

Covid-19 Disease Outbreak Outlook

Arizona State and Pima County

Updated March 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 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>.

For the week ending March 21st, 3893 Covid-19 cases were diagnosed in Arizona (Figure 1). This represents a 12% decrease from last week's initial tally of 4445 cases and marks the tenth straight week of decline. The prior week's tally was upwardly revised by 1% (39 cases) to 4484 cases this week. The outbreak remains evenly distributed by age (Figure 2 following page).

Arizona is transitioning from a period of substantial risk to one of moderate risk. While continuing small improvements are possible, it is becoming more likely that improvements will stall or reverse owing to more transmissible variants (e.g., [B.1.1.7](#)) and/or further normalization of business and social activities (e.g., [EO 2021-06](#)). Hospital capacity remains adequate to meet Arizona's needs; however, the backlog of non-Covid care has yet to be fully addressed as evidenced by unseasonably high hospital occupancy.

While residents and businesses should continue to follow public health recommendations, normalization of low-risk activities is reasonable. New cases are now being diagnosed at a rate of 53 per 100K residents per week; and, this rate is declining by approximately 8 cases per 100K residents per week. **For reference, September 8th marked the fall nadir between the summer and winter outbreaks at 38 per 100K per week.** Unvaccinated Arizonans who are at risk of developing severe disease (e.g., age or comorbid conditions) or who simply wish to be vaccinated should remain sheltered as much as feasible as viral activity remains widespread.

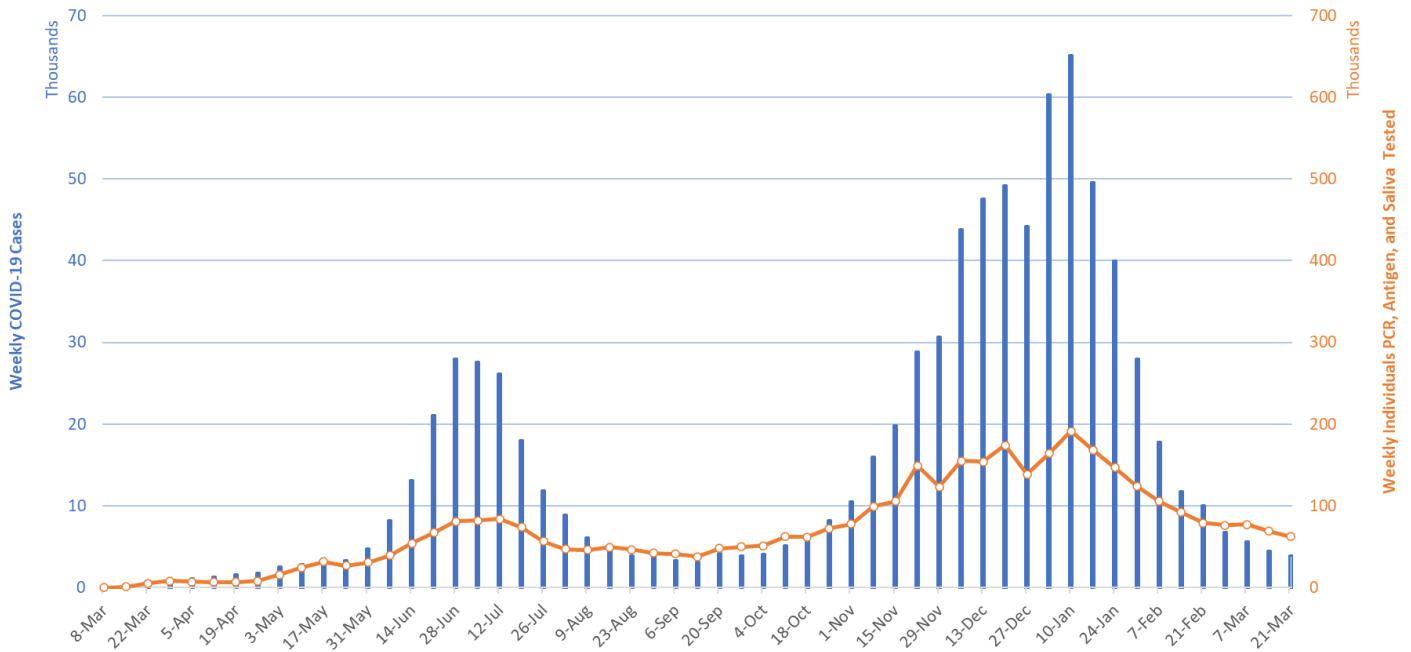


Figure 1. Newly Diagnosed Covid-19 Cases in Arizona and Number of Individuals Undergoing Covid-19 Diagnostic Testing March 1, 2020 through March 21, 2021.

Note: Data for this report was updated Friday, March 26 allowing 4 full days to adjudicate cases and keep week-over-week backfill <10%. This allows more interpretable comparisons and graphics. All comparisons are week-over-week changes. No update is planned for April 2nd, instead updates will now occur every other week.

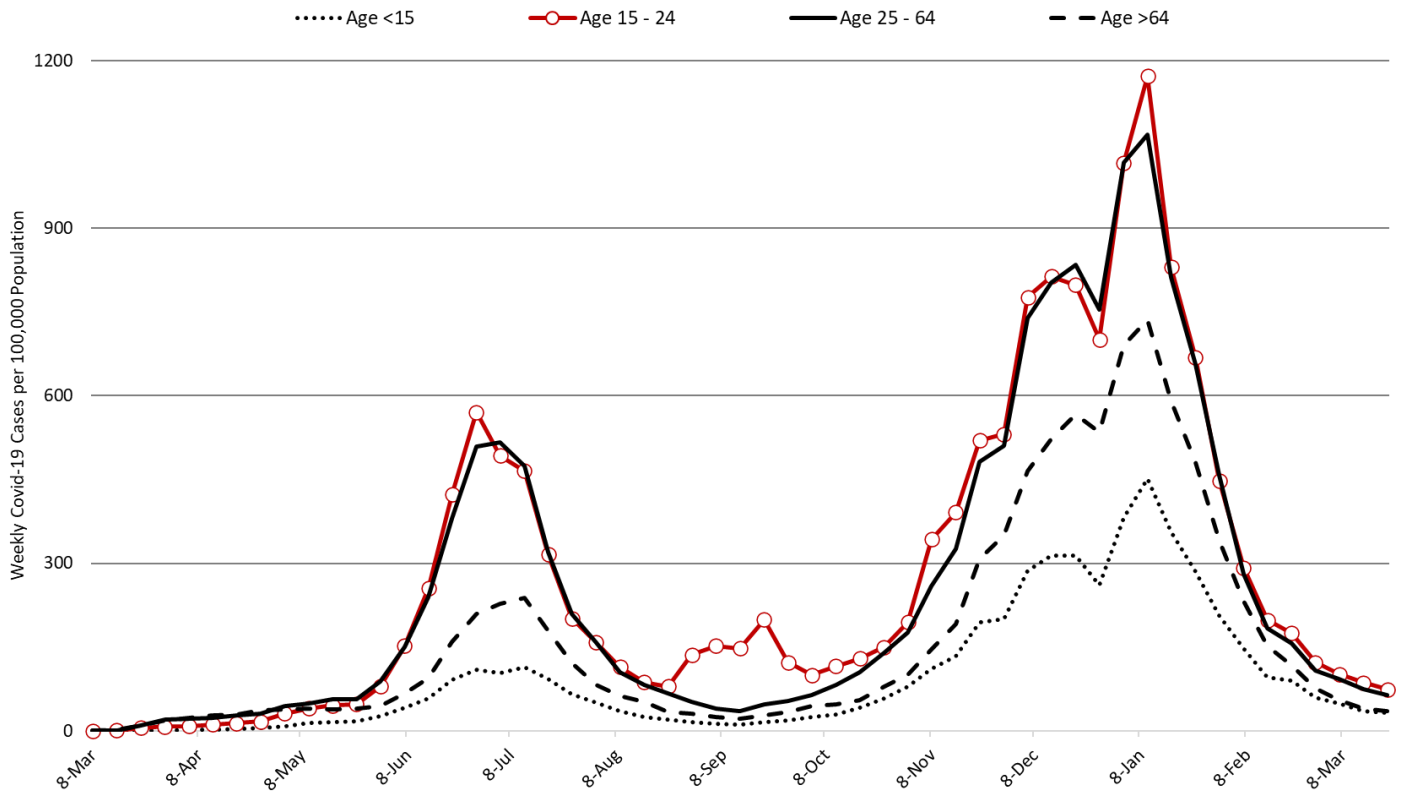


Figure 2. Newly Diagnosed Covid-19 Cases in Arizona by Age Group March 1, 2020 through March 21, 2021.

Test positivity among those undergoing traditional nasopharyngeal PCR testing was essentially unchanged this week, at 8% the week ending March 21st (Figure 3). Positivity is now within the recommended 5 – 10% for optimal public health practice.

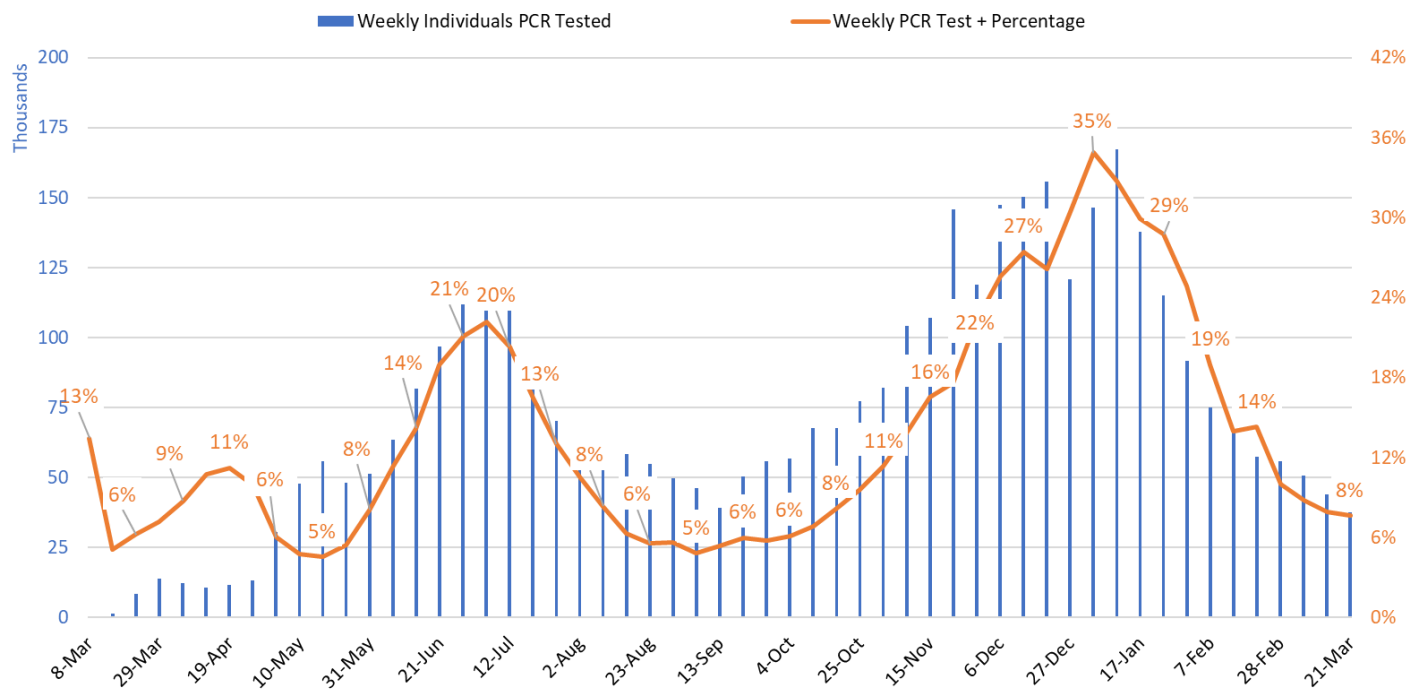


Figure 3. Weekly Number Patients Undergoing Traditional Nasopharyngeal PCR Testing and Associated Percent Positivity March 1, 2020 – March 21, 2021.

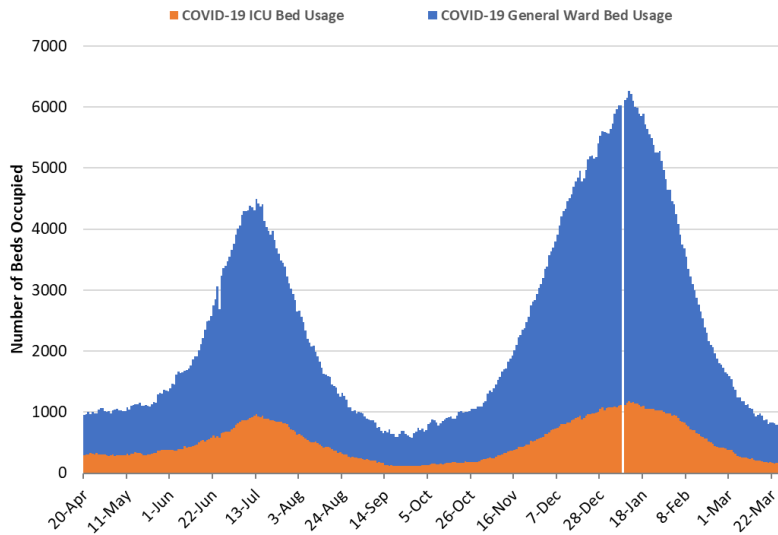


Figure 4. Arizona Daily Covid-19 General Ward and ICU Census April 20, 2020 – March 26, 2021.

As of March 26th, 581 (7%) of Arizona’s 8591 general ward beds were occupied by Covid-19 patients, a 17% decrease from the previous week’s 700 occupied beds (Figure 4 and Figure 5 Panel A). Another 1049 (12%) beds remained available for use. The number of available beds is higher than the previous week’s 978 beds.

Covid-19 occupancy has dropped by 89% from its January 11th peak of 5082 ward patients. The summer-fall nadir was 468 occupied beds on September 27th.

As of March 26th, 181 (11%) of Arizona’s 1734 ICU beds were occupied with Covid-19 patients, a 0% decrease from the prior week’s count of 182 patients (Figure 4 and Figure 5 Panel B). An additional 252 (15%)

ICU beds remained available for use. This is similar to the prior week’s 259 available beds. ICU occupancy has fallen 85% from its January 11th peak of 1183 occupied beds. The summer-fall nadir was 114 occupied beds on September 22nd.

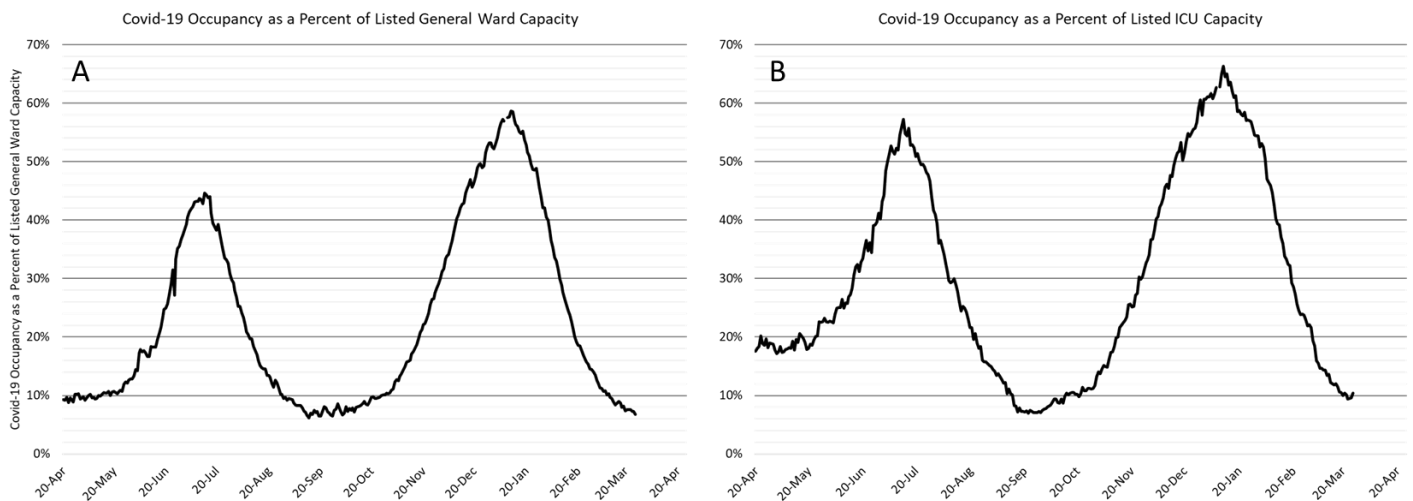


Figure 5. Covid-19 Occupancy as a Percent of Listed General Ward (A, left) and ICU (B, right) Capacity in Arizona April 20, 2020 – March 26, 2021.

Arizona hospital occupancy remains above seasonal trends. Improvements in ward and ICU occupancy remain 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 April before returning to pre-outbreak levels assuming continued reductions in viral transmission.

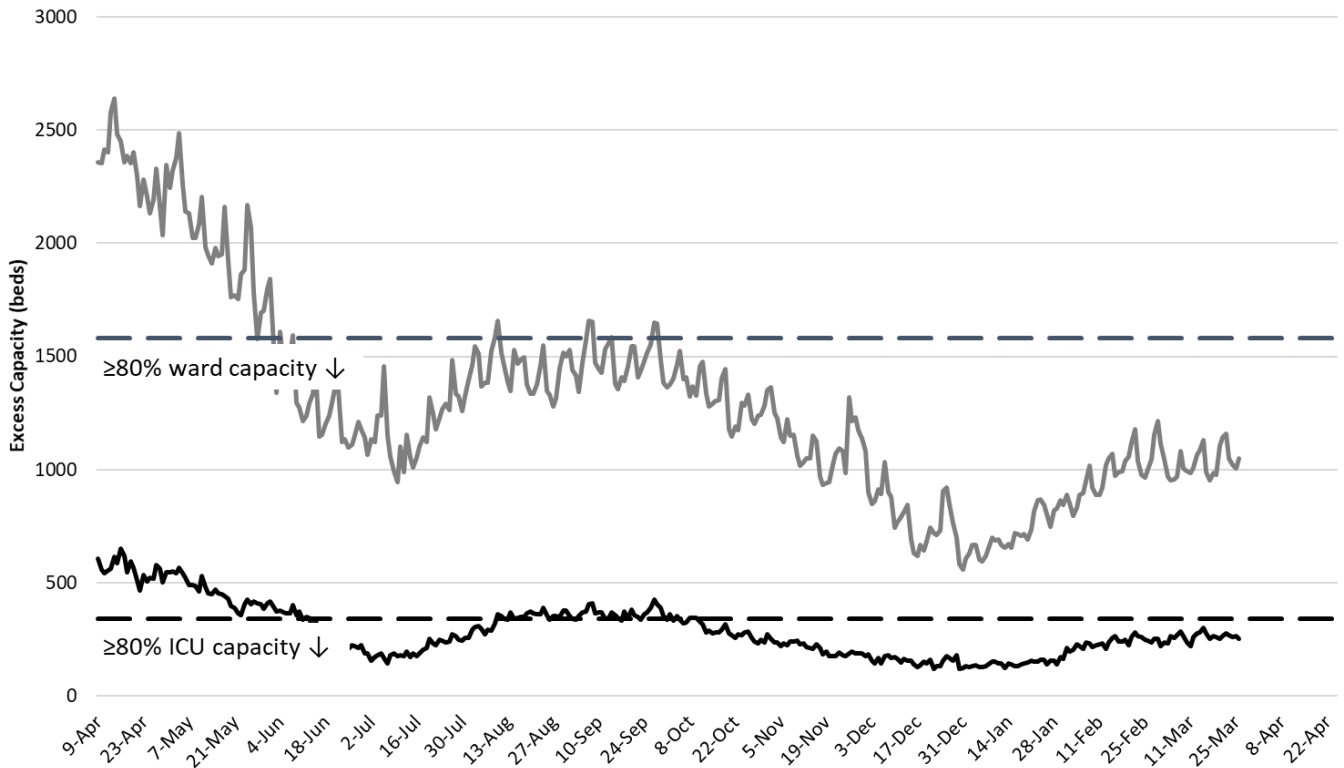


Figure 6. Observed Excess Non-Surge General Ward and ICU Capacity April 20, 2020 – March 26, 2021.

The week ending January 17th remains Arizona’s deadliest with 1065 deaths (Figure 7). Covid-19 deaths are expected to fall below 200 per week by the week ending March 14th or 21st.

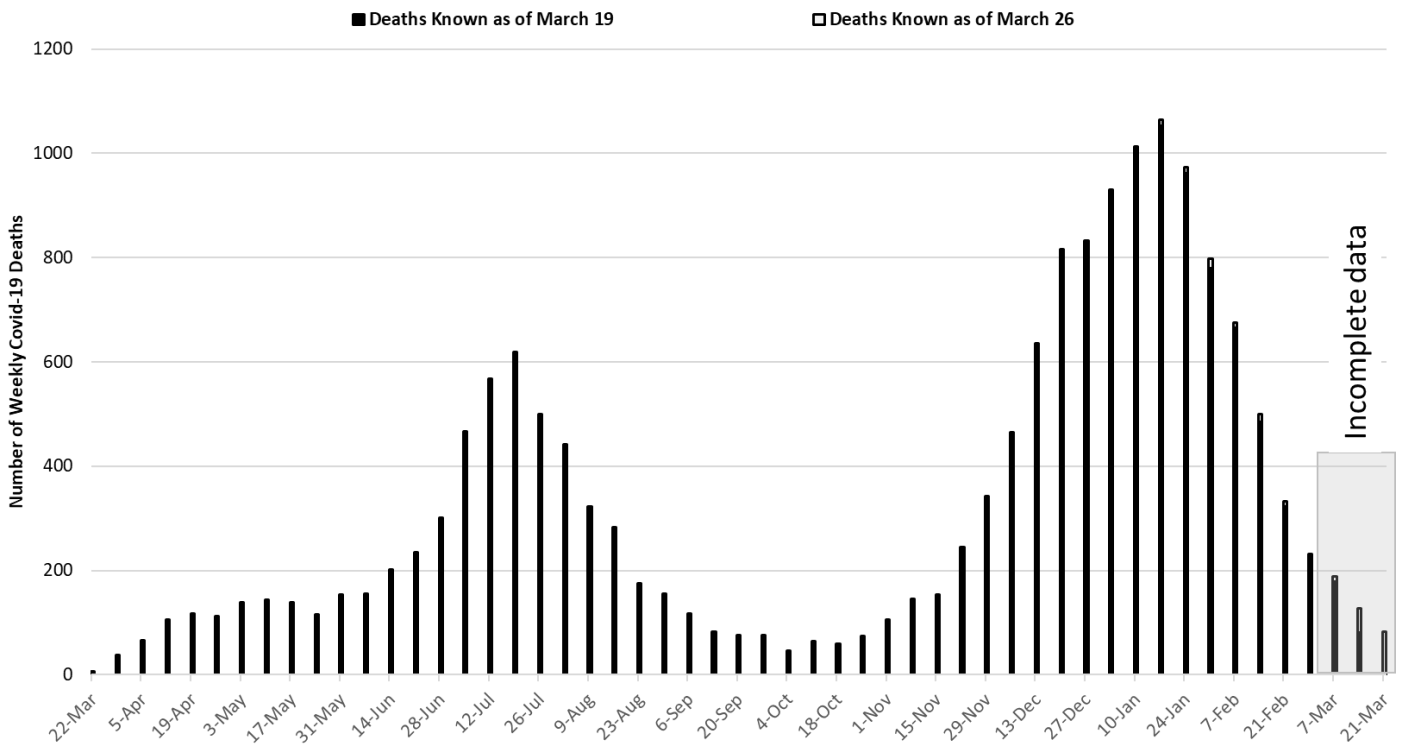


Figure 7. Weekly Arizona Covid-19 Deaths March 1, 2020 – March 21, 2021.

Pima County Outlook

For the week ending March 21st, 462 Pima County residents were diagnosed with Covid-19, a 16% decrease from the 548 cases initially reported last week (Figure 8). Last week's initial tally was upwardly revised by <1% (4 cases) to 552 cases. New cases are being diagnosed at a rate of 44 cases per 100K residents per week and are declining by approximately 9 cases per 100K residents per week. **For reference, October 9th marked a nadir between the summer and winter outbreak at 46 cases per 100K residents per week.** Trends are similar across the various age groups (Figure 9).

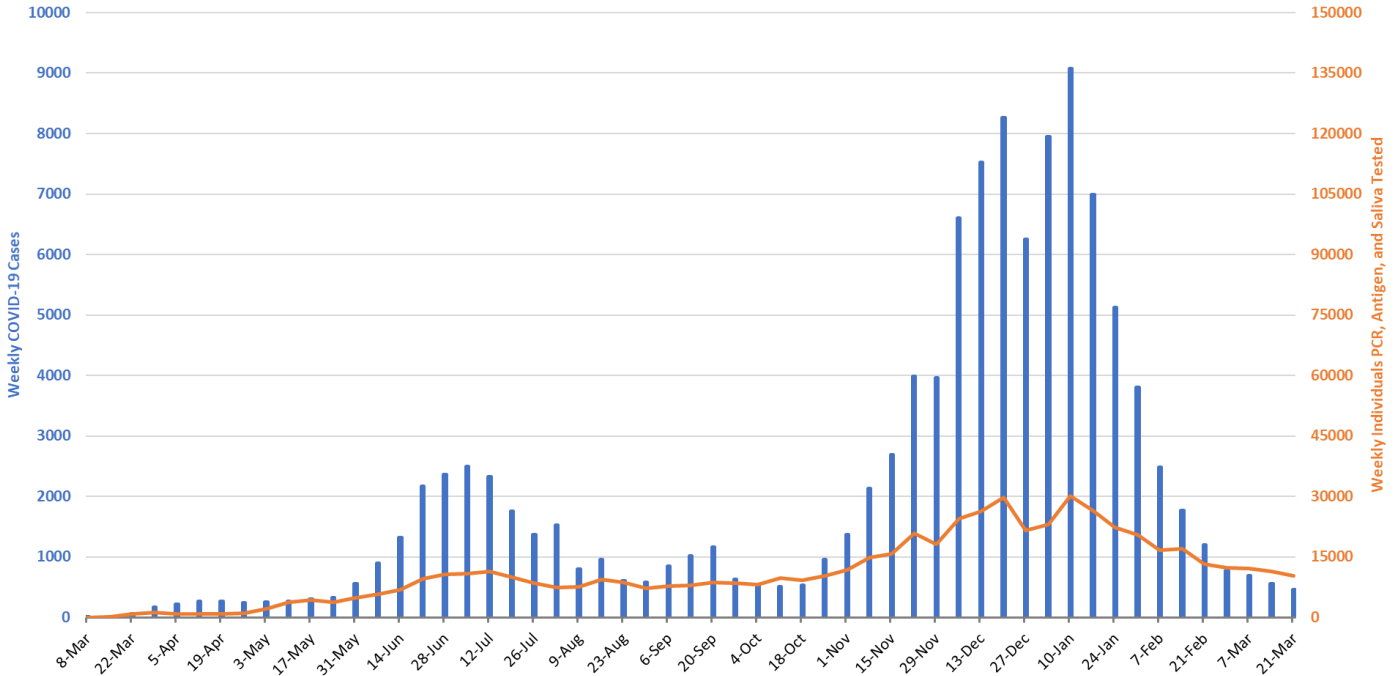


Figure 8. Covid-19 Cases and Individuals Undergoing Diagnostic Testing in Pima County March 1, 2020 – March 21, 2021

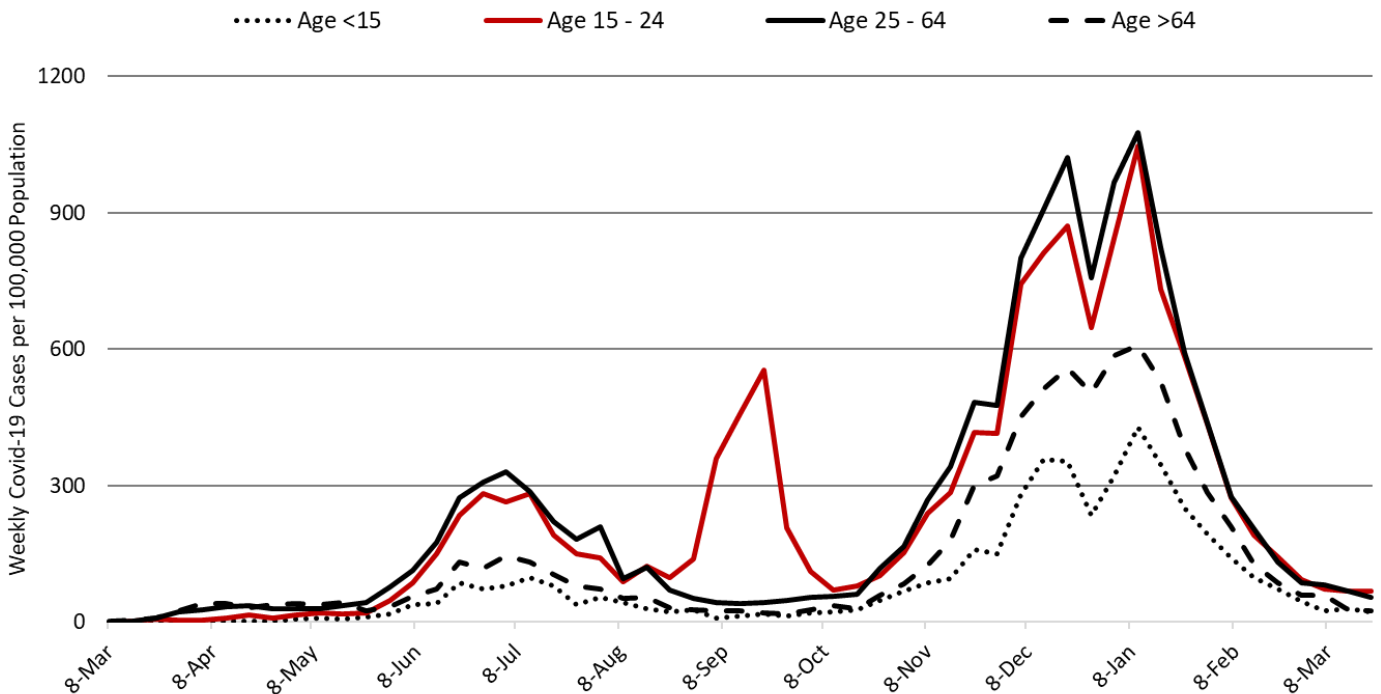


Figure 9. Covid-19 Cases by Age Group in Pima County from March 1, 2020 – March 21, 2021.

Summary:

- This week saw a tenth straight week of meaningful declines in Covid-19 cases and hospital occupancy. Absolute levels of SARS-CoV-2 viral transmission are below 50 new cases per 100,000 residents per week threshold in many Arizona counties.
 - As of March 21st, new cases were being diagnosed at a rate of 53 cases per 100,000 residents per week (Figure 10 below). This rate is declining by 8 cases per 100,000 residents per week.
 - While Arizona has one of the lowest viral transmission rates in the US according to the [CDC](#), it remains the 6th hardest hit state overall.
 - All residents should continue to wear a mask in public, avoid large social gatherings, maintain physical distance from non-household contacts, avoid >15 minutes contact in indoor spaces, especially if physical distancing is inadequate and adherence to face masks is low.
 - While residents and businesses should continue to follow the recommended public health mitigation efforts, normalization of lower risk activities is reasonable throughout the state.
 - The test positivity rate for traditional nasopharyngeal PCR testing is now <10% which is within the recommended 5 – 10% range for optimal public health practice.

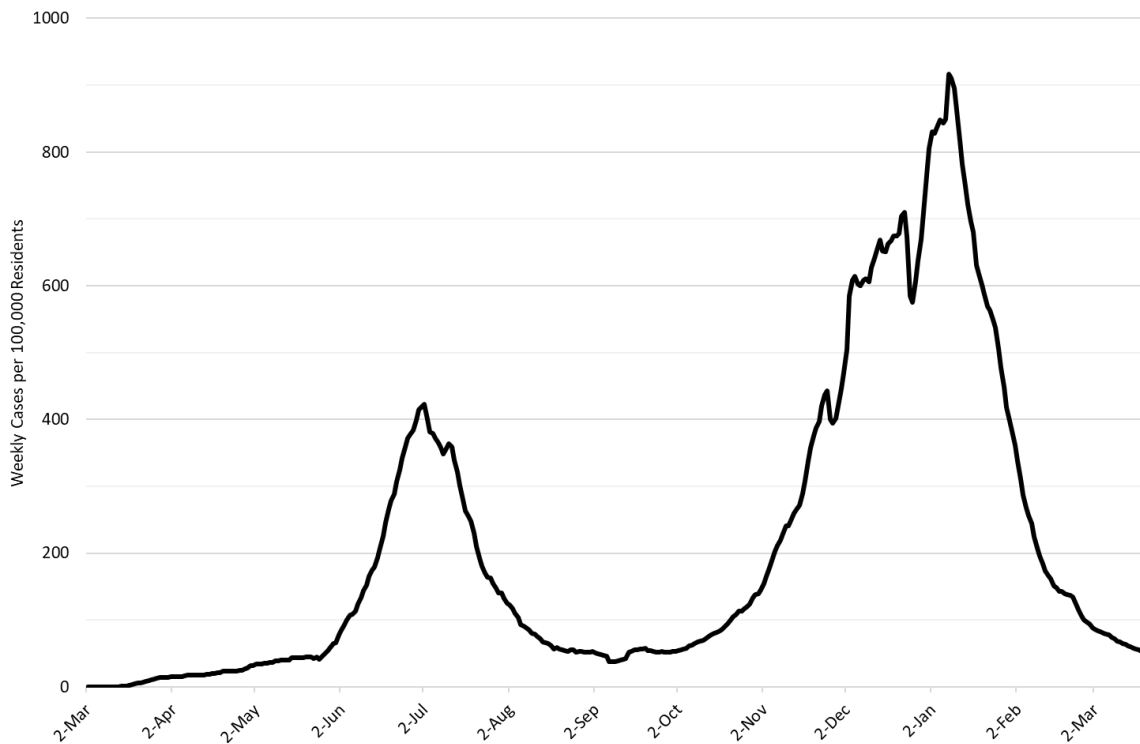


Figure 10. 7-Day Moving Average of Arizona Covid-19 Cases by Date of Test Collection Mar 1, 2020 – March 21, 2021.

- In all communities, absolute levels of transmission and test positivity have reached levels that warrant a return to in-person instruction using a hybrid mode or reduced attendance (see [CDC Recommended Mitigation Strategies for K – 12 Learning Modes](#)). In many communities, transmission has fallen below 50 cases per 100K residents per week which marks the threshold for in-person instruction by the CDC.
- Hospital Covid-19 occupancy continues to decline in the ward and ICU. Access to care however, remains somewhat restricted as the backlog of medically necessary non-Covid procedures is addressed.
- Arizona is still reporting a large number of weekly deaths and this count may underestimate true fatalities. The week ending January 17th will be Arizona's deadliest with >1000 deaths. Arizona's weekly tally of deaths ranks it 6th in the nation while its overall rank remains 6th since the outbreak began.
- According to the [CDC](#), 20.4% of Arizona adults have received at least 2-doses of vaccine while another 14.5% have received 1-dose. The ADHS Dashboard is reporting slightly higher levels.

Next update scheduled for April 9th.

County data appear in the Appendix.

Some discussion of vaccination progress / herd immunity follows county data.

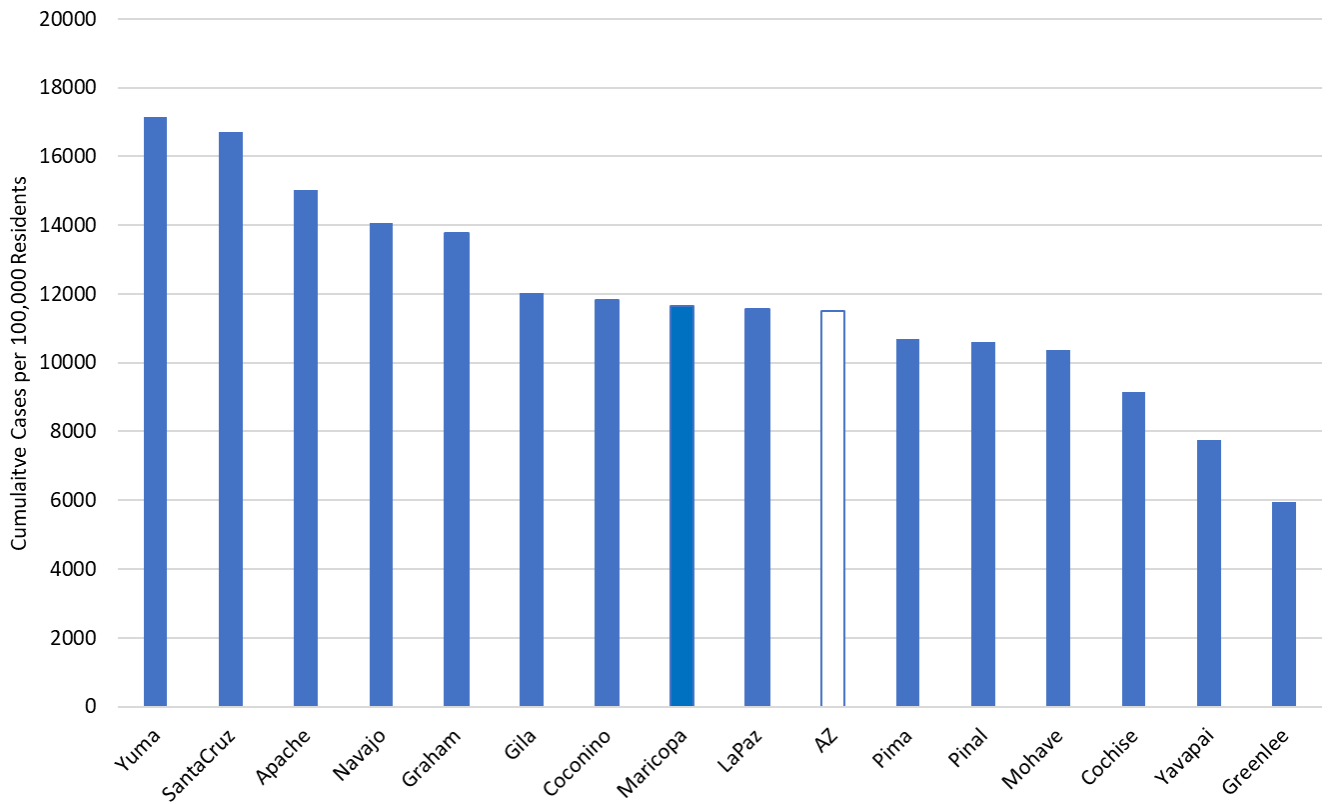


Figure 1A. Cumulative Covid-19 Incidence in Arizona by County March 1, 2020 – March 21, 2021.

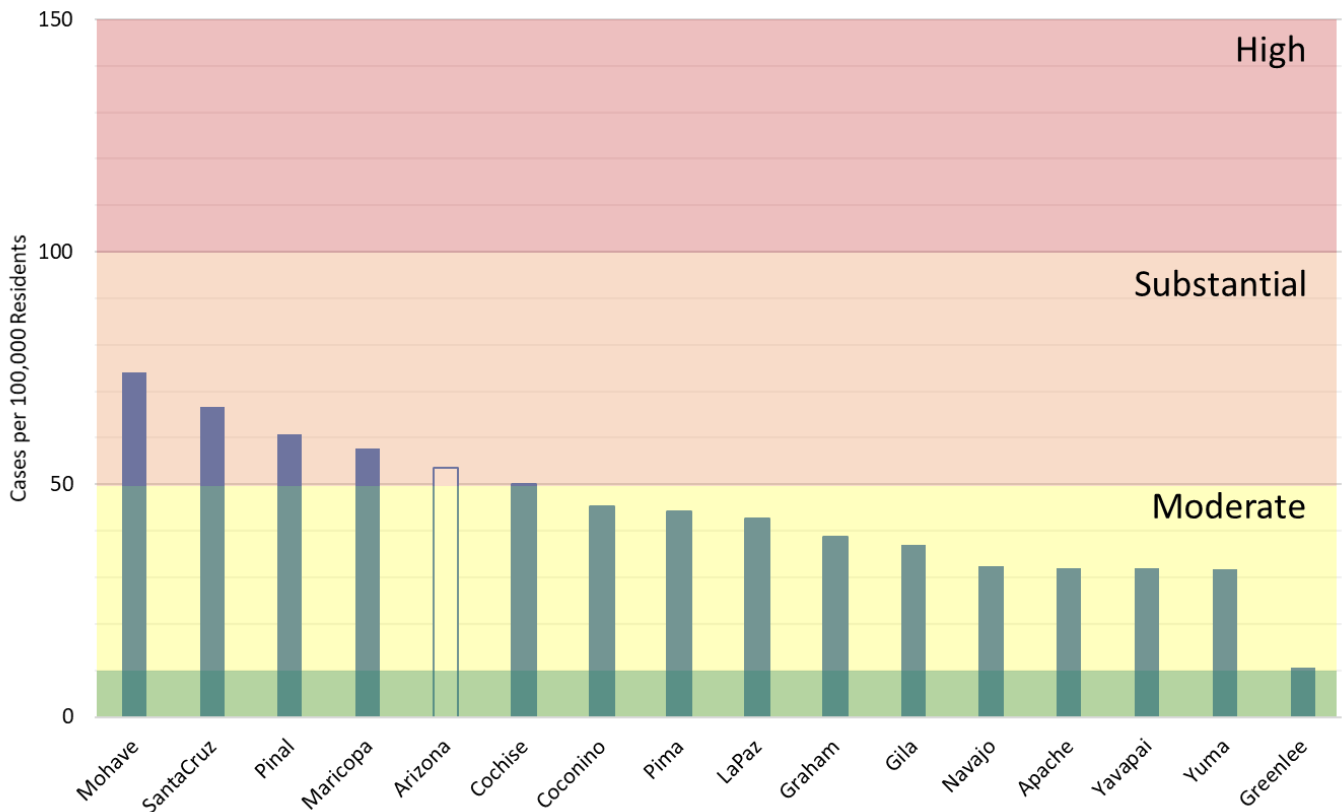
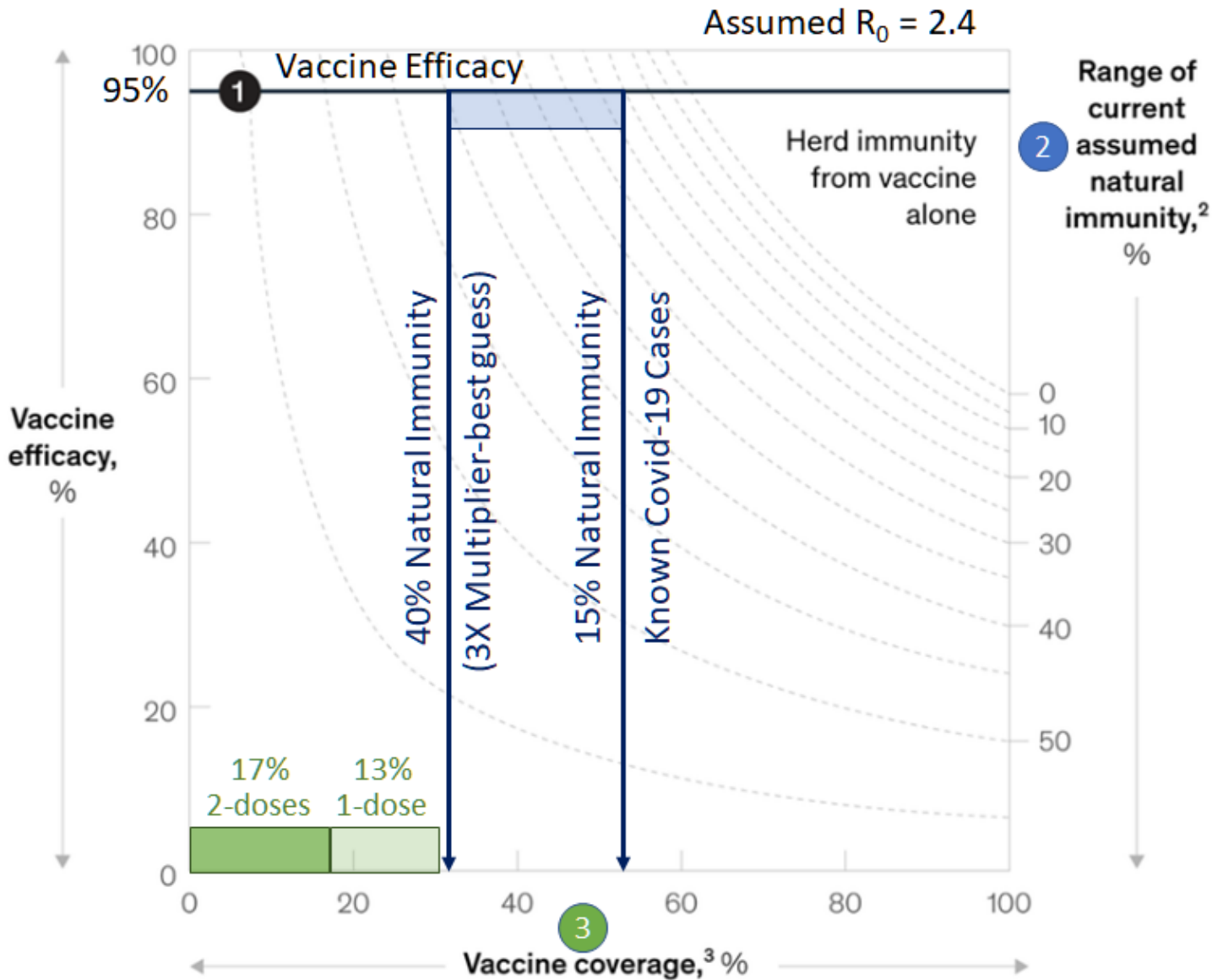


Figure 2A. Covid-19 Weekly Cumulative Incidence in Arizona by County March 7 – March 21, 2021 (Risk bands coincide with CDC recommendations for K – 12 schools’ instructional mode).

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Last week, I showed a graphic indicating [potential levels of vaccination needed to achieve herd immunity](#) based on combinations of vaccine efficacy, viral transmissibility, and natural immunity. I hypothesized that about 40% of Arizonans had recovered and that the original SARS-CoV-2 variant ($R_0=2.4$) was predominant. IF that were true, then about 30% of the additional adult population would need to be vaccinated to reach a level of immunity where community transmission could ultimately be extinguished (e.g., herd immunity; >60% total immunity). Last week's assumptions suggested we could get there in late April - early May.

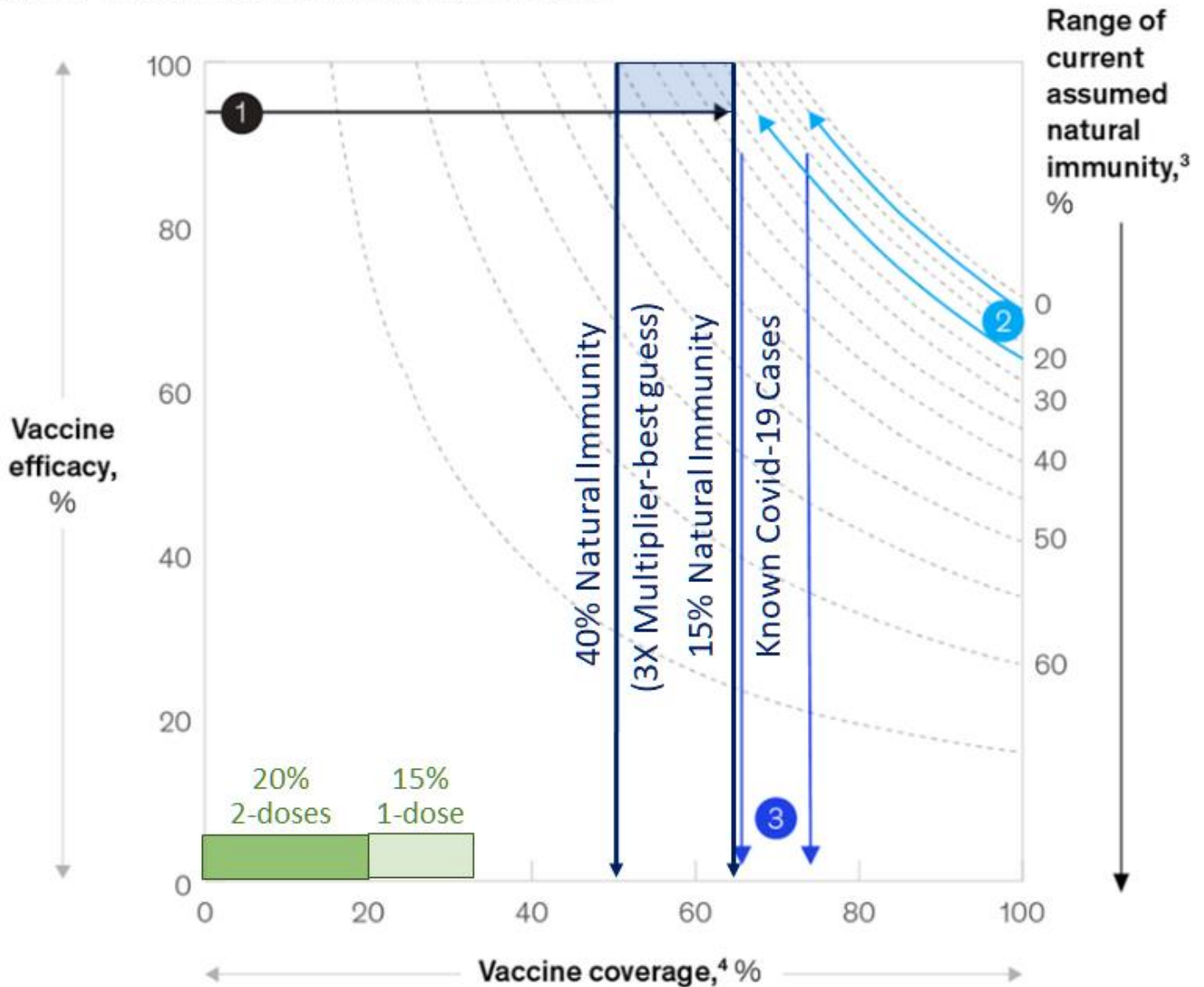
LAST WEEK'S SCENARIO (R0=2.4)



Unfortunately, this week brought bad news about the B.1.1.7 (UK) variant on the UA campus as well as more isolates showing up on the [TGen Dashboard](#). More transmissible variants can have a big impact on the number needed to vaccinate. If we assumed all new cases were attributable to a more transmissible variant (e.g., the UK variant), then more Arizonans would need to be vaccinated to achieve the same goal.

THIS WEEK'S SCENARIO (R0=3.3)

COVID-19 strain that is 40% more transmissible²



Just like Lucy, a more transmissible virus moves the goalpost on Charlie Brown! That is in part why it is important to maintain our public health mitigation measures. We will need more time to vaccinate as the more transmissible viruses become more prevalent.

Even if we achieve our vaccination goal, some sub-populations will still lack sufficient natural or vaccine immunity to prevent localized outbreaks due to infections imported from other areas or by traveling to areas where it remains and bringing it back (e.g., measles outbreaks in schools). Therefore, if Arizonan achieves population-level herd immunity in theory, it will not create a magic shield that can substitute for YOU getting vaccinated too. As long as coronavirus is circulating somewhere, you will remain at risk.

To make matters worse, there are a number of scientists who suggest [herd immunity may no longer be possible](#). Under this scenario, some form of SARS-CoV-2 would remain in circulation like influenza. If so, then some schedule of periodic re-immunization might be necessary.