

COVID-19 Disease Outbreak Outlook Arizona and Pima County

Updated January 14, 2022

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 January 9th, at least 108783 Arizonans were diagnosed with COVID-19, a 104% increase from the 53207 cases reported during the prior week (Figure 1). The previous weekly record, 64981 cases, occurred exactly one year ago. Cases are currently being diagnosed at a rate of 1494 cases per 100K residents per week. Given 2 – 3 undiagnosed cases per reported case, 1-in-20 (5%) Arizonans had COVID-19 last week. With rates doubling weekly, 1-in-10 Arizonans will be infected this week; 1-in-4 will be infected in the month of January. Rates are highest among those 15 – 24 years, 2342 cases per 100K residents, and are lowest among those ≥ 65 years, 711 cases per 100K residents (Figure 2a following page).

While Arizona's new case ranking has risen to 27th, the state still falls well short of the rates seen among eastern states. The nation's leaders are Rhode Island (3534), New York (2529), Massachusetts (2415), New Jersey (2293), and Delaware (2159). According to the [CDC](#), only 36% of Arizona adults and 54% of its seniors are vaccinated with a third dose booster. Fortunately, the primary 2-dose Pfizer sequence retains [70% protection against hospitalization from Omicron](#). Our immunity wall against severe illness may hold although it is not certain. The [ADHS Vaccine Dashboard](#) shows weekly doses delivered rose slightly to 150K doses. The [CDC](#) recommends everyone ≥ 12 years who received Pfizer primary sequence should receive a booster; ≥ 18 years if they received the Moderna primary sequence.

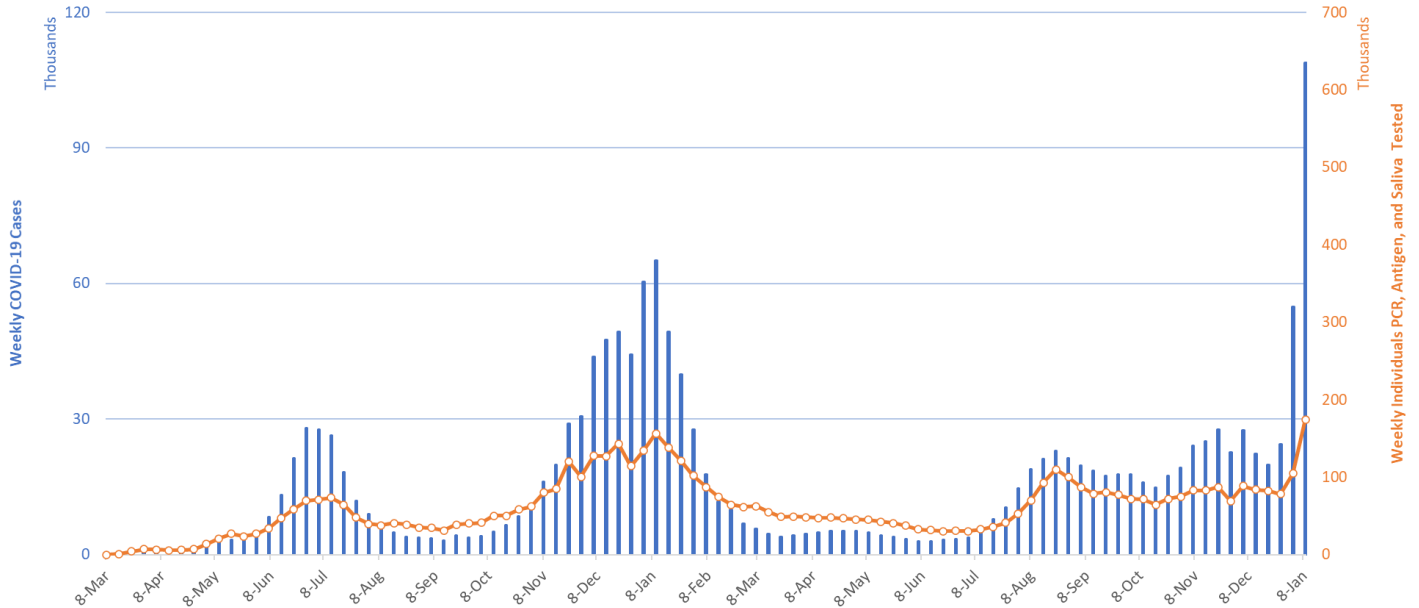


Figure 1. Weekly COVID-19 Cases in Arizona and Number of Individuals Undergoing COVID-19 Diagnostic Testing March 1, 2020 – January 9, 2022.

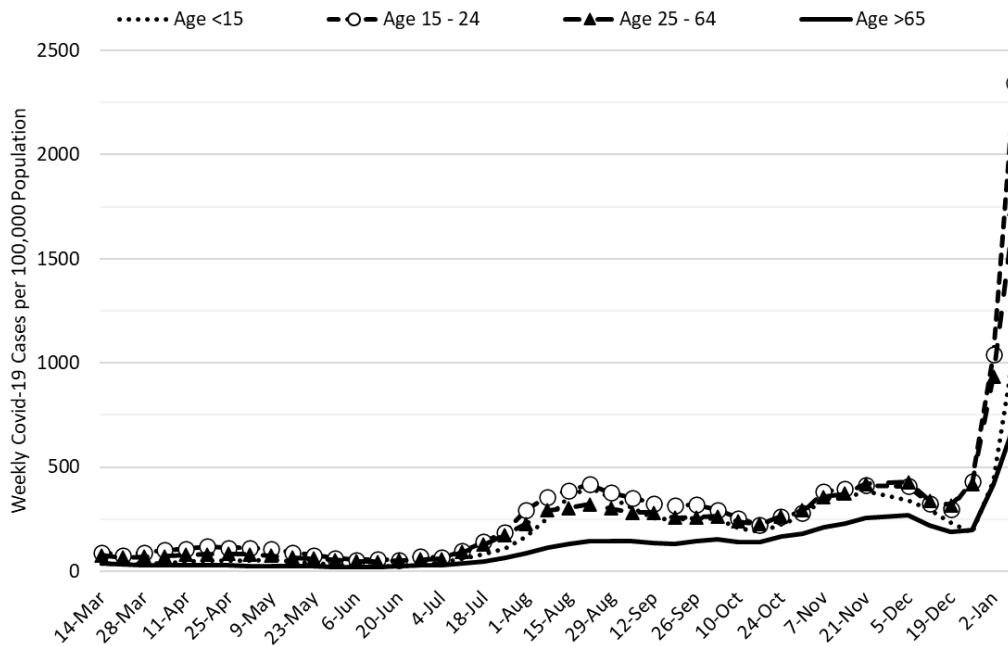


Figure 2a. COVID-19 Cases in Arizona by Age Group March 7 – January 9, 2022 (Data from week ending November 28 suppressed).

Figure 2a shows transmission among all age groups is rapidly increasing with the largest increases among adolescents and working-age adults. Figure 2b compares this week’s COVID-19 incidence by age group with that of the same calendar week last year, the 2021 peak. Transmission is more widespread and shifted towards younger age groups likely due to higher third-shot booster rates among the elderly. Last week, nearly 3% (2698 per 100K) of all Arizonans 20 – 24 years had a positive COVID-19 test, meaning 9 – 12% were likely infected after accounting for asymptomatic cases, at-home tests, and test scarcity. The rate among resident 20 – 24 years of age was even higher in Maricopa County, 3220 cases per 100K. Forks Up Sun Devils!!

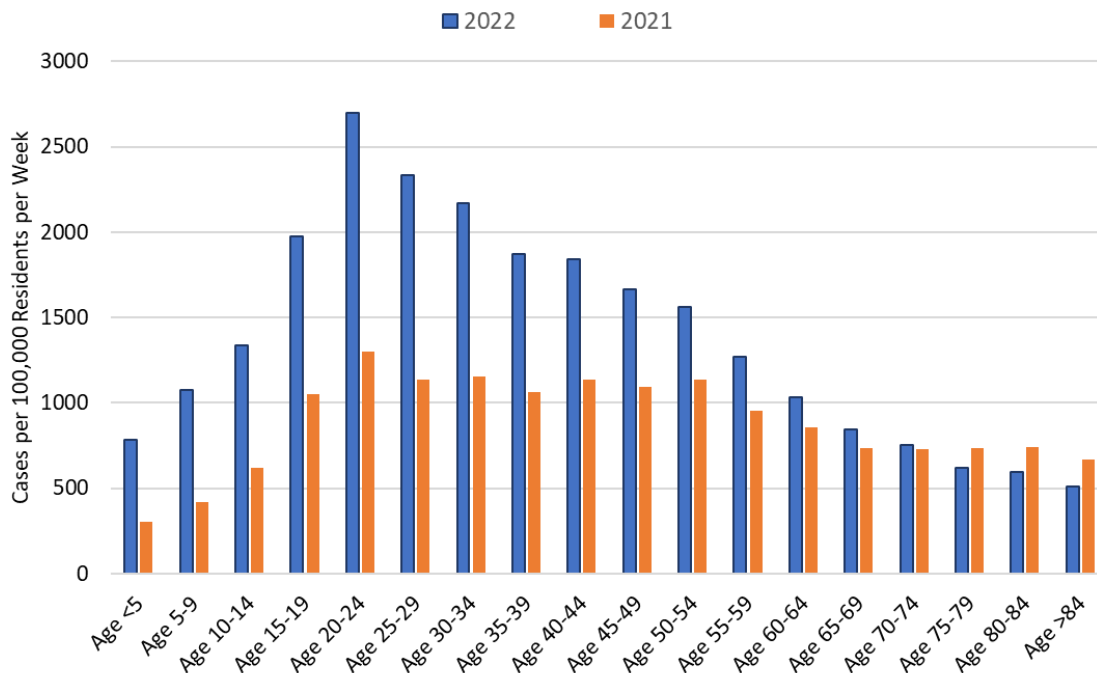


Figure 2b. COVID-19 Weekly Incidence in Arizona by Age Group January 10, 2021 versus January 9, 2022.

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.

Test positivity increased again this week rising to an astounding 60% (Figure 3). Test positivity = individuals with any positive test in the past week / all unique individuals who had ≥1 test result in the past week. This formula tends to yield higher values than elsewhere. At-home tests, also contribute to under-reporting because few results are transmitted to authorities.

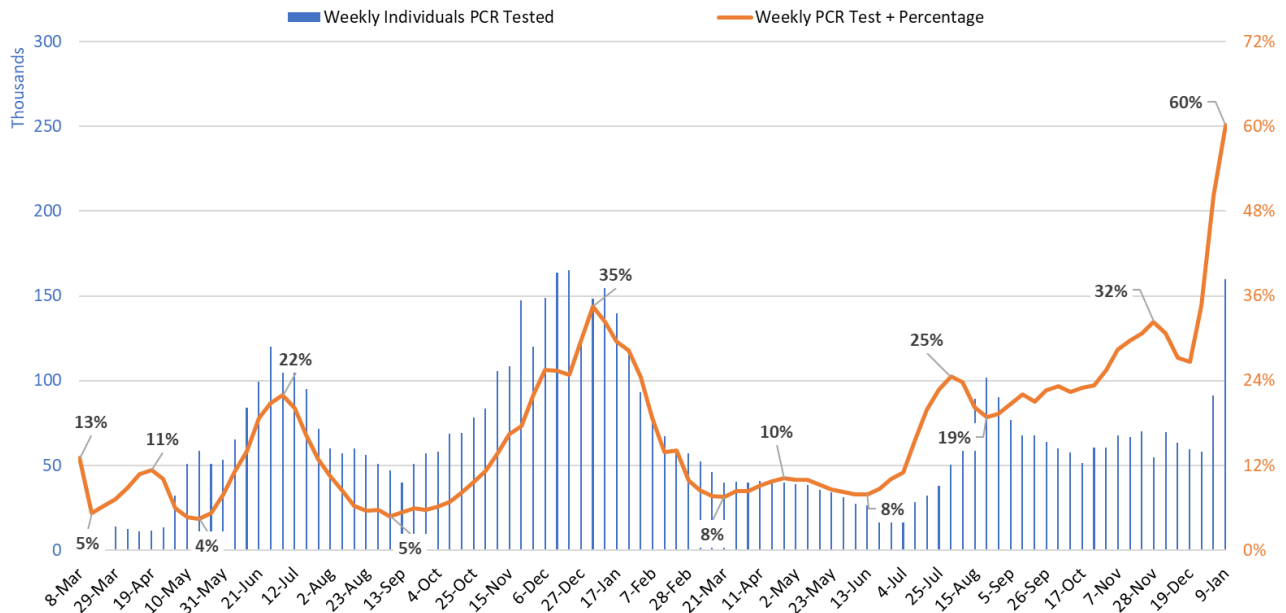


Figure 3. Weekly Number of Patients Undergoing Traditional Nasopharyngeal PCR Testing and Associated Percent Positivity March 1, 2020 – January 9, 2022.

As of January 13th, 2932 (34%) of Arizona’s 8763 general ward beds were occupied by COVID-19 patients, a 14% increase from last week’s 2562 occupied beds (Figure 4 and Figure 5 Panel A). Another 446 (5%) beds remained available for use which is lower than last week’s 483 available beds. Six-hundred thirty (630, 38%) of Arizona’s 1652 ICU beds were occupied by COVID-19 patients, a 4% increase from last week’s 608 occupied beds (Figure 4 and Figure 5 Panel B). An additional 75 (5%) ICU beds remained available for use which is lower than last week’s 95 beds.

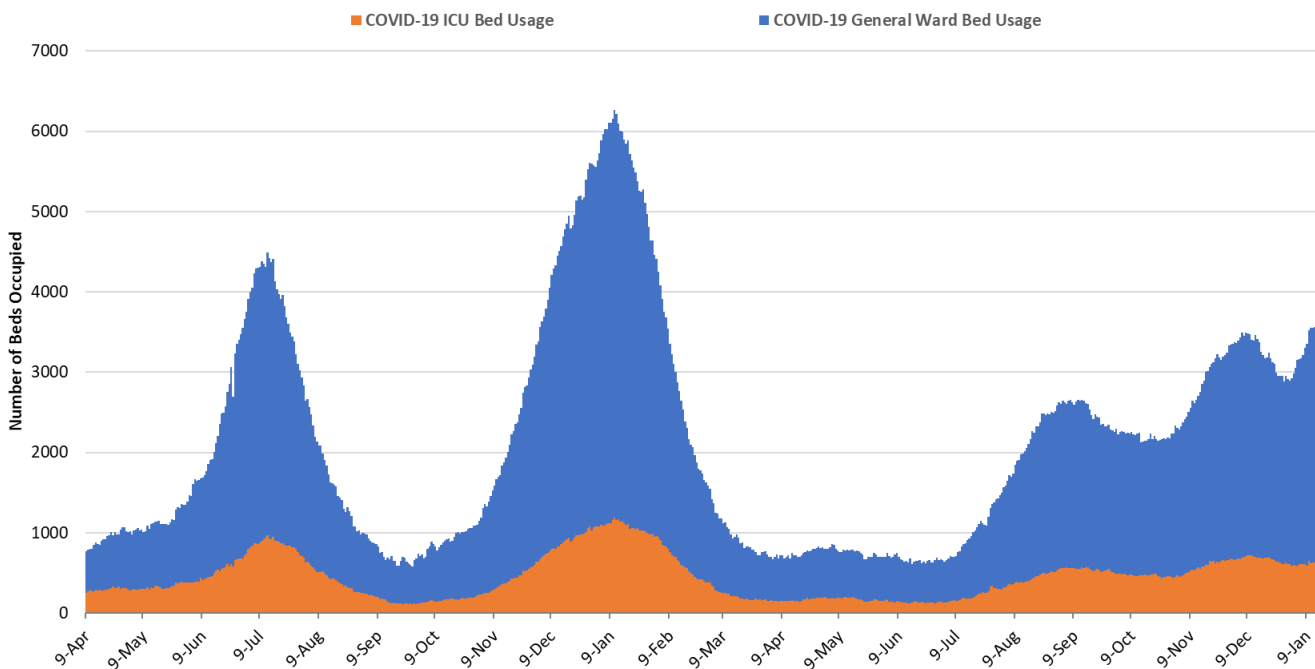


Figure 4. Arizona Daily COVID-19 General Ward and ICU Census April 9, 2020 – January 13, 2022.

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 will not reach prior levels, the *Delta*, and now *Omicron*, waves have placed much higher levels of chronic stress on our health system. **We have so far seen 153 consecutive days with a combined occupancy >2000 patients** whereas the summer 2020 and winter 2021 waves saw 57 and 98 days, respectively. Until week before last, we had experienced 37 consecutive days with >3000 combined occupancy whereas the summer 2020 and winter 2021 waves saw 35 and 78 days, respectively. After a 10-day respite over Christmas-New Years, we are once again >3000 combined occupancy (last 11 days).

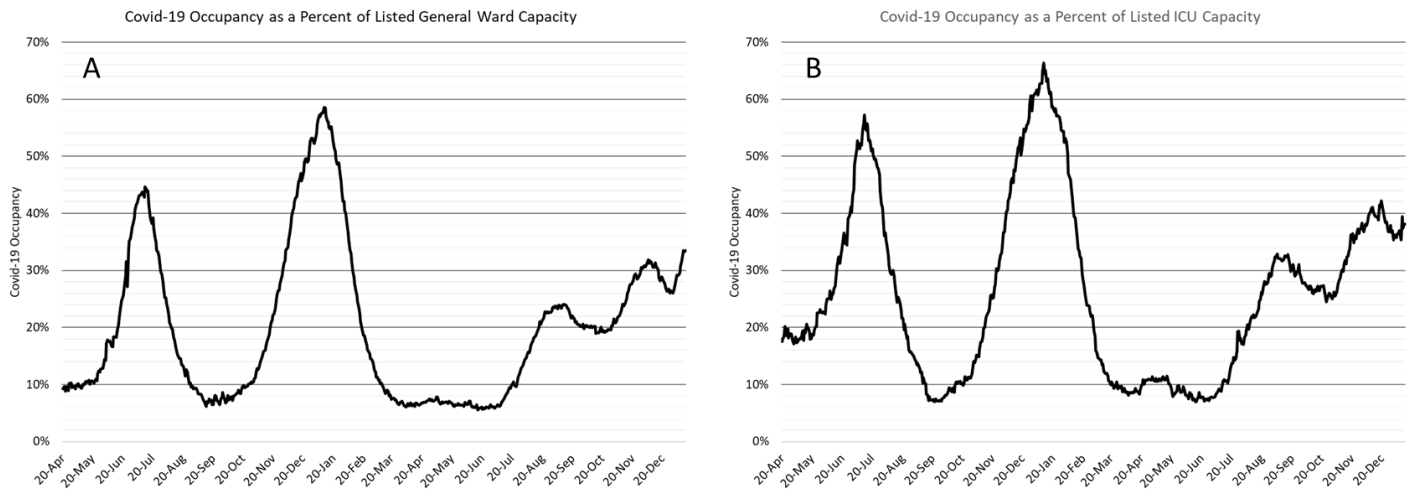


Figure 5. COVID-19 Occupancy as a Percent of Listed General Ward (A, left) and ICU (B, right) Capacity in Arizona April 20, 2020 – January 13, 2022.

Hospital occupancy remains far above seasonal levels with safety margins, as measured by available beds, once again near historical lows (Figure 6). Hospitals should prepare for >25% ward occupancy and >35% ICU occupancy for some time to come. There is no let-up in sight!

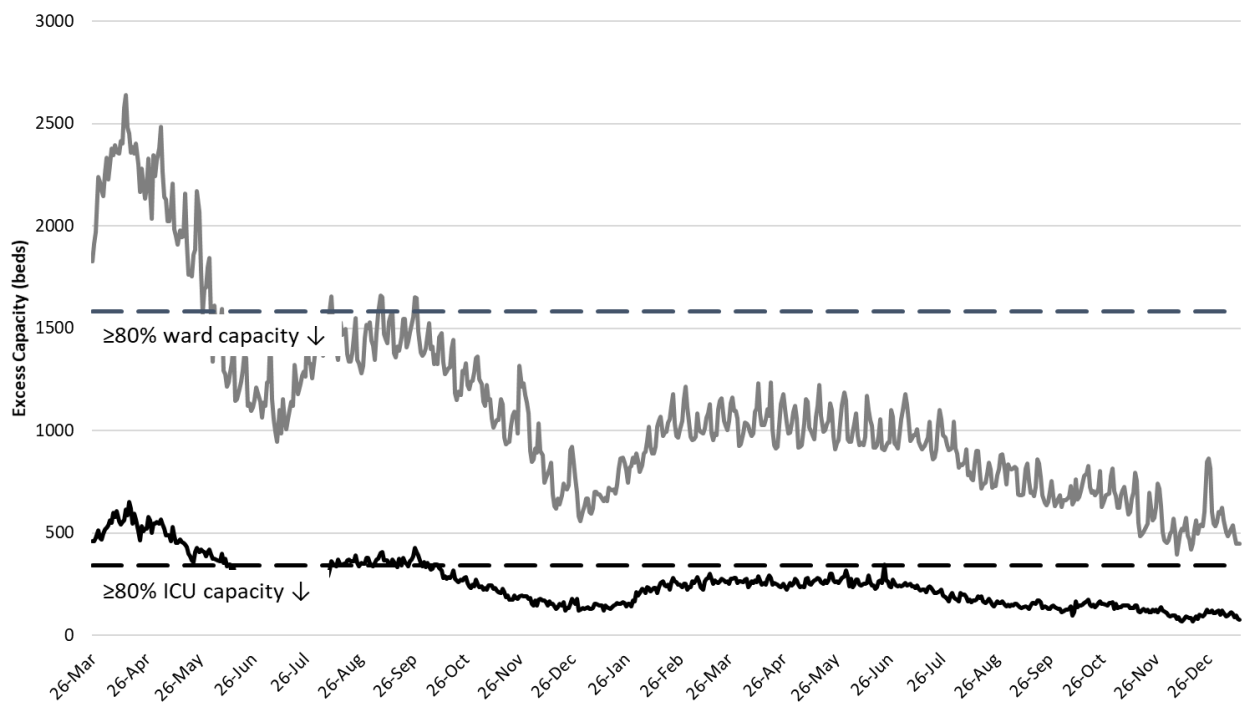


Figure 6. Observed Excess Non-Surge General Ward and ICU Capacity in Arizona March 26, 2020 – Jan 13, 2022.

The week ending December 12th has now recorded 524 deaths to date, crossing the 500 deaths per week threshold for the first time during the *Delta* wave (Figure 7). At least 25068 Arizonans have lost their lives to COVID-19. However, as an [updated mortality report](#) from the Arizona Public Health Association indicates, excess deaths are considerably higher than the official COVID-19 death statistics. Also, a new report indicates the [life expectancy fell the largest amount in 75 years](#) from 78.8 years (2019) to 70.0 years (2020), a drop of 1.8 years.

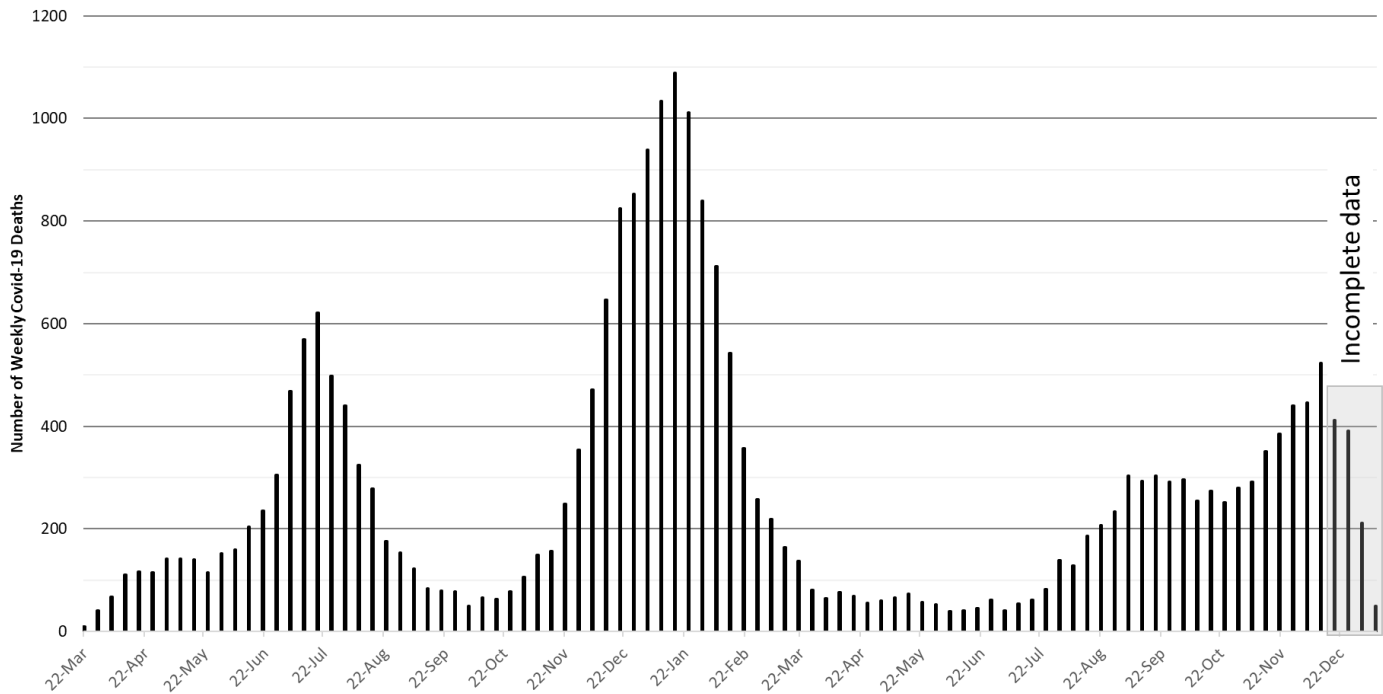


Figure 7. Weekly Arizona COVID-19 Deaths March 16, 2020 – January 9, 2022.

[Seasonal influenza cases in Arizona](#) (blue line) remain below the 5-year historical average (grey bars, Figure 8) with a marked departure over the past two weeks suggesting [individual](#) COVID-19 mitigation efforts may be paying dividends for less transmissible of flu virus. Continued observation over the next 3 - 4 weeks is warranted.

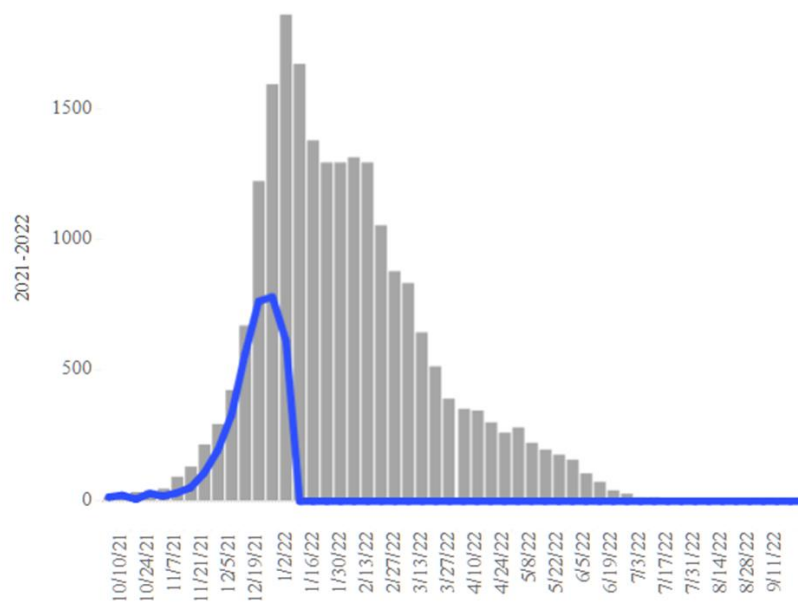


Figure 8. Arizona Influenza Cases in 2021 (blue) versus 5-Year Historical Average (grey)

Pima County

For the week ending January 9th, 12438 Pima County residents were diagnosed with COVID-19, a 112% increase from the initial tally of 5858 cases last week (Figure 9). Comparisons of transmission by age group, this year versus last year, are shown in Figure 10.

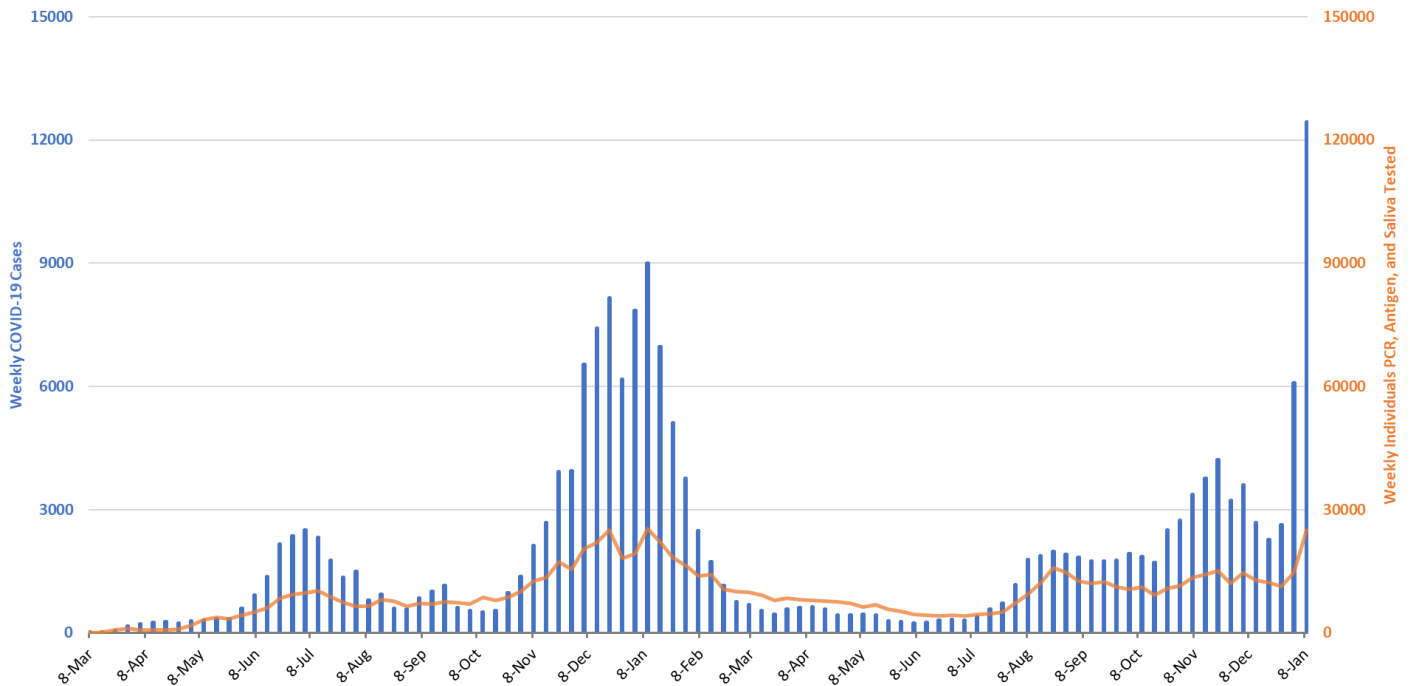


Figure 9. Weekly COVID-19 Cases in Pima County and Number of Individuals Undergoing COVID-19 Diagnostic Testing March 1, 2020 – January 9, 2022.

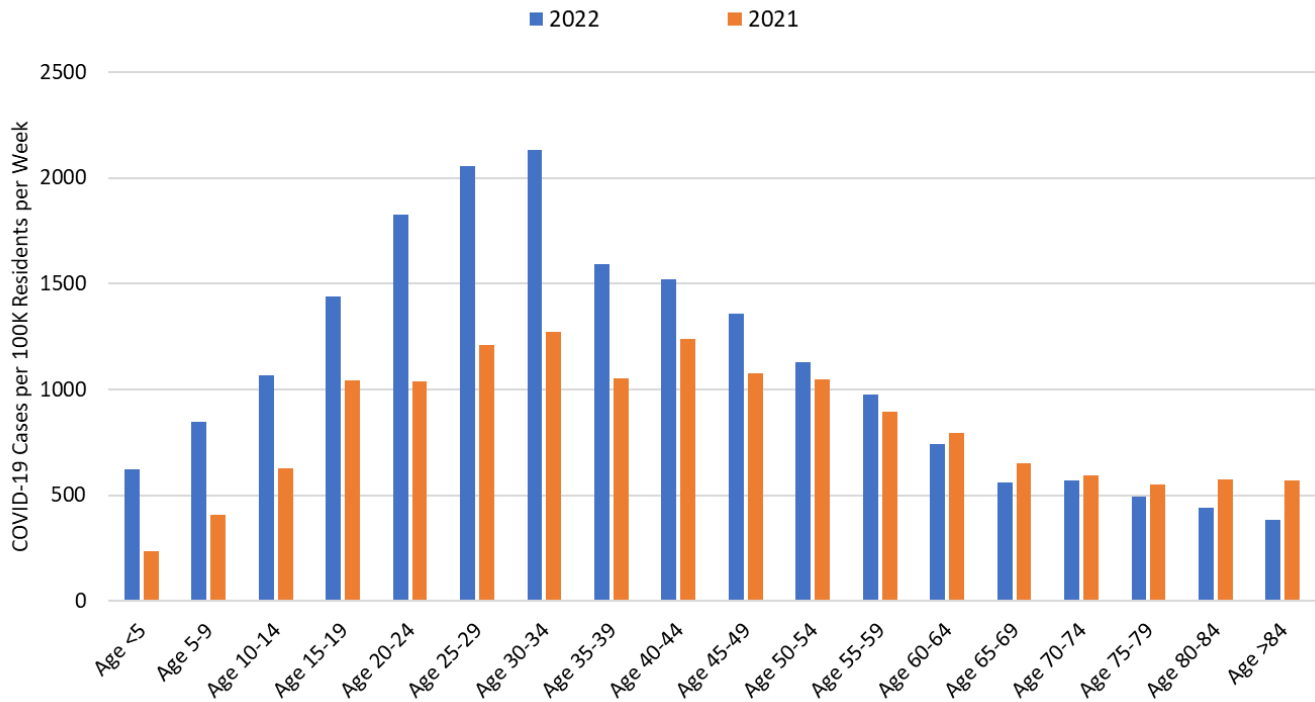
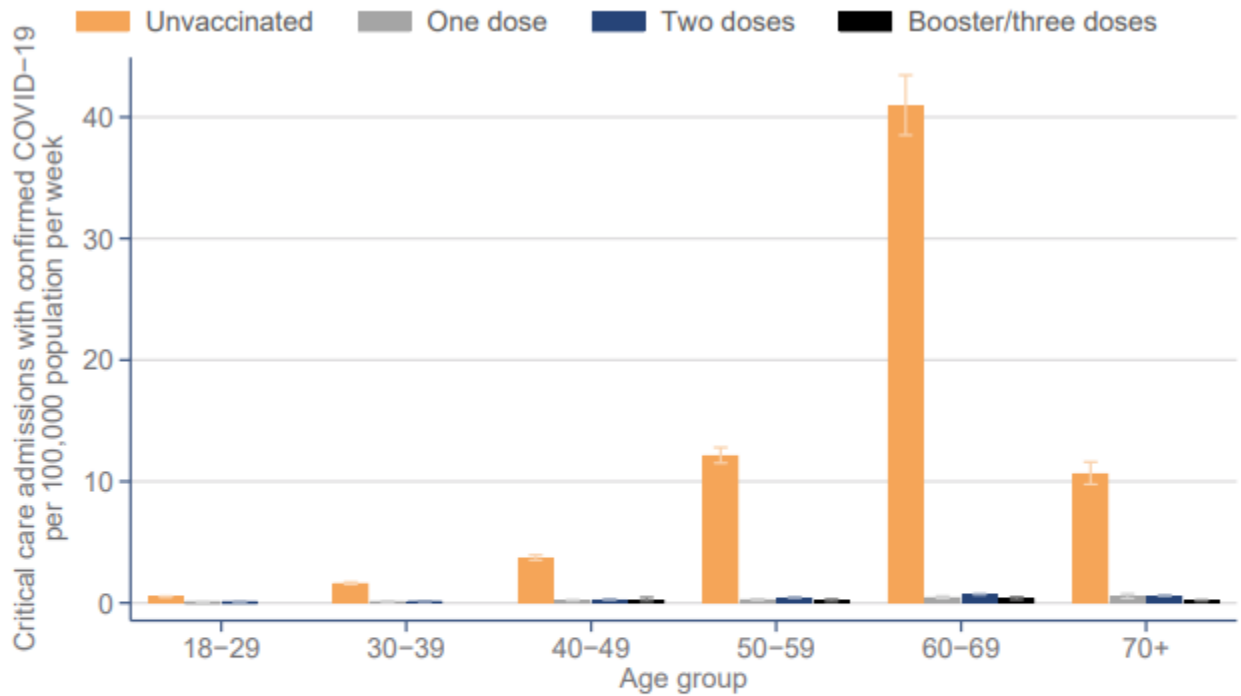


Figure 10. COVID-19 Weekly Incidence in Pima County by Age Group January 10, 2021 versus January 9, 2022.

Summary:

- Arizona is experiencing historic levels of community transmission attributable to the newly dominant *Omicron* variant. Test positivity is insanely high reminding us that test capacity, accessibility, and/or uptake is wholly inadequate. Arizona, like much of the United States, is in the midst of another large pandemic wave. Expect transmission to peak in late January with very large numbers of hospitalizations continuing into February. The greatest burden on our health care system will shift towards emergency departments and general wards and away from our ICU facilities.
 - **As of January 9th, new cases were being diagnosed at a rate of 1494 cases per 100K residents per week.** Given the experience of eastern states, we can expect this rate to likely peak in the ballpark of 3000 cases per 100K residents per week before the end of the month.
 - Given it is now January 15th, rates are considerably higher as you read this in the moment. For example, the ADHS Dashboard recorded a whopping 24964 cases on January 15th which is roughly equivalent to 175000 per week.
 - Mask mandates were needed at municipal and county levels to reduce transmission, blunt the worst of the *Omicron* wave, and relieve overwhelmed hospitals. Now, hospitals will just have to grin and bear it.
- Waning vaccine immunity makes it important that all adults who were previously vaccinated obtain a booster, particularly those 50+ years of age.
 - Risk factors for breakthrough hospitalization and death were recently elucidated in the British Medical Journal: <https://www.bmj.com/content/374/bmj.n2244>. These findings were replicated in the MMWR with poor outcomes among those age >40 years, immunocompromised or with underlying chronic illness. <https://www.cdc.gov/mmwr/volumes/71/wr/mm7101a4.htm>
- **COVID-19 hospital occupancy is once again increasing and should continue to do so throughout January. Hospitals should prepare for >30% occupancy in general wards and in the ICU.** Access to care will continue to be further restricted in the face of staff shortages owing to infections among healthcare workers. However, healthcare workers have told to “suck it up, Buttercup” and work even if COVID-19 positive.
 - January, and perhaps early February, will be hospital’s most difficult month with the tail of the *Delta* wave, below average but still meaningful seasonal influenza, and a large *Omicron* wave.
 - While not ideal, the 2-dose Pfizer primary sequence provided 70% protection against hospitalization in South Africa during their *Omicron* wave. Therefore, our immunity wall may hold just enough to prevent collapse of our hospital systems, but it will be close <https://www.nejm.org/doi/full/10.1056/NEJMc2119270>
- Weekly COVID-19 deaths have now reached 500 per week and should remain at or below this level as the tail end of the *Delta* wave recedes. So far, 25068 Arizonans have lost their lives to COVID-19.
 - The CDC recently documented the largest decline in US life expectancy in 75 years <https://www.cdc.gov/nchs/products/databriefs/db427.htm>. Higher mortality rates were observed for all age groups >15 years of age highlighting that COVID-19 is not just impacting the elderly.

- The United Kingdom continues to publish excellent summaries of Omicron’s impact (Jan 14): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1046853/technical-briefing-34-14-january-2022.pdf
- For those willing to read, INARC has released a detailed report documenting how Omicron changed utilization and outcomes among ICUs in England (Jan 14). file:///C:/Users/Joe/Downloads/ICNARC_COVID-19_Report_2022-01-14.pdf.pdf
 - One of the most striking, but not surprising, findings is the disproportionate burden unvaccinated adult males 60 – 69 are placing on the UK’s critical care services.



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Figure 26. Rate of admission to critical care with confirmed COVID-19 by vaccination status for patients admitted 1 May 2021 to 15 December 2021

Rate of admission to critical care with confirmed COVID-19 per 100,000 population per week (with 95% confidence interval) by vaccination status, assessed at 14 days prior to the positive COVID-19 test, and age group.

This figure is from the January 14, 2022 INARC Report: file:///C:/Users/Joe/Downloads/ICNARC_COVID-19_Report_2022-01-14.pdf.pdf.

Appendix

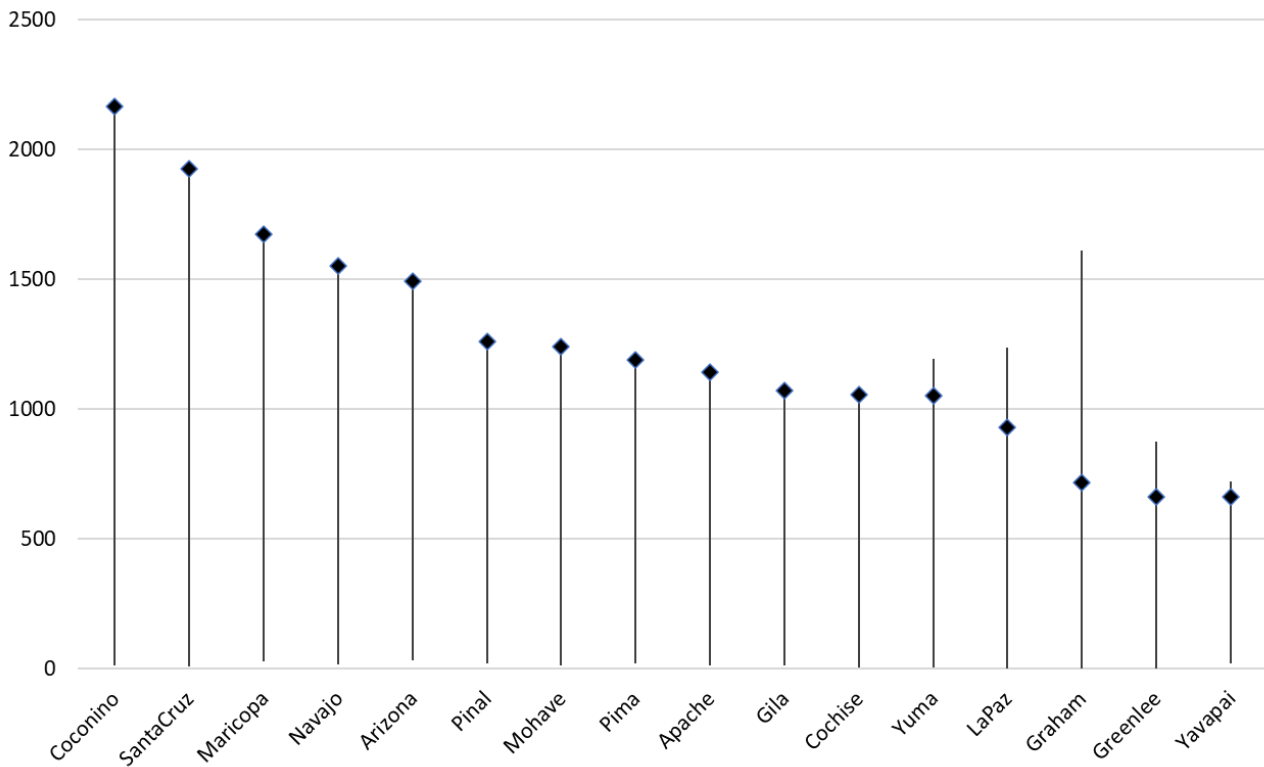


Figure 1A. Minimum, Maximum and Current COVID-19 Cases Rates by County April 1, 2020 – January 9, 2022.

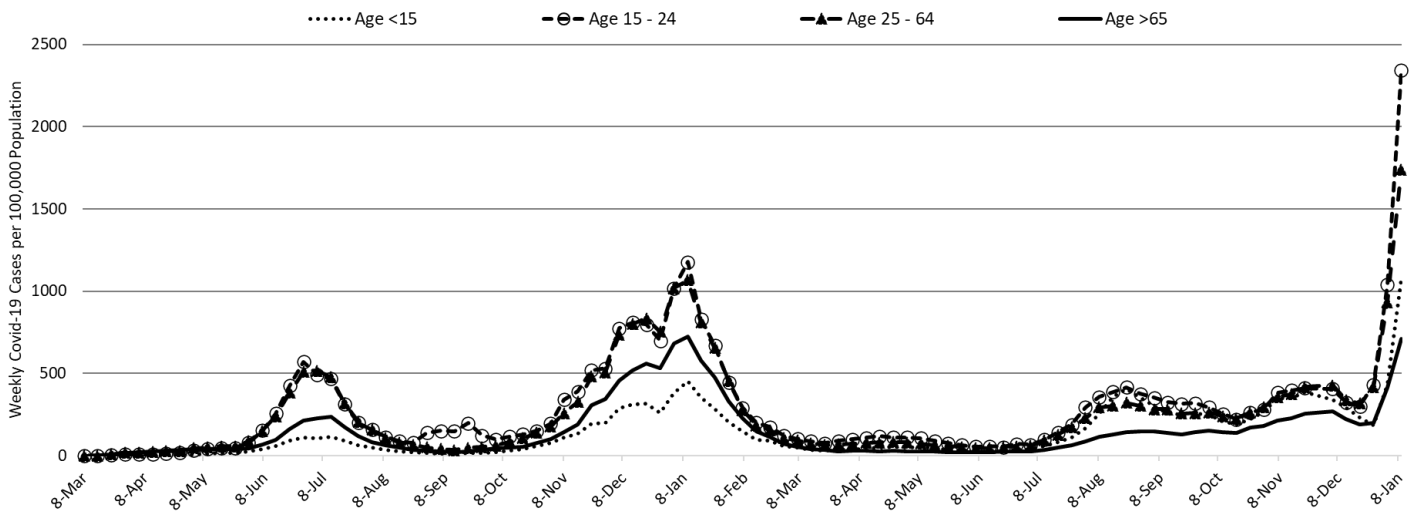


Figure 2A. COVID-19 Cases in Arizona by Age Group March 1, 2020 – January 9, 2022.