

Covid-19 Disease Outbreak Outlook

Arizona State and Pima County

Updated September 4, 2020

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. Updates can be accessed at <https://publichealth.arizona.edu/news/2020/covid-19-forecast-model>.

For the week ending August 30th, 3535 new Covid-19 cases were diagnosed in Arizona (Figure 1). While >90% of nasopharyngeal PCR results are being reported within 48 hours, the expansion of saliva antigen testing on university campuses has yet to be fully automated. Therefore, some backfill of recent tallies in the weeks ahead remains a possibility. For example, last week's tally was revised upwards by 8%, 3222 to 3474 cases.

Viral transmission is no longer waning in Arizona; last week's tally, 3474 cases, and this week's tally, 3535 cases are essentially equivalent. The change is attributable to more cases among those 10 – 29 years of age, presumably students returning to university campuses. Current transmission levels remain similar to those of late May indicating the risk of viral transmission remains relatively high.

The percent of patients testing PCR positive has declined from a peak of 23% the week ending July 25th to 5% the week ending August 30th (Figure 2 following page). The test positive percentage has now been stable for 2 consecutive weeks. This test positive percentage is near the recommended level necessary to support diagnostic and surveillance activities. The percent of patients testing positive on the antibody (serology) test has remained stable for the past 7 weeks at roughly 12%.

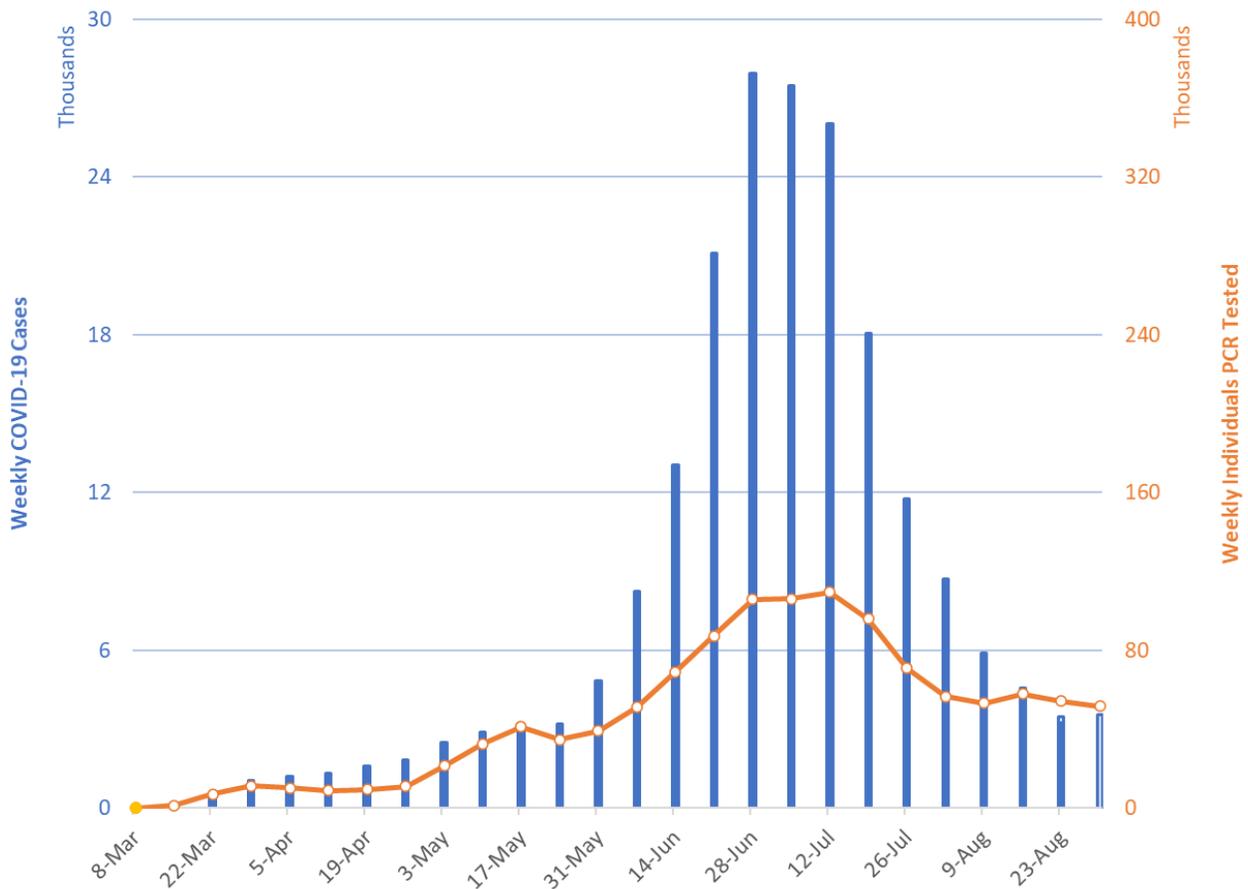


Figure 1. Newly Diagnosed Covid-19 Cases in Arizona and Number of Individuals Undergoing PCR Testing March 1 through August 30.

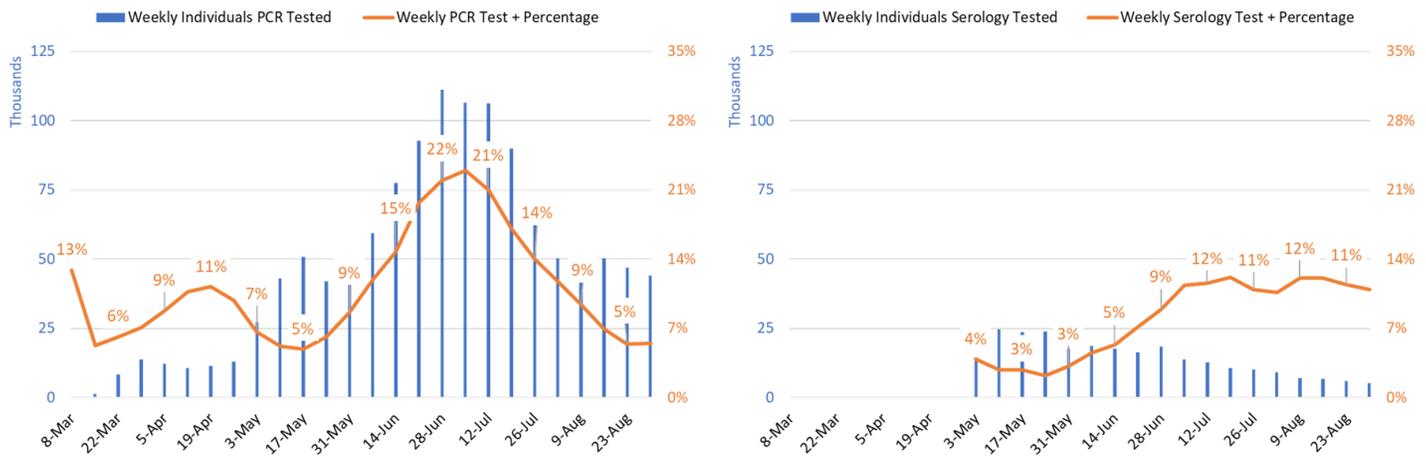


Figure 2. Weekly Number Patients Tested and Percent of Individuals with Positive Covid-19 PCR and Serology Results March 1 - August 30.

As of September 4th, Covid-19 hospitalizations have finally fallen below levels of the May 22nd plateau, 927 versus 1093 occupied beds (Figure 3). Since last week, Covid-19 hospitalizations have decreased 14% from 1074 to 927 occupied beds.

As of September 4th, 702 (9%) of Arizona’s 7962 general ward beds were occupied by patients with suspected or confirmed Covid-19 infection, a 14% decline from last week. An additional 1344 (17%) beds remain available which is slightly higher than last week’s 1315 beds.

Similarly, 225 (14%) of Arizona’s 1670 ICU beds were occupied for Covid-19 care, a 14% decrease from last week. An additional 352 beds (20%) beds remain available which is similar to last week’s 351 beds.

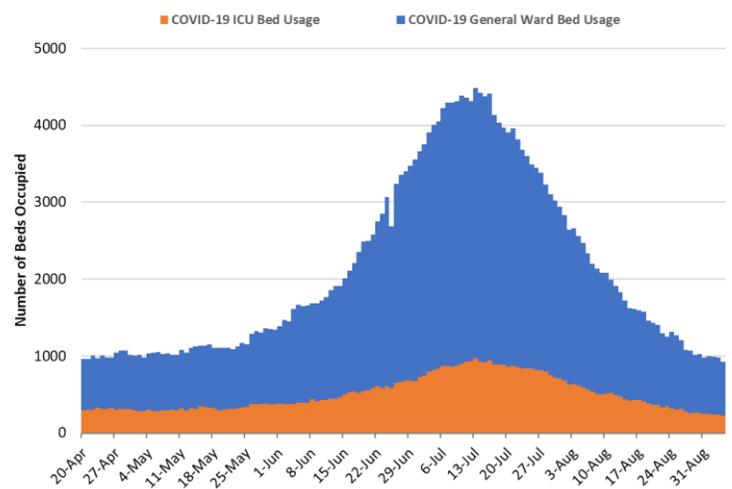


Figure 3. Arizona Daily Covid-19 General Ward and ICU Census April 20 – September 4.

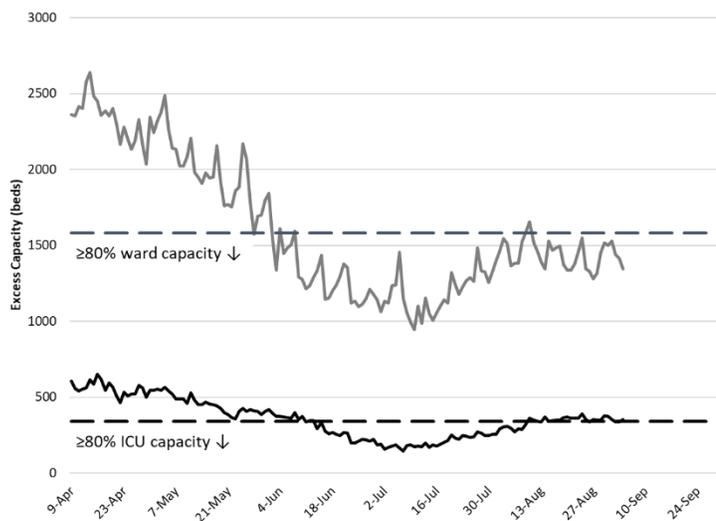


Figure 4. Observed and Projected Excess Non-Surge General Ward and ICU Capacity April 20 – September 31.

Arizona will not exceed its listed capacity of non-surge general ward or ICU beds unless improvements reverse (Figure 4). State-wide occupancy for general ward beds has been >80% for the past several weeks presumably to reduce the backlog of patients waiting for elective procedures. Given that seasonal respiratory viruses have not yet arrived and Covid-19 remains at modest levels, the next 4 – 6 weeks presents an opportunity to attend to postponed care.

ICU occupancy continues to hover at 80% occupancy, presumably for similar reasons. It will likely take several months before the backlog of care is fully resolved. However, we must also be concerned about the background rate of non-Covid-19 hospitalizations increasing as we move toward the late-fall, early-winter months.

With 578 deaths reported to date, the week ending July 19th remains Arizona's deadliest week (Figure 5). Because deaths are declining, we will not see a higher weekly tally for the foreseeable future.

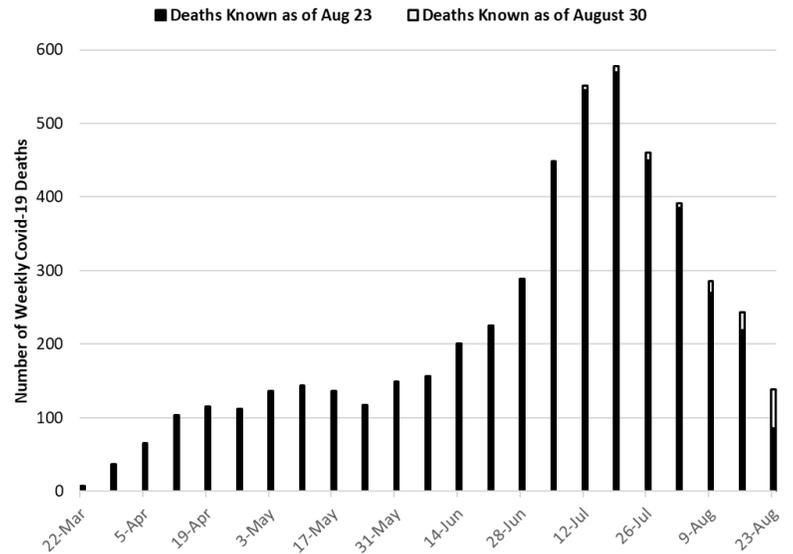


Figure 5. Weekly Arizona Covid-19 Deaths March 1 – August 30 by Date of Death

Pima County Outlook

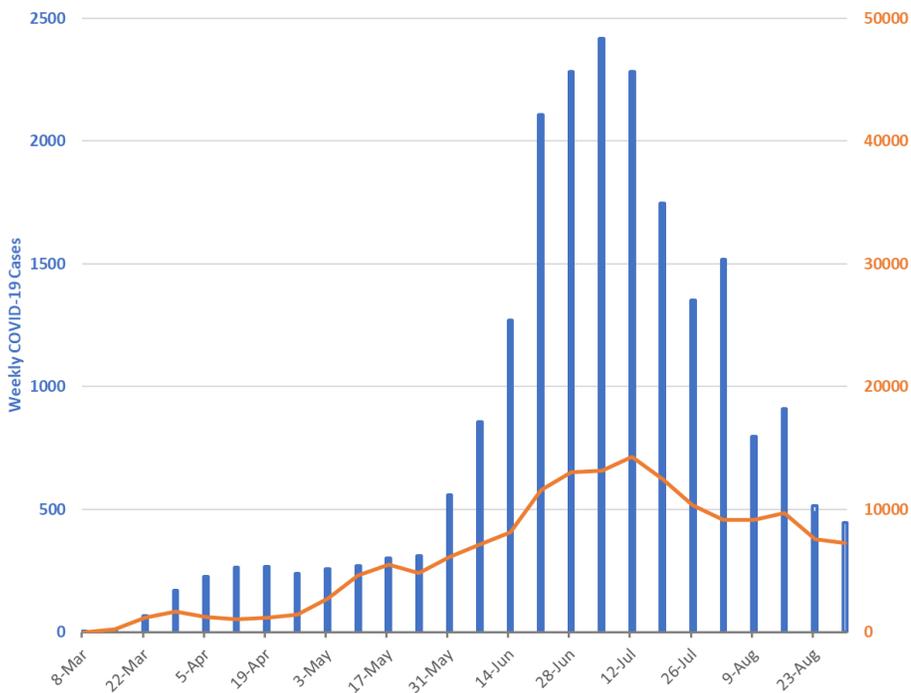


Figure 6. Newly Diagnosed Covid-19 Cases in Pima County and Individuals PCR Tested through August 30.

For the week ending August 30th, 445 Pima County residents were diagnosed with Covid-19. This is a 13% decline from the 514 cases identified the week ending August 23rd (Figure 6). However, there is reason to be concerned this figure could be updated if additional antigen results are manually updated next week.

PCR reporting has improved in Pima County such that $\geq 90\%$ of results are reported within 48 hours; however, the county continues to struggle with unusual reporting trends which again may continue owing to the ramp up of antigen testing.

While the overall trend is downward and generally follows that of the state, the pace of Pima County's improvement bears careful scrutiny in the coming weeks as events unfold on the University of Arizona campus.

Changing Nature of Arizona's Covid-19 Outbreak

All of Arizona's major university's returned students to campus in mid-to-late August. Doing so increased the frequency and intensity of social interactions for structural (e.g., congregate living) and behavioral (e.g., social gatherings) reasons. Even with strong mitigation measures and testing, these conditions were/are likely to facilitate viral transmission, particularly within high-risk groups.

As evidenced by recent media reports, other universities are having difficulty controlling viral transmission. Practical constraints pose challenges for testing, isolation, contact tracing, and quarantine. A [simulation study](#) suggested students would need to be tested every 1 – 3 days for optimal viral suppression (Figure 7, Panel A and B) whereas weekly testing (Panel C) would only be marginally better than no screening (Panel D). To date, none of the Universities are testing students more frequently than weekly.

Both the [University of Arizona](#) and [Arizona State University](#) are reporting aggregate cases identified on campus. So far, the University of Arizona reports 480 cases among 16,647 (2.9%) tests since July 31st. ASU reports 957 cases among 74,500 students (1.3%). However, without temporal reporting (e.g., trends), it is difficult to interpret these numbers.

Figure 2. Projecting the Required Size of the Isolation Dormitory

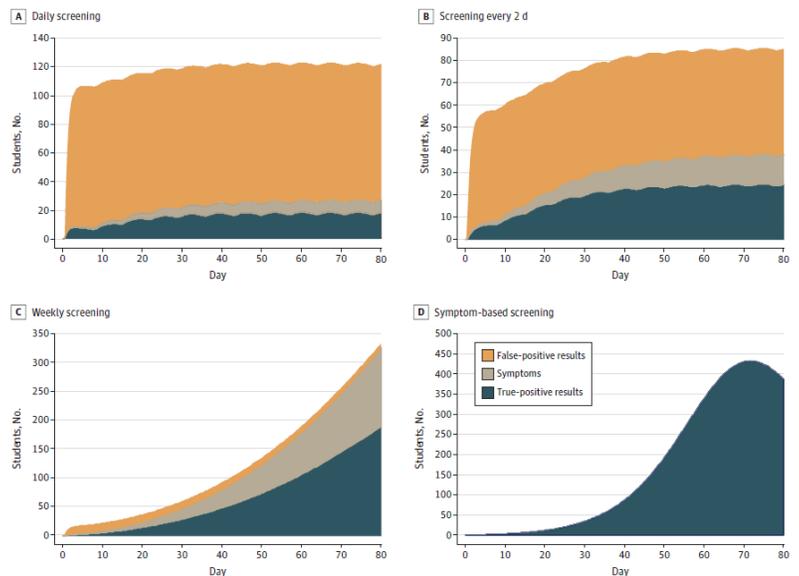


Figure 7. Simulated Outcomes from Daily, QoD, and Weekly Screening on University Campus (Peltier AD. [JAMA Network Open. 2020;3\(7\)](#)).

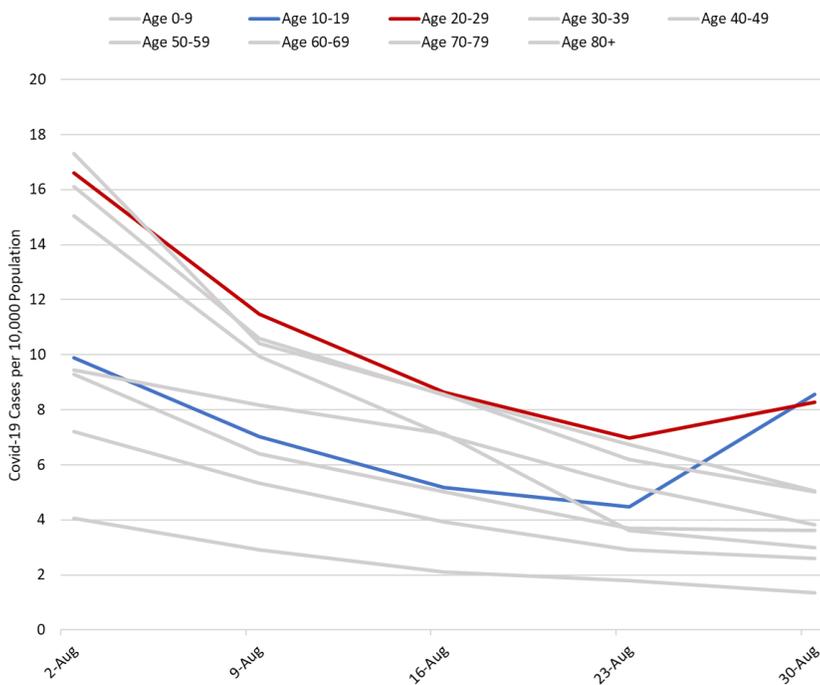


Figure 8. Population-Normed Covid-19 Cases per 10,000 population by Age Group in Arizona July 27 – August 30 (best viewed in color).

Arizona Covid-19 cases among those 0 – 19 years and 20 – 29 years deflected upwards this past week (Figure 8) while all other age groups continued to decline. The deflection was more pronounced in Maricopa County than Pima County presumably because ASU resumed a bit before the UA (Figure 9, following page)

During the earlier June – July surge, cases not only increased among those 20 – 29 years, but also those 30 – 59 years (Figure 10 following page). This most recent trend is different because so far it is concentrated among those 10 – 29 years. It is unclear whether this more localized re-opening of Universities will spill-over into the larger community.

It should also be noted that Universities are conducting surveillance and outbreak testing. Therefore, some increase was expected; however, if these trends persist, then uncontrolled viral transmission will be the substantiated.

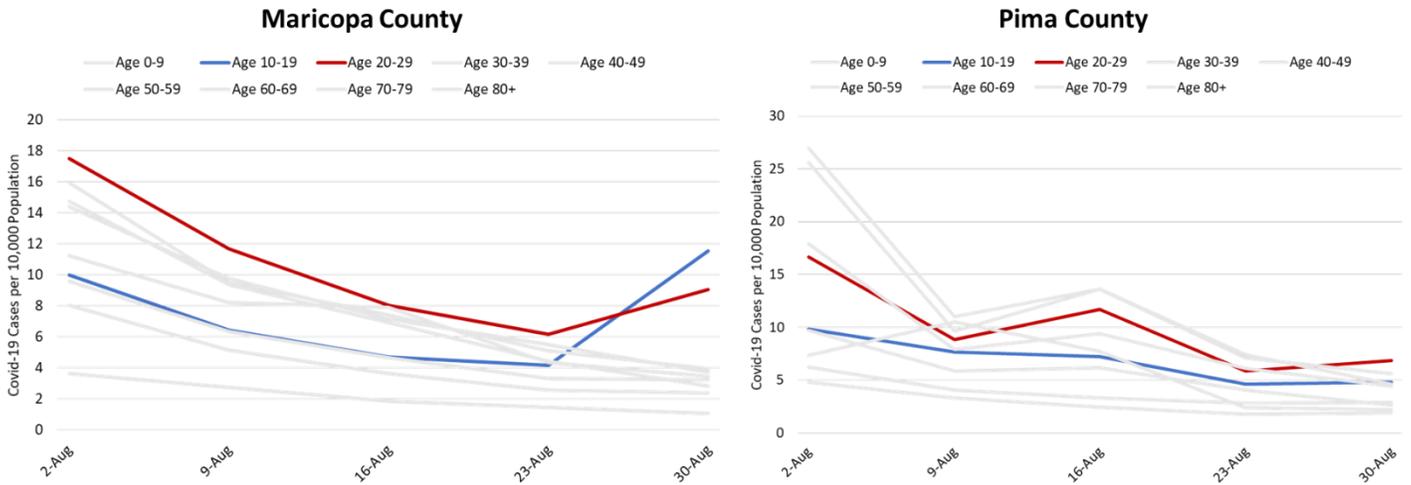


Figure 9. Population-Normed Covid-19 Cases per 10,000 population by Age Group Jul 27 – August 30 in Maricopa and Pima Counties (best viewed in color).

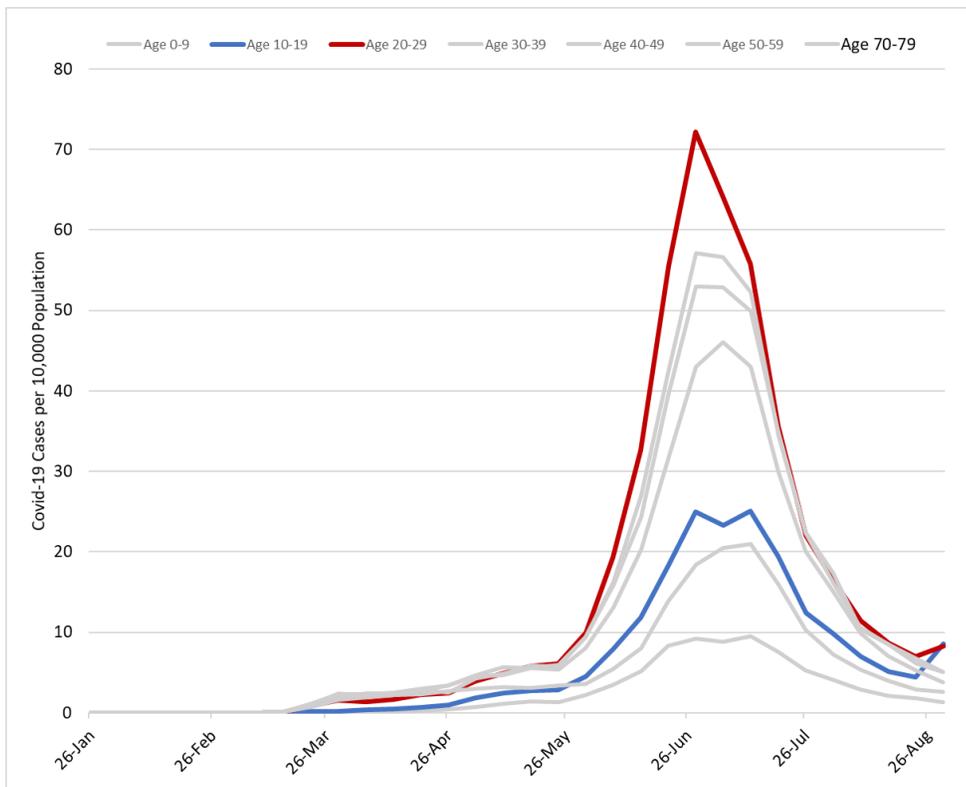


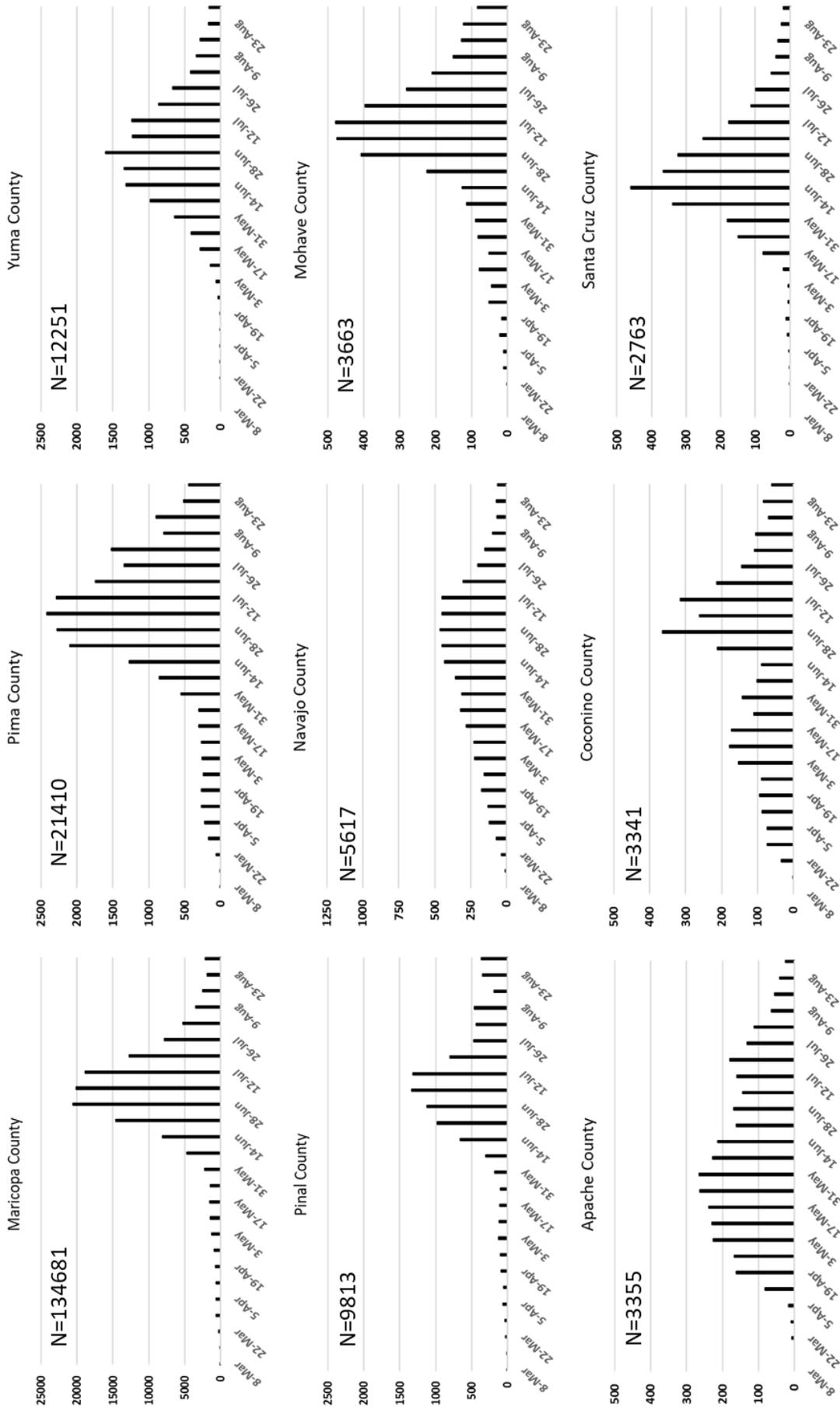
Figure 10. Population-Normed Covid-19 Cases per 10,000 population by Age Group January 19 – August 30 (best viewed in color, those 60 – 69 and 80 – 89 removed for clarity).

Summary:

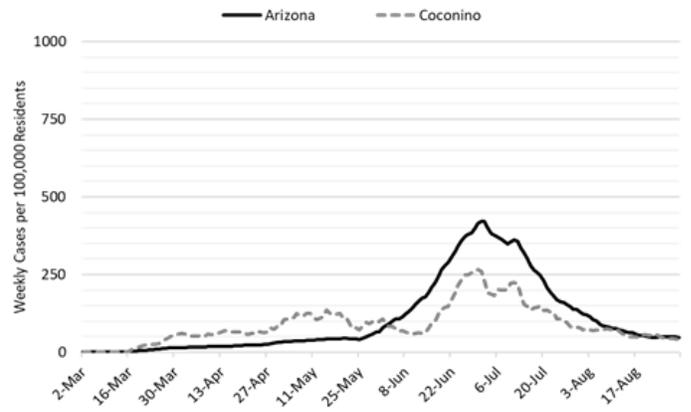
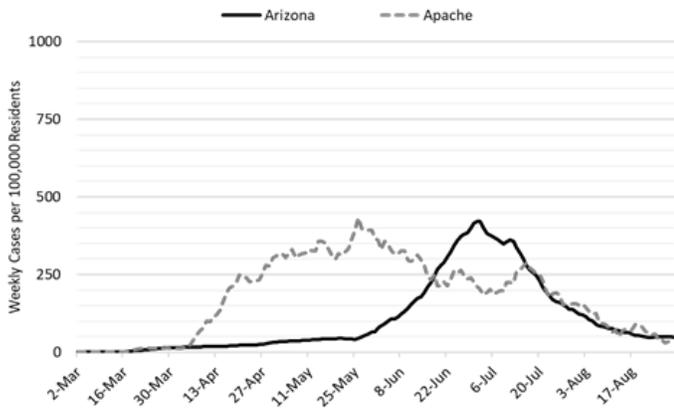
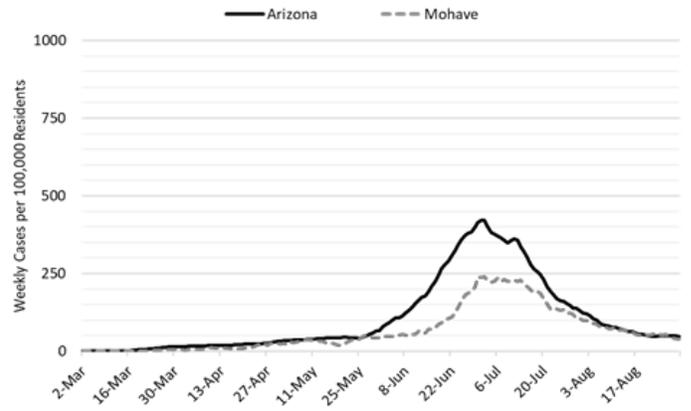
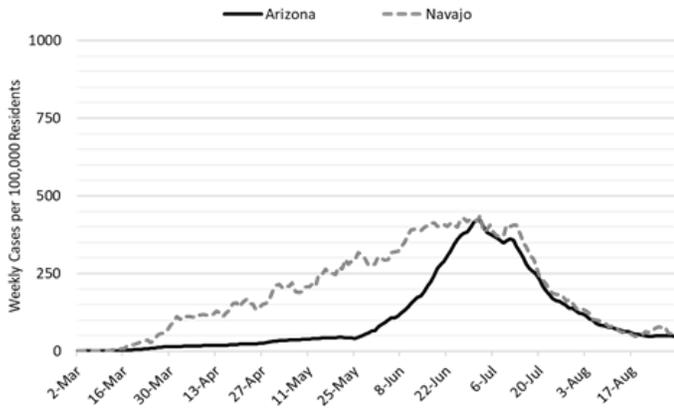
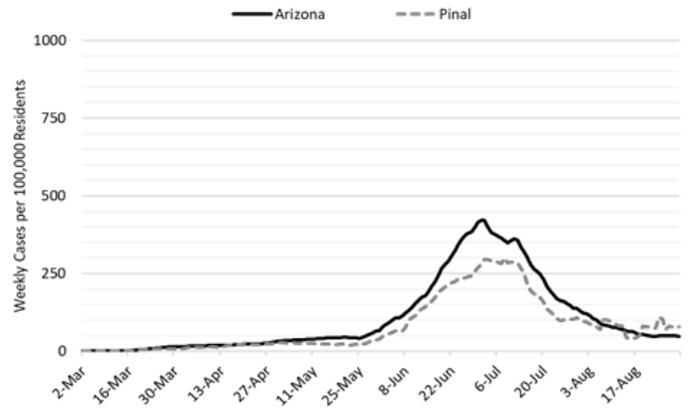
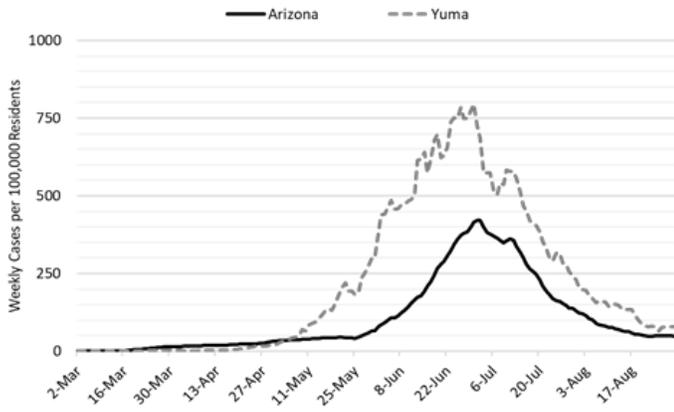
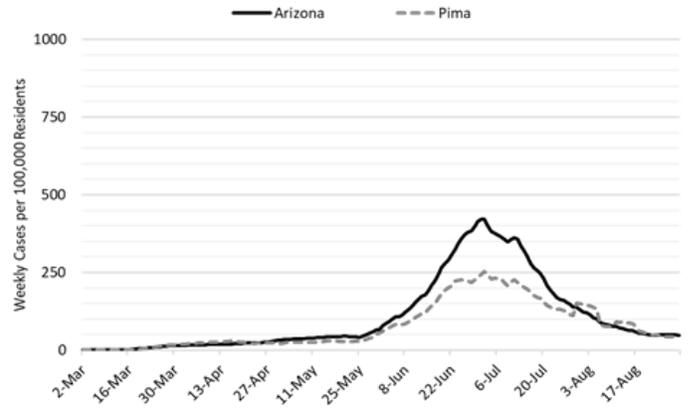
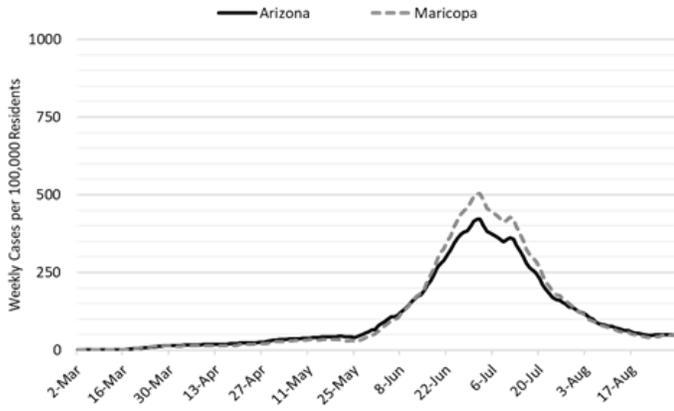
- Arizona is transitioning to a new phase of the outbreak where viral transmission is declining in the working-age and older adult populations but beginning to increase among adolescents and young adults. This is most likely attributable to re-opening of university campuses.
 - Rising cases on university campuses pose an unknown risk to the broader community as it is unclear to what extent that the social networks of students and the broader community overlap.
 - While the risk of severe disease in young adults is low, that is not the same as no risk. As case counts increase, some young adults will invariably require hospitalization and it is not out-of-the question that a small number of deaths could result.
 - Reporting lag for PCR results has improved such that $\geq 90\%$ of results are returned within 48 hours; however, the rapid rise in antigen testing on University campuses may present new challenges in data reporting and interpretation.
- Outside of young adults, levels of community-driven viral transmission remain comparatively high but continue to decline. Overall, transmission levels are on par with those observed in late-May.
 - For all locales, mask-wearing ordinances will be needed for the foreseeable future to mitigate the spread of Covid-19.
 - As some additional business activities (e.g., schools and businesses) resume, they will bring more people into closer contact and will facilitate additional viral transmission. Therefore, continued adherence with mask wearing, physical distancing, hand hygiene, and surface decontamination will be needed to mitigate these risks.
- Covid-related hospital utilization continues to decline while excess capacity is not being replenished owing to larger amounts of non-Covid care. However, adequate capacity is available for the foreseeable future.
 - From now until January, non-Covid hospitalizations are expected to increase putting additional strain on hospital capacity.
 - Hospitals will continue to experience large volumes of elective care to address the backlog of patients waiting elective procedures.
- Current Covid-19 test capacity appears adequate as evidenced by quick turn-around for PCR results and a PCR test positive percentage of 5% which is within the recommended 3 – 5% threshold.
 - As more Covid-19 testing transitions to antigen testing, it is unclear how this might impact test positivity trends. A rising test positive percentage should raise the possibility of resurgence.

Next update scheduled for September 11.

County Data (weekly crude and population-adjusted cases counts) appear in Appendix.

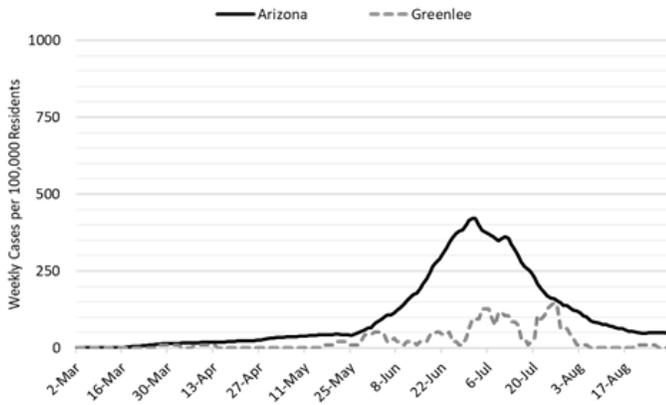
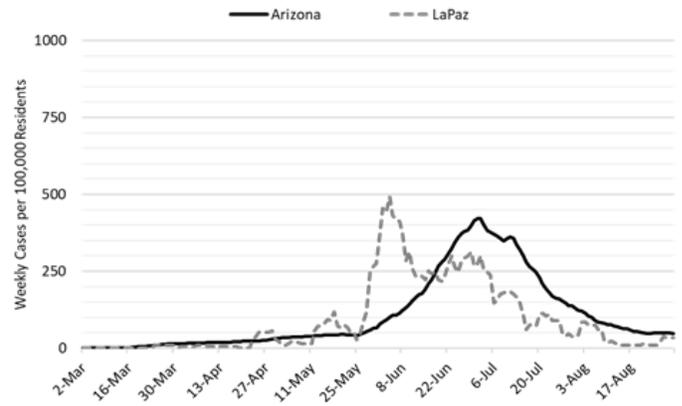
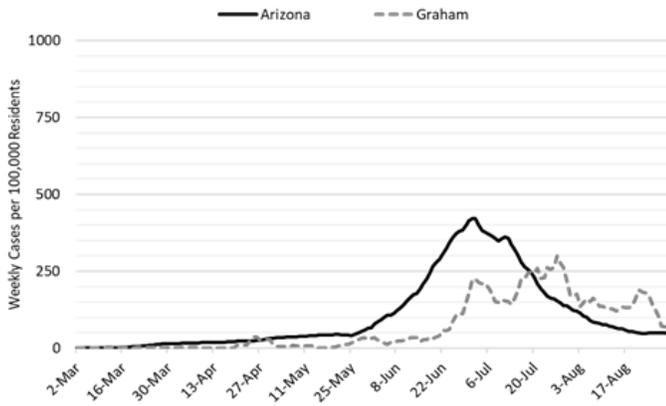
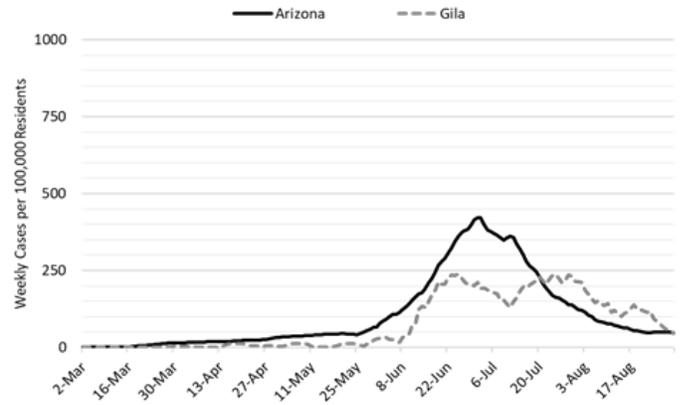
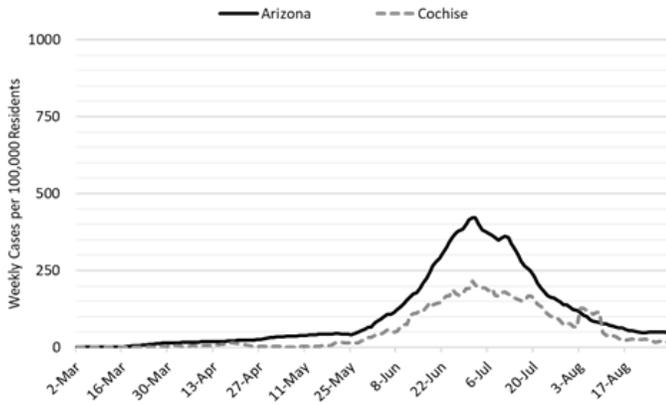
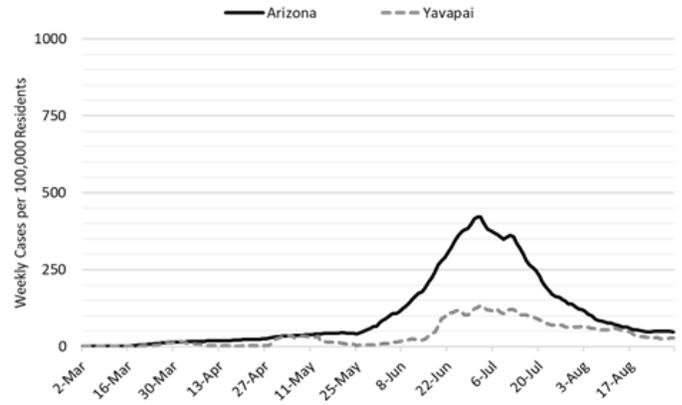
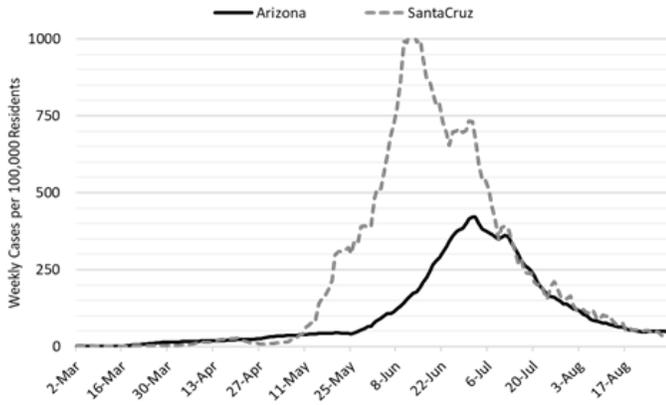


Appendix Figure 1. Weekly Covid-19 Cases by County March 1 – Aug 30.



Appendix Figure 2. Weekly Covid-19 Cases per 100,000 Residents by County March 1 – Aug 30.

Created by: Joe K. Gerald, MD, PhD (Associate Professor, Zuckerman College of Public Health, geraldj@email.arizona.edu) with gratitude to Patrick Wightman, PhD, MPP from the UA Center for Population Health Sciences for assistance with data analysis.



Appendix Figure 2. Weekly Covid-19 Cases per 100,000 Residents by County March 1 – Aug 30.

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