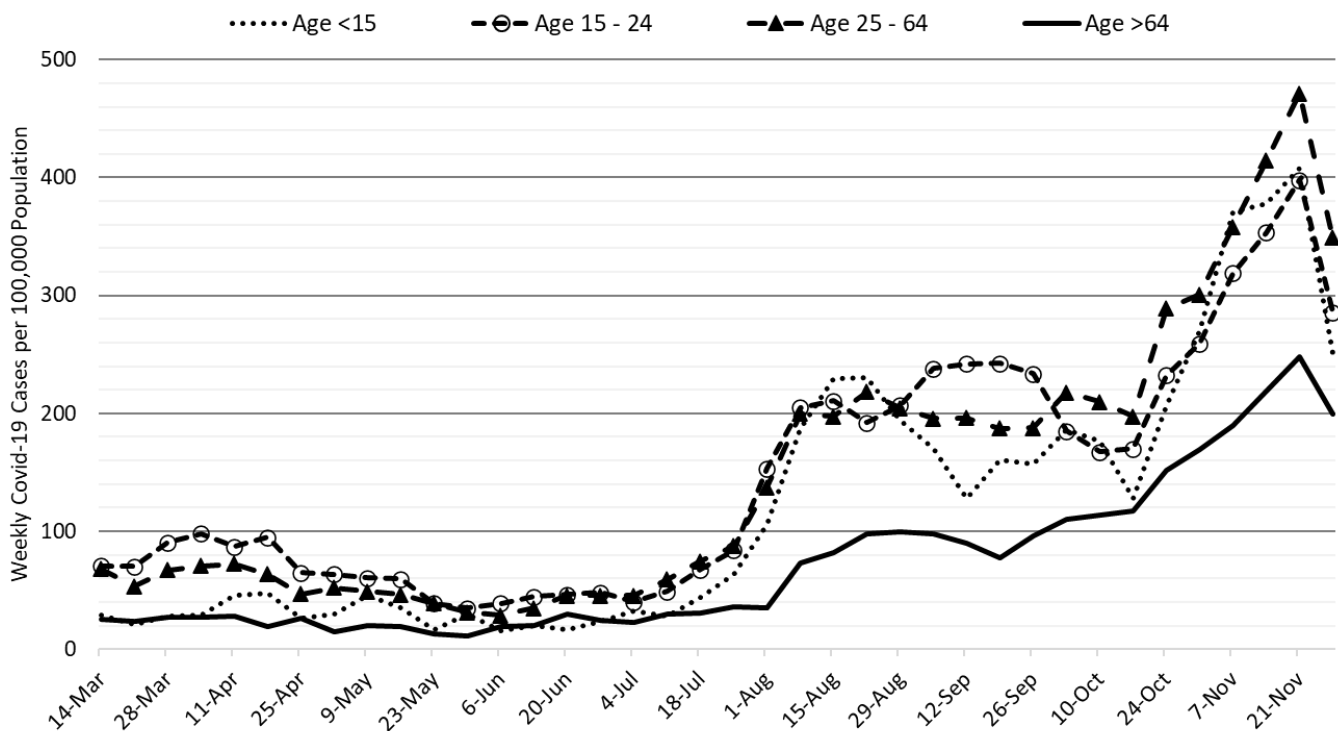


Figure 10. COVID-19 Cases in Pima County by Age Group March 7, 2020 – November 28, 2021.

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Summary:

- Arizona continues to experience high levels of community transmission. Test positivity also remains high reminding us that test capacity, accessibility, and/or uptake is inadequate. Increasing case rates among older, highly vaccinated groups serves as a warning that major behavioral shifts and/or waning immunity could result in future increases in not only cases but also hospitalizations. In general, transmission will likely increase in fits-and-starts through the holidays before gradually subsiding in early 2022. While Arizona is unlikely to set new records for daily cases, the base of the delta wave will be considerably broader than any other creating substantial misery in its own way.
 - **As of November 28th, new cases were being diagnosed at a rate of at least 302 cases per 100K residents per week. This rate was likely much higher than reported due to reduced testing during Thanksgiving.**
- Vaccination remains the most important public health priority to reduce transmission and severe illness; however, mask mandates, restrictions on indoor gatherings, and targeted business mitigations are also needed to reduce/control transmission in the short-run with the primary goal being to avoid overwhelming our critical care facilities.
 - **Waning vaccine immunity also makes it imperative that all adults who were previously vaccinated obtain a third shot booster, particularly those 50+ years of age.** Persistently high levels of community transmission, and more importantly hospitalizations, are possible for an extended time until the supply of unvaccinated, previously uninfected adults is exhausted.
 - Third shot boosters provided considerable protection against breakthrough infection <https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2786890>
 - **Risk factors for breakthrough hospitalization and death were recently elucidated in the British Medical Journal:** Down's syndrome, kidney transplantation, sickle cell disease, nursing home residents, chemotherapy, recent bone marrow or solid organ transplantation (ever), HIV/AIDS, dementia, Parkinson's disease, neurological conditions, and liver cirrhosis. <https://www.bmj.com/content/374/bmj.n2244>
- The World Health Organization has named another COVID-19 variant of concern (VOC), the Omicron variant. [https://www.who.int/news/item/26-11-2021-classification-of-omicron-\(b.1.1.529\)-sars-cov-2-variant-of-concern](https://www.who.int/news/item/26-11-2021-classification-of-omicron-(b.1.1.529)-sars-cov-2-variant-of-concern)
 - A VOC is a variant that “through a comparative assessment, has been demonstrated to be associated with ≥ 1 of the following changes at a degree of global public health significance:
 - Increase in transmissibility or detrimental change in COVID-19 epidemiology; OR
 - Increase in virulence or change in clinical disease presentation; OR
 - Decrease in effectiveness of public health and social measures or available diagnostics, vaccines, therapeutics.”
 - The European CDC published a good current assessment (Dec 2): <https://www.ecdc.europa.eu/en/publications-data/covid-19-threat-assessment-spread-omicron-first-update>
 - Here is a briefing from ground zero in South Africa (Dec 2; epidemiological data starts 18.45): <https://www.youtube.com/watch?v=qMzMFmprYdq>
 - Omicron doesn't fundamentally change what is needed in Arizona NOW: get vaccinated, get boosted, wear an upgraded K-95 or KN-95 mask, avoid risky indoor situations. **Instead of worrying about what might happen (Omicron), we need to do more to stop what IS happening (Delta) right now in our own backyard.**

- For those wanting to track variant data, here are links to genomic state data (<https://pathogen.tgen.org/covidseq-tracker/>) and national data (<https://covid.cdc.gov/covid-data-tracker/#variant-proportions>). Other surveillance methods include S-gene Target Failure (SGTF) from PCR testing and wastewater surveillance. Unfortunately, I do not have any links to publicly available data for these latter two mechanisms.
- **COVID-19 hospital occupancy is increasing and will likely exceed 25% of all beds in the general ward and 30% of beds in the ICU for the remainder of the year.** Access to care will continue to be restricted in the face of staff shortages in inpatient and outpatient settings.
 - The importance of vaccination to prevent overwhelming critical care resources was highlighted by the ICNARC report on COVID-19 in Critical Care: England, Wales and Northern Ireland (26-Nov). <https://www.icnarc.org/our-audit/audits/cmp/reports>

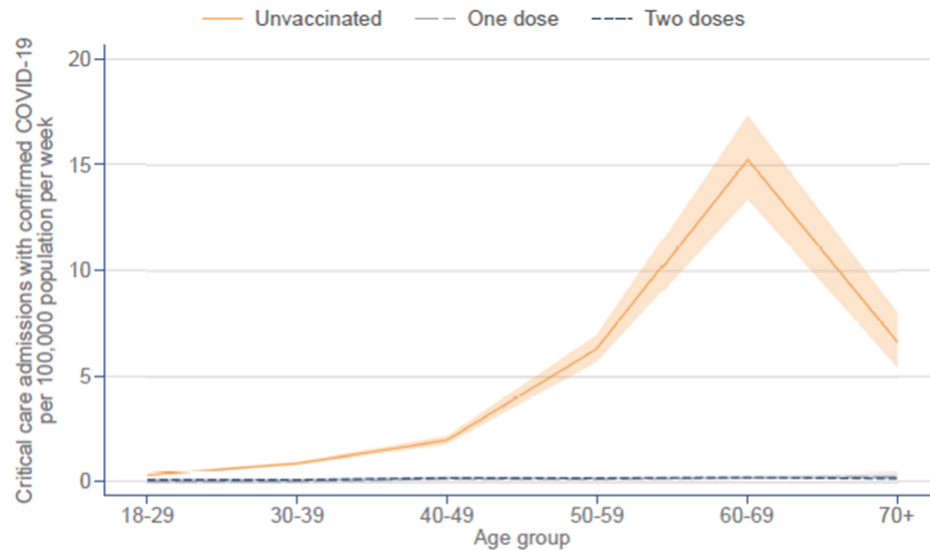


Figure 26. Rate of admission to critical care with confirmed COVID-19 by vaccination status for patients admitted 1 May 2021 to 31 July 2021

- Unfortunately, Merck’s new COVID-19 anti-viral, Molnupiravir (Lagevrio), has less efficacy than originally touted, from 50% reduction of hospitalization to 30%. The FDA advisory panel narrowly approved it for sale, 13 to 10. While helpful, it is not going to be the game changer we had hoped. It will not be approved for pregnant or lactating women or children. <https://www.bmj.com/content/375/bmj.n2984>
- **Weekly COVID-19 deaths have now reached 300 per week and should remain at or above this level as long as cases exceed 20000 per week.**
 - So far, 22561 Arizonans have lost their lives to COVID-19.

Appendix

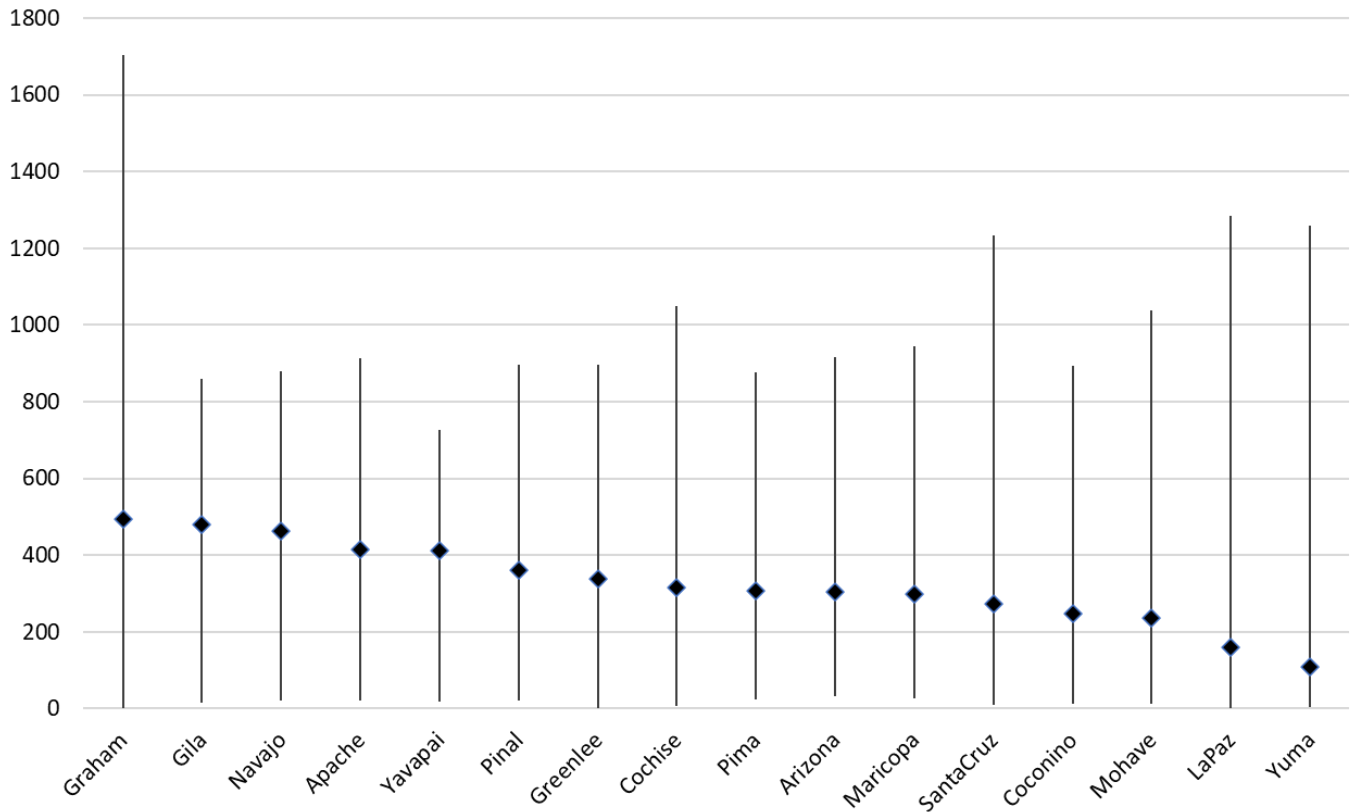


Figure 1A. Minimum, Maximum and Current COVID-19 Cases Rates by County April 1, 2020 - November 28, 2021.

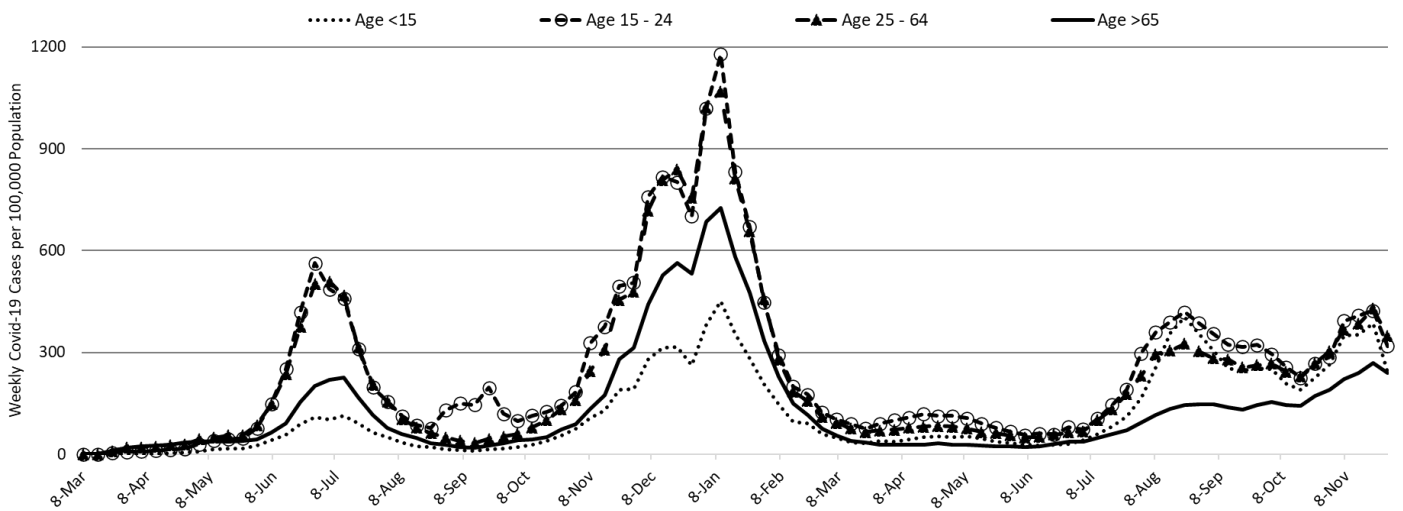


Figure 2A. COVID-19 Cases in Arizona by Age Group March 1, 2020 - November 28, 2021.