

COVID-19 Disease Outbreak Outlook Arizona and Pima County

Updated November 26, 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 21st, 27846 Arizonans were diagnosed with COVID-19, a 10% increase from last week's initial tally of 25234 cases (Figure 1). Cases are currently being diagnosed at a rate of 383 cases per 100K residents per week; this rate is increasing by 31 cases per 100K residents per week. Rates are highest among those 25 – 64 years and are lowest among those 65+ years, 424 versus 268 cases per 100K residents per week, respectively (Figure 2a following page).

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 does.

Arizona's new case ranking has moved up 6 spots to 9th. The nation's leaders have again rearranged themselves: Michigan (560), Minnesota (525), New Hampshire (510), New Mexico (475), Wisconsin (439). Given the experience of other states, Arizona's delta wave is unlikely reach last winter's peak, 916 cases per 100K residents, but will almost certainly exceed the summer 2020 peak, 409 cases per 100K residents.

According to the [CDC](#), only 19% of Arizona adults are fully vaccinated with a third dose booster (37th overall); twice as many of those 65+ years are (38%, 40th overall). Vermont is winning the booster race at 35% and 62%, 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 continues to rise, reaching 180K doses last week.

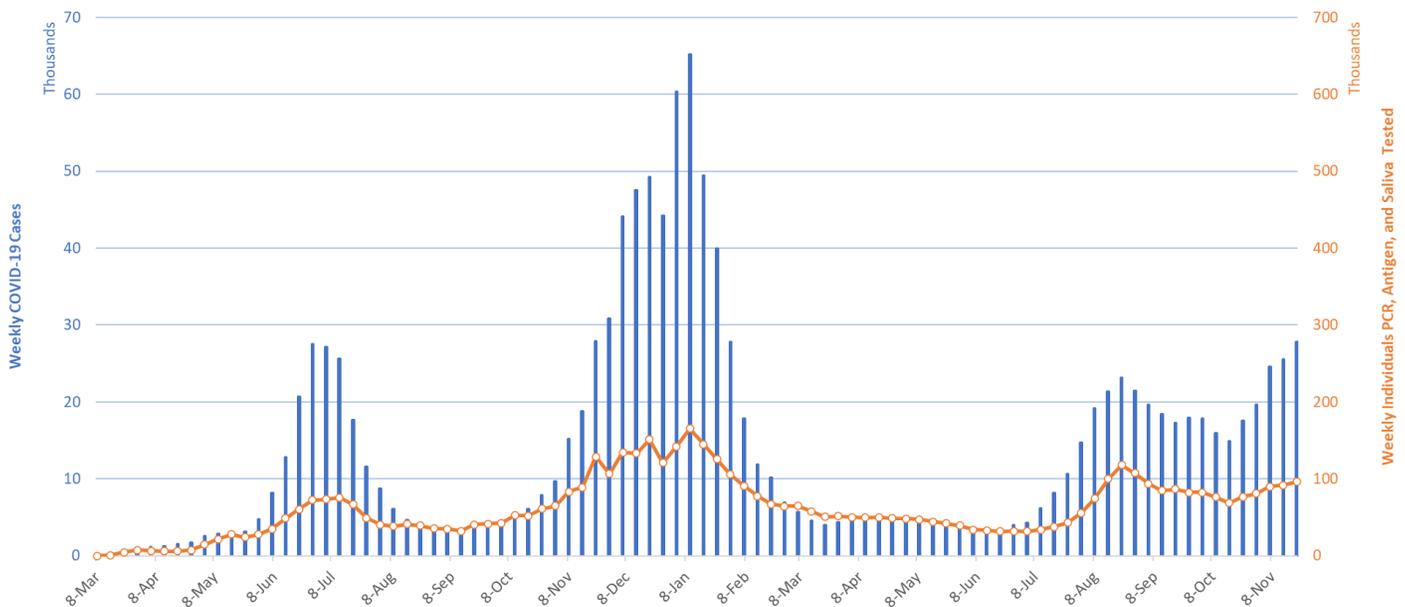


Figure 1. Weekly COVID-19 Cases in Arizona and Number of Individuals Undergoing COVID-19 Diagnostic Testing March 1, 2020 – November 21, 2021.

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.

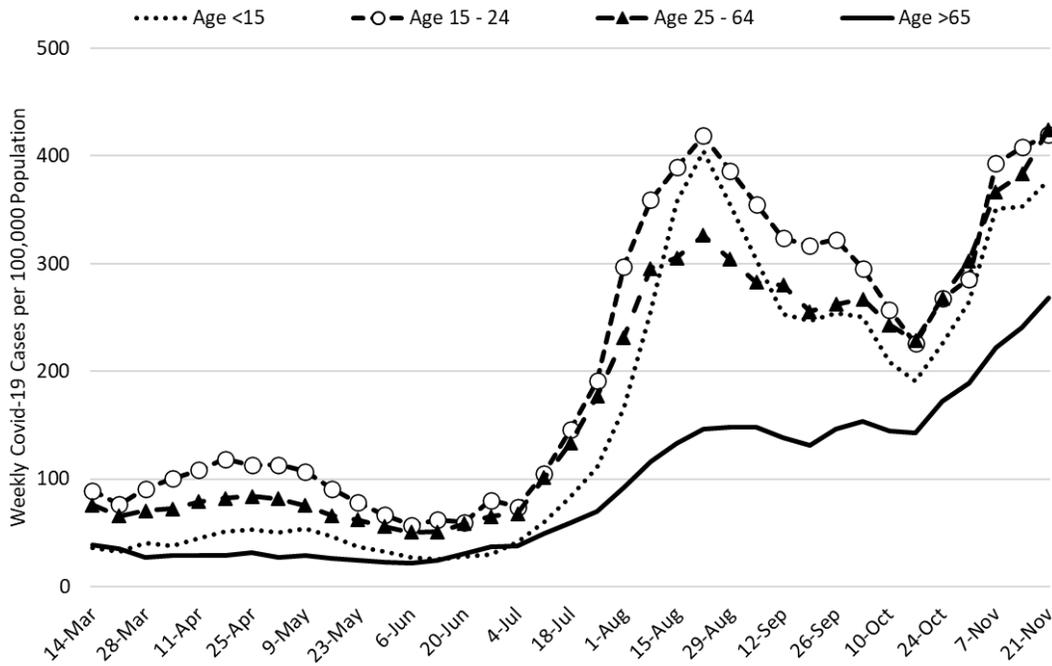


Figure 2a. COVID-19 Cases in Arizona by Age Group March 7 – November 21, 2021.

Figure 2a shows increasing transmission among all age groups heading into December. A similar pattern is evident among children (Figure 2b). Ultimately, our inability to control transmission is attributable to the state’s low vaccination rates, ineffectual or absent mitigation efforts, and waning immunity from prior infection and the 2-dose vaccination sequence. As we exit Thanksgiving, transmission is expected to increase in fits and spurts as the holidays bring major changes to work and social life along with variable access to testing and willingness to obtain it.

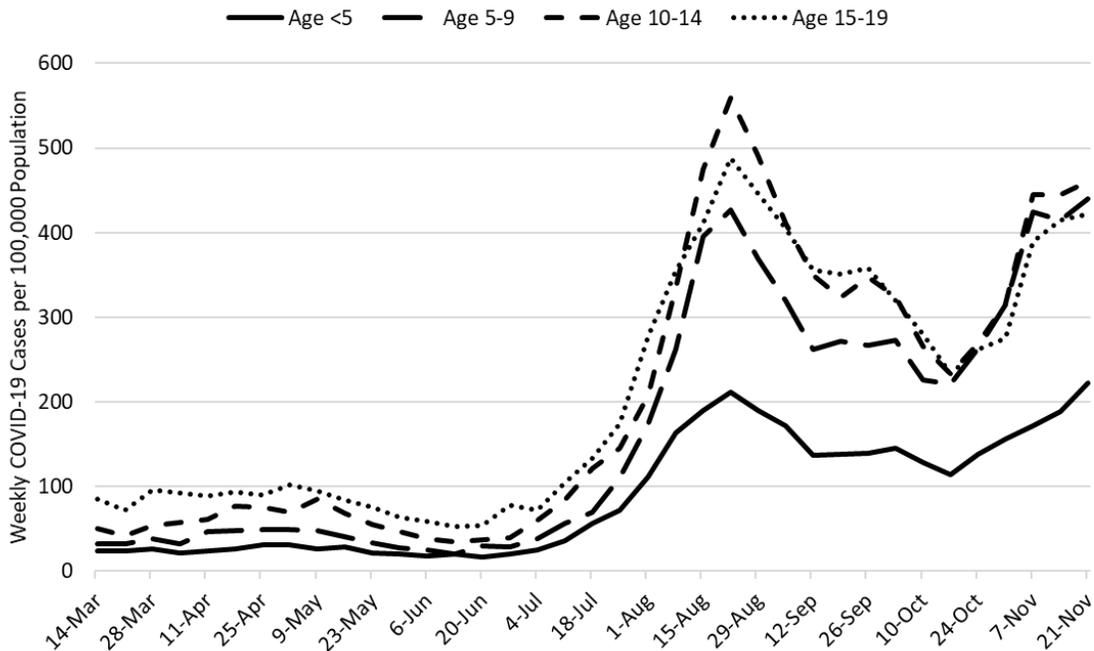


Figure 2b. COVID-19 Cases in Arizona among Children by Age Group March 7 – November 21, 2021.

Test positivity, at 30%, continues to rise indicating that testing is inadequate for public health practice and many cases are going undiagnosed (Figure 3).

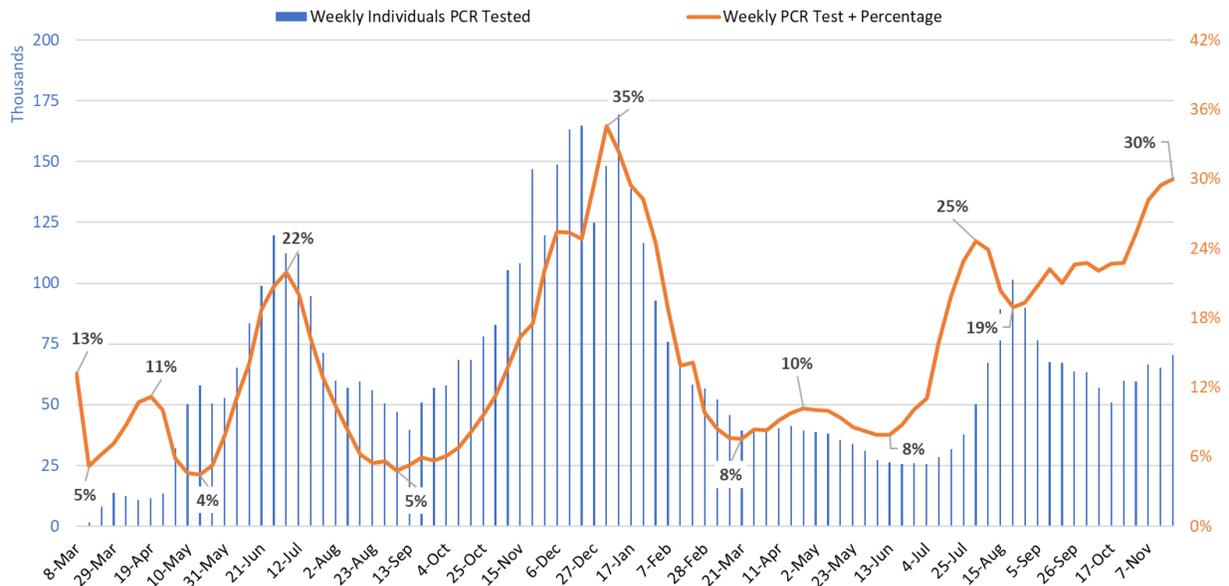


Figure 3. Weekly Number of Patients Undergoing Traditional Nasopharyngeal PCR Testing and Associated Percent Positivity March 1, 2020 – November 21, 2021.

As of November 24th, 2550 (29%) of Arizona’s 8782 general ward beds were occupied by COVID-19 patients, a 6% increase from last week’s 2403 occupied beds (Figure 4 and Figure 5 Panel A). Another 562 (6%) beds remained available for use which is higher than last week’s all-time low of 484 beds. Six-hundred thirty-three (633, 36%) of Arizona’s 1780 ICU beds were occupied by COVID-19 patients, a 6% increase from last week’s 597 occupied beds (Figure 4 and Figure 5 Panel B). An additional 126 (7%) ICU beds remained available for use, higher than last week’s 112 beds.

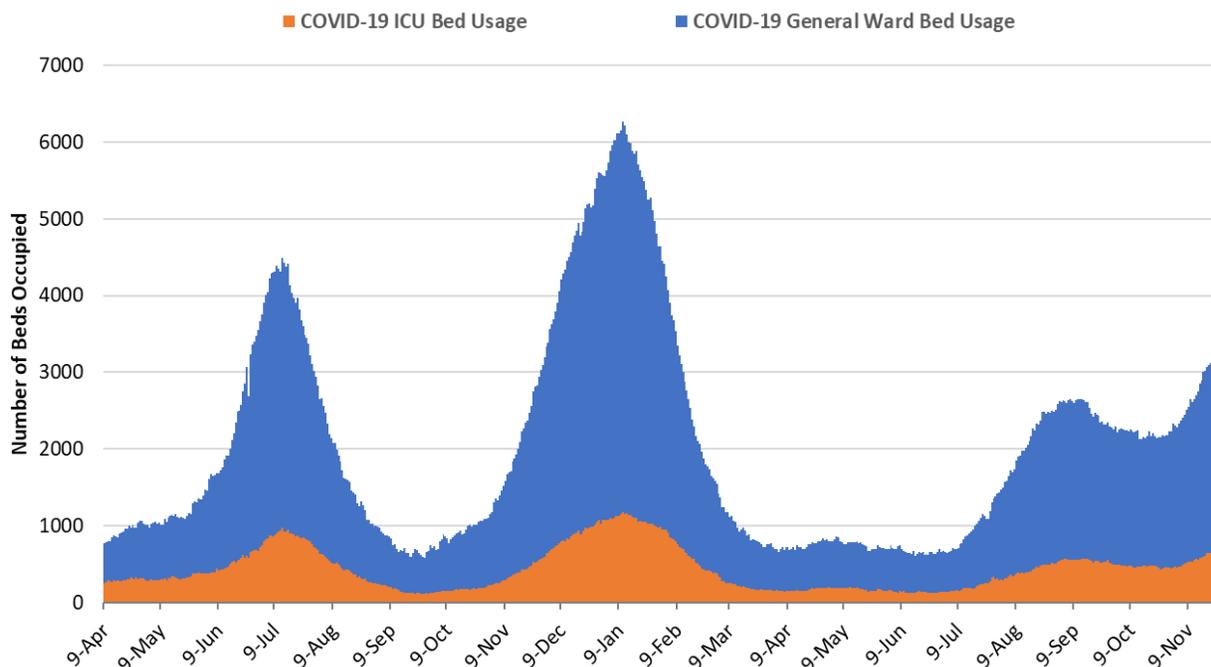


Figure 4. Arizona Daily COVID-19 General Ward and ICU Census April 9, 2020 – November 24, 2021.

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.

While peak occupancy is unlikely to reach prior levels, the base of the wave is broader. **The delta wave has seen 104 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 7 days whereas the summer 2020 and winter 2021 waves saw 35 and 78 days, respectively.

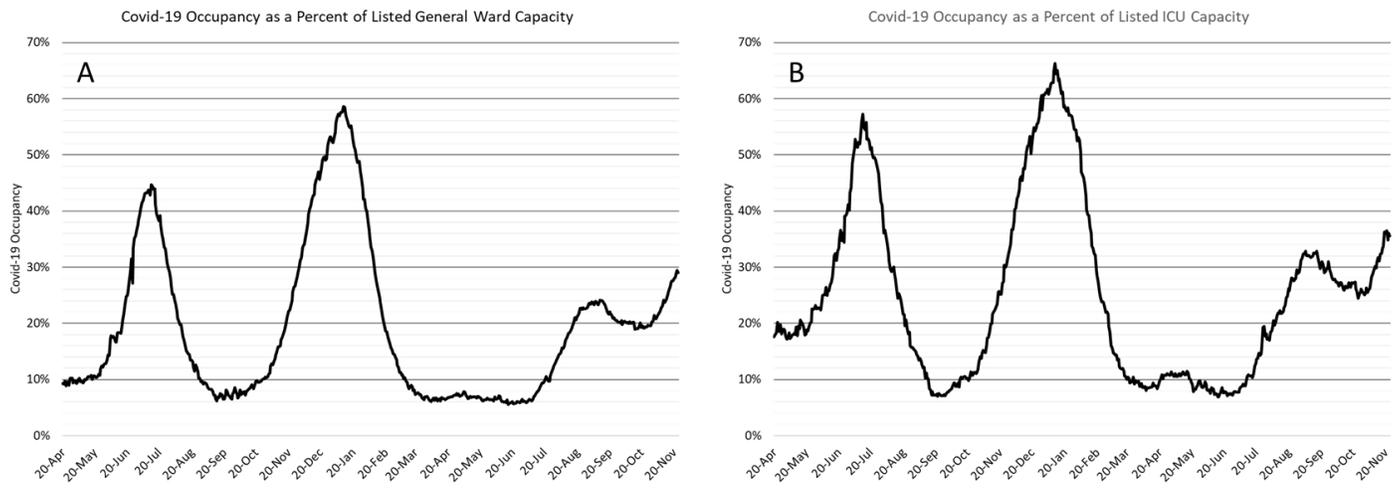


Figure 5. COVID-19 Occupancy as a Percent of Listed General Ward (A, left) and ICU (B, right) Capacity in Arizona April 20, 2020 – November 24, 2021.

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 first-time last week. Hospitals should prepare for >25% ward occupancy and >30% ICU occupancy for some time to come.

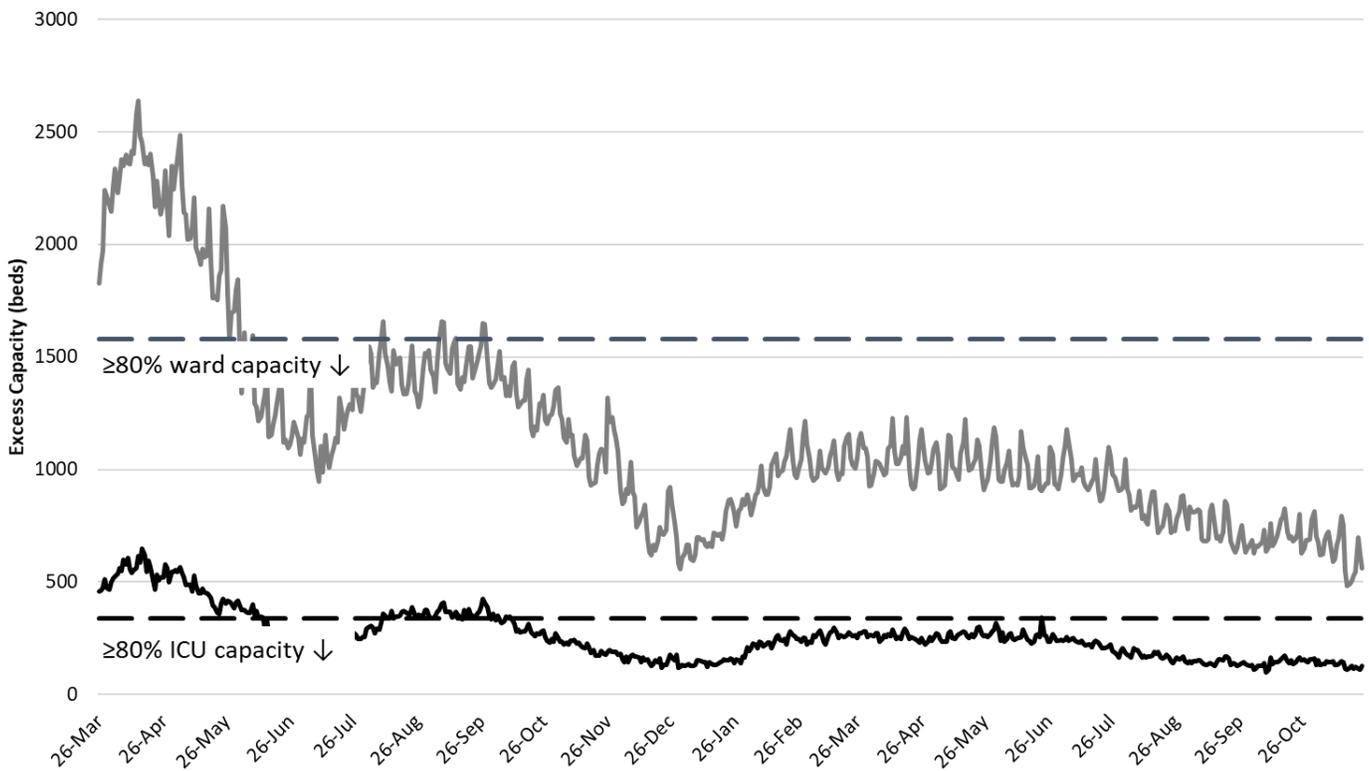


Figure 6. Observed Excess Non-Surge General Ward and ICU Capacity in Arizona March 26, 2020 – Nov 24, 2021.

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.

Arizona has been experiencing >200 COVID-19 deaths per week since August 22nd and will once again flirt with the 300 deaths per week threshold (Figure 7). So far, 22224 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.

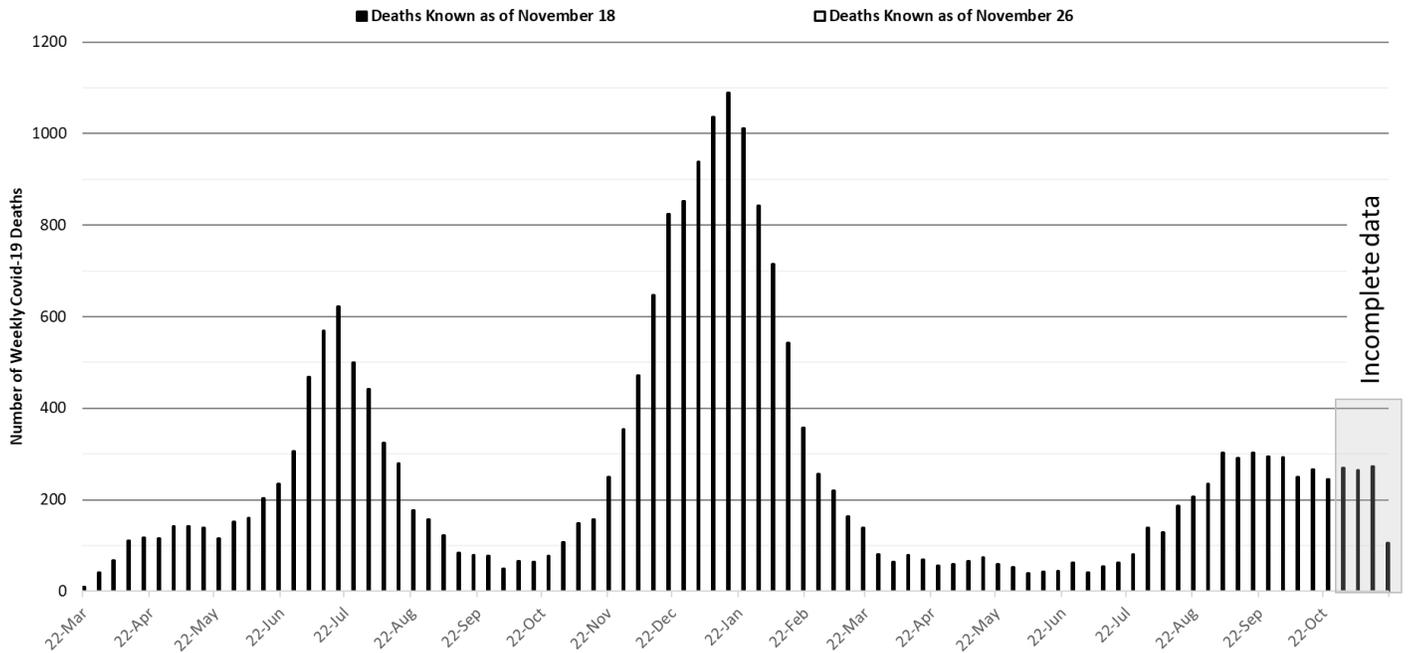


Figure 7. Weekly Arizona COVID-19 Deaths March 16, 2020 – November 21, 2021.

[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.

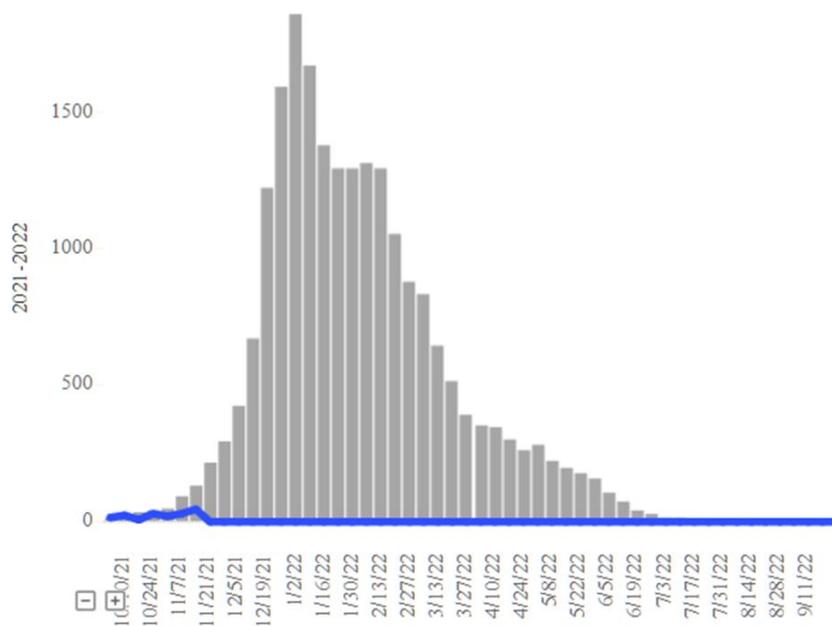


Figure 8. Influenza Cases in Arizona October – November 21, 2021.

Pima County

For the week ending November 21st, 4169 Pima County residents were diagnosed with COVID-19 a 13% increase from last week's tally (Figure 9). New cases are being diagnosed at a rate of 398 cases per 100K residents per week and this rate is increasing by 40 cases per 100K residents per week. Trends across the various age groups appear in Figure 10.

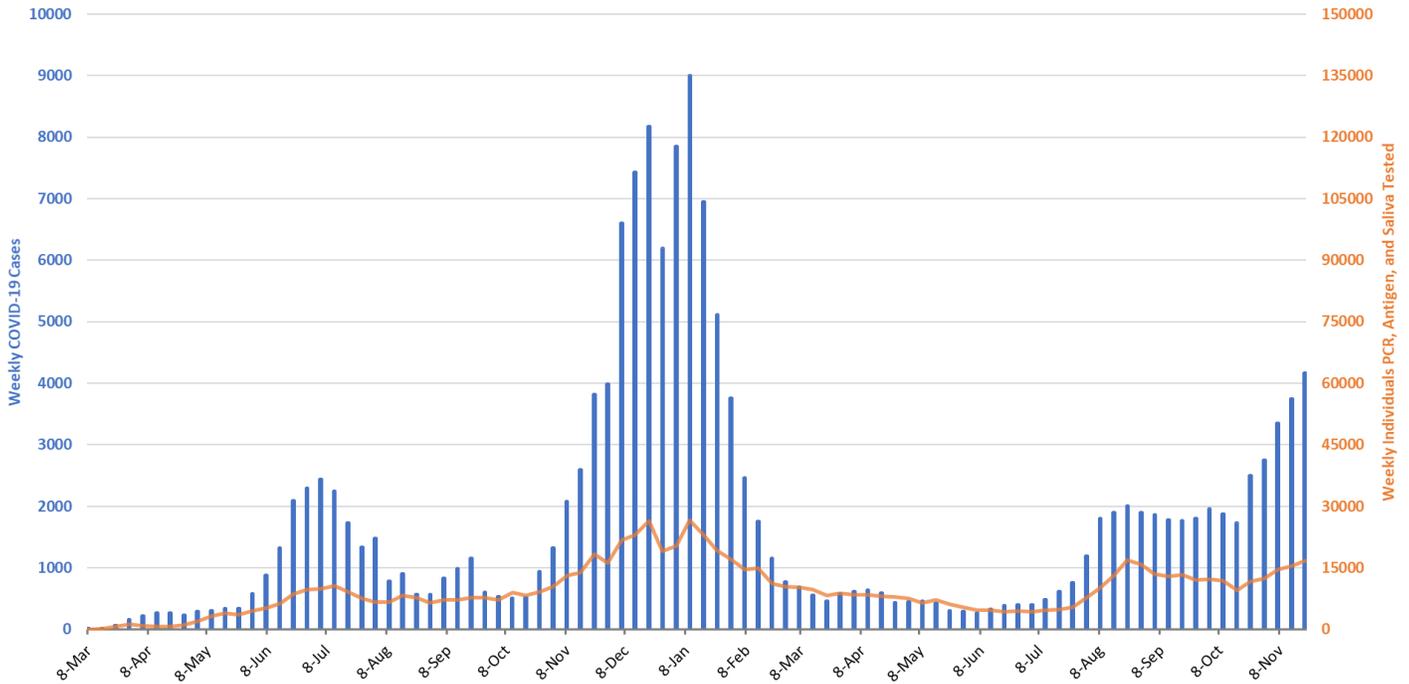


Figure 9. Weekly COVID-19 Cases in Pima County and Number of Individuals Undergoing COVID-19 Diagnostic Testing March 1, 2020 – November 21, 2021.

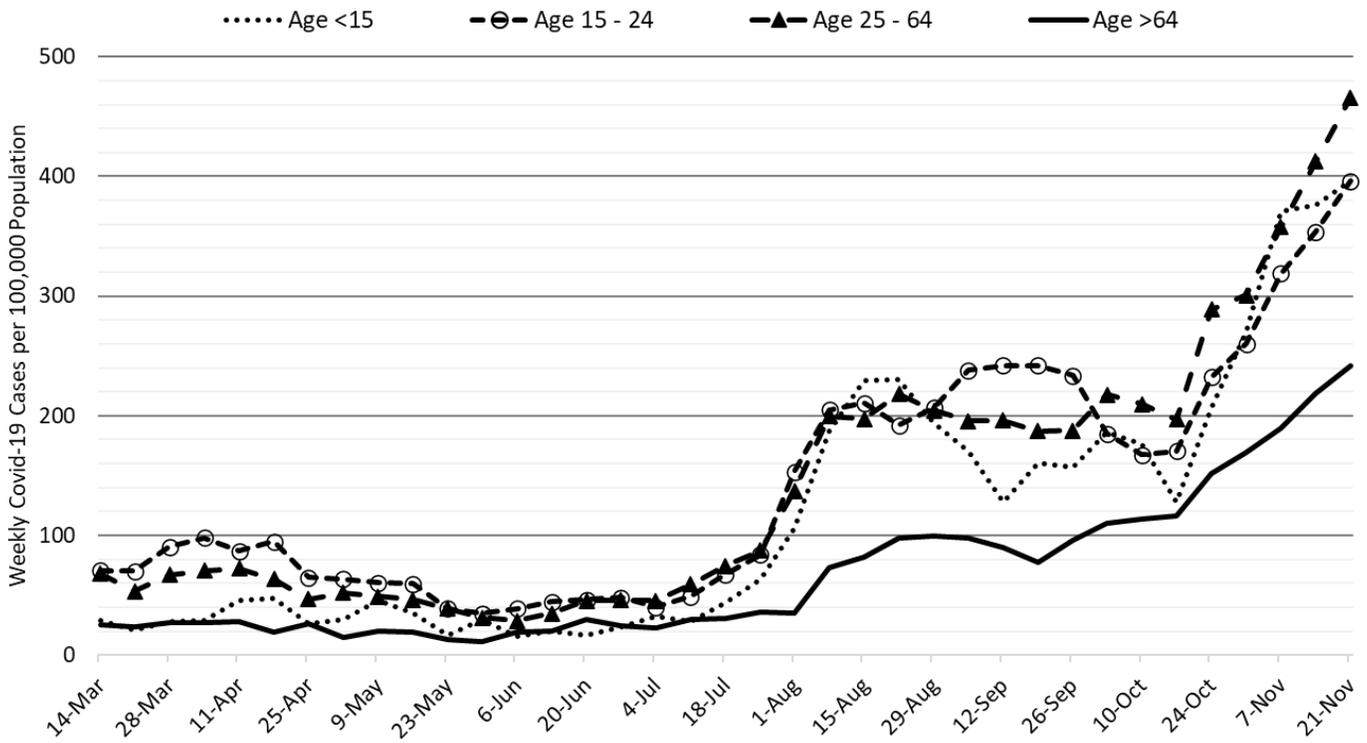


Figure 10. COVID-19 Cases in Pima County by Age Group March 7, 2020 – November 21, 2021.

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:

- 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 21st, new cases were being diagnosed at a rate of 383 cases per 100K residents per week. The rate was increasing by 31 cases per 100K residents per week.** Compared to the same calendar week last year, 379 cases per 100K residents, we are at exactly the same spot heading into December, except cases shifted towards children and away from adults (see Appendix).
- 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 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.
 - **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)
 - In brief, a VOC is a variant that “through a comparative assessment, has been demonstrated to be associated with one or more 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 Omicron variant has multiple mutations to its spike domain which raise concerns about possible increases in transmissibility and immune escape. So far, there is too little information to draw meaningful conclusions about its potential impact.
 - <https://www.azcentral.com/story/news/local/arizona-science/2021/11/26/covid-19-omicron-variant-arizona-what-you-need-know/8771269002/>
 - At this point, Omicron doesn't fundamentally change what is needed in Arizona: get vaccinated, get boosted, wear a mask, avoid risky situations. **Instead of worrying about what might happen (Omicron), let's do more to stop what IS happening (Delta).**

- **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>

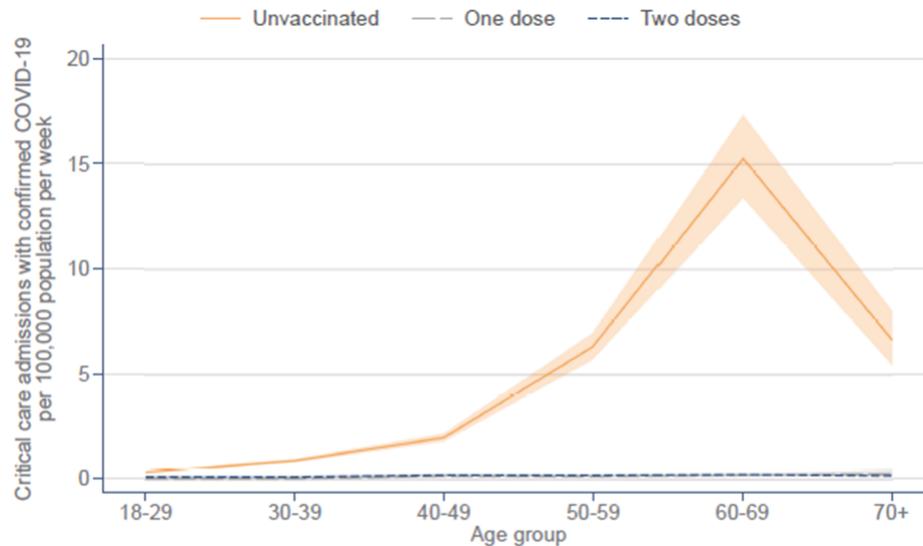


Figure 26. Rate of admission to critical care with confirmed COVID-19 by vaccination status for patients admitted 1 May 2021 to 31 July 2021

- **Weekly COVID-19 deaths continue to exceed 200 per week and will once again reach, and likely exceed, 300 per week soon.** So far, 22224 Arizonans have lost their lives to COVID-19.

Appendix

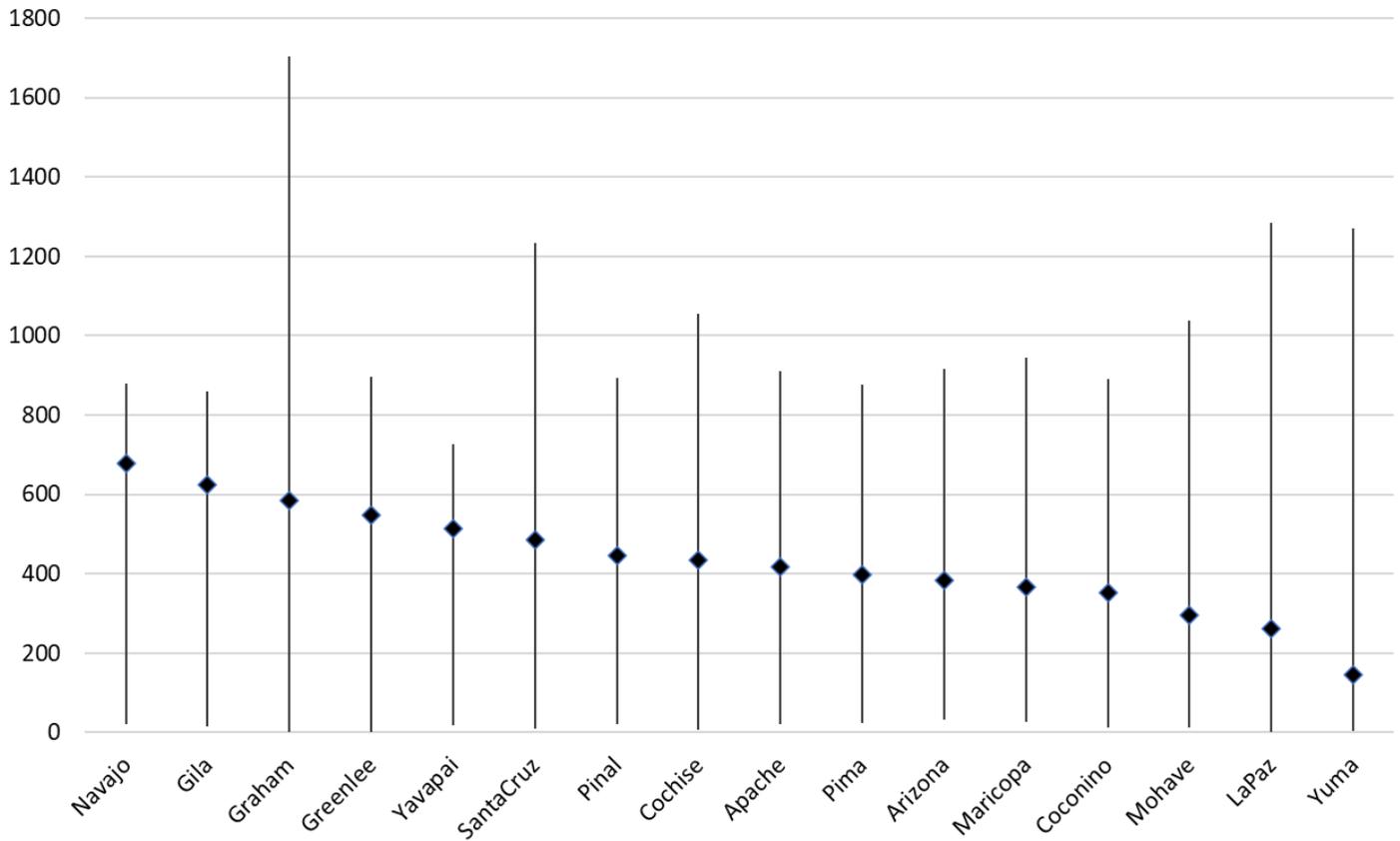


Figure 1A. Minimum, Maximum and Current COVID-19 Cases Rates by County April 1, 2020 - November 21, 2021.

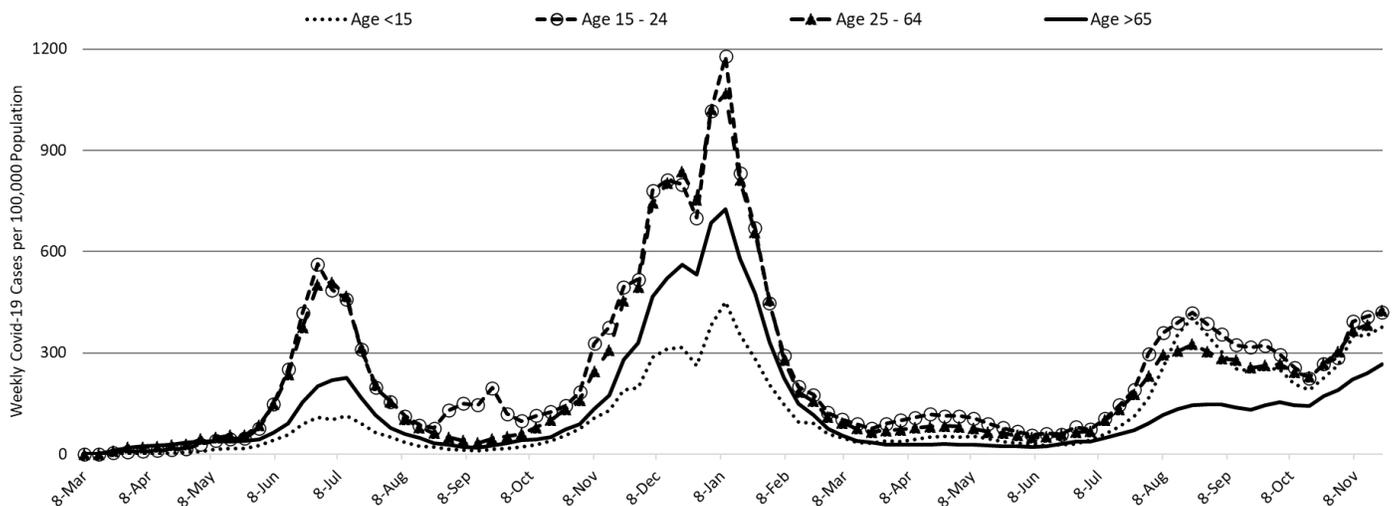


Figure 2A. COVID-19 Cases in Arizona by Age Group March 1, 2020 – November 21, 2021.

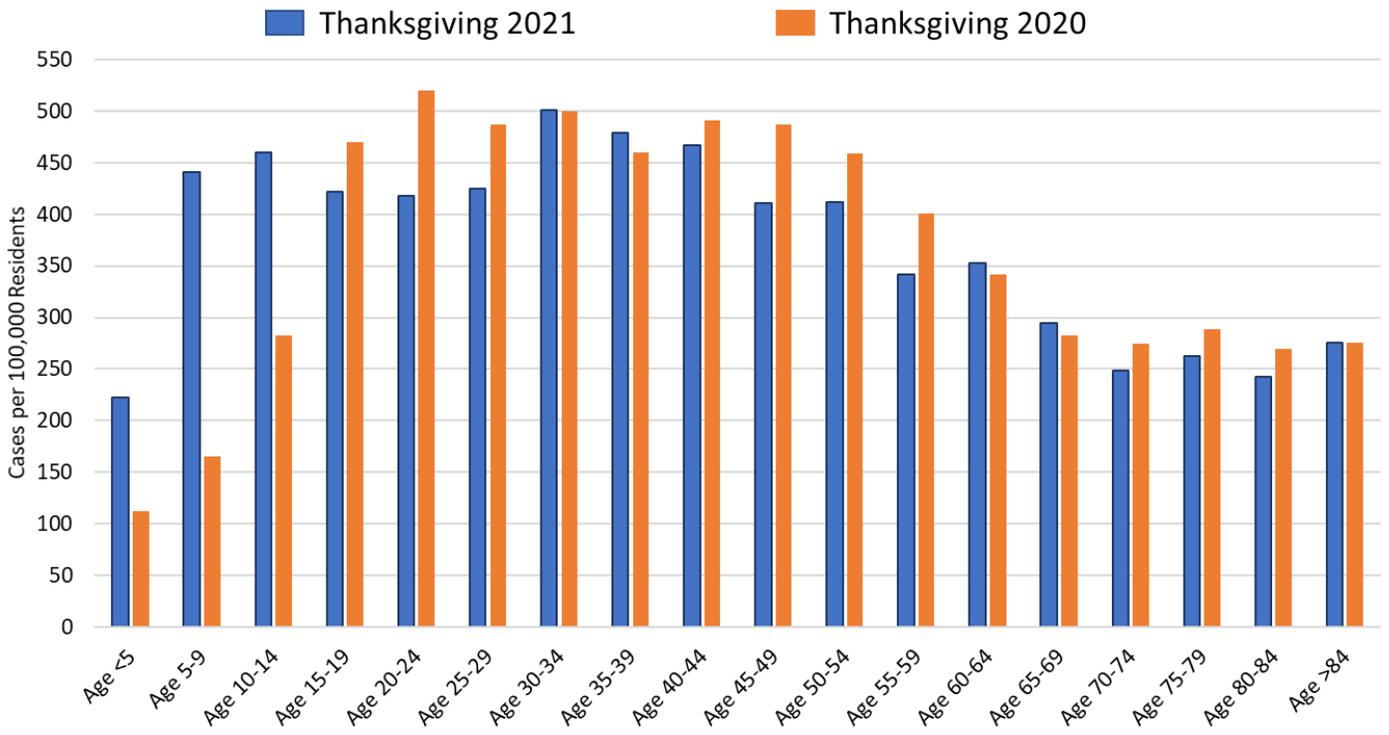


Figure 3A. COVID-19 Cases in Arizona by Age Group, Week before Thanksgiving 2021 (383 cases per 100K residents, orange) and 2020 (379 cases per 100K residents, blue)