

Covid-19 Disease Outbreak Outlook

Arizona State and Pima County

Updated August 7, 2020

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For the week ending August 2nd, 7066 new Covid-19 cases were diagnosed in Arizona (Figure 1). However, this tally likely undercounts the actual number of new cases owing to persistent reporting delays. For example, last week's tally has been upwardly revised this week by 25% from 8917 to 11129 cases. On a positive note, this revision was half the size of last week's. The case count from two weeks ago, the week ending July 19th, has also been revised upwards by 9% this week.

Despite reporting delays, recent trends indicate viral transmission is waning. The rapidity of improvement is surprising given that April's broader stay-at-home order only slowed transmission enough to cause cases to plateau. Given that face-mask ordinances are an important different between then and now, they would seem to be the most likely explanation. Until proven otherwise, they should remain a necessary public health intervention.

Because PCR testing has been stable or slightly declining since early-July, the exact magnitude of recent declines is somewhat uncertain. Long reporting delays suggest some of the decline could be attributable to shortages of critical supplies or personnel (supply side); however, waning transmission could be causing fewer patients to seek care (demand side).

While PCR testing results are incomplete, the percent of patients testing positive has declined from a peak of 23% the week ending July 25th to 12% the week ending August 2nd (Figure 2 following page). A declining test positive percentage in the face of stagnant testing supports slowing viral transmission. The percent of patients testing positive on the antibody (serology) test has remained steady at 12%.

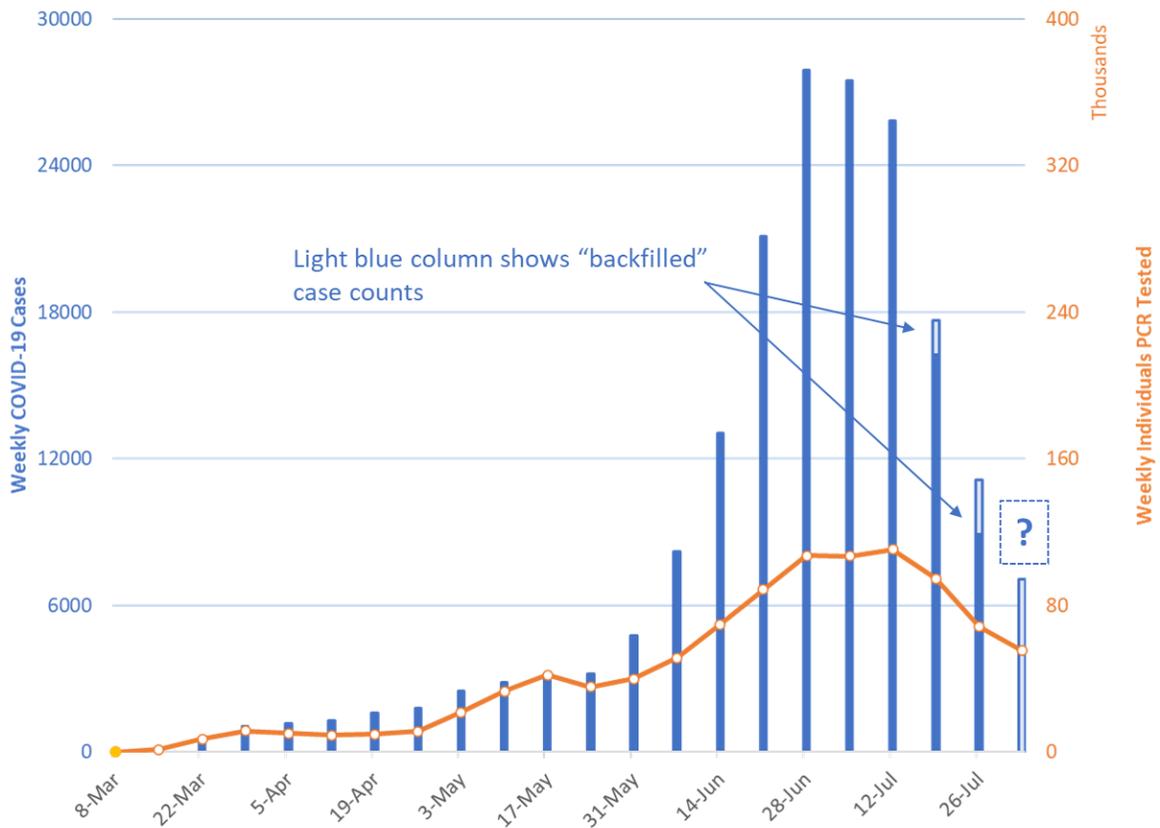


Figure 1. Newly Diagnosed Covid-19 Cases in Arizona and Number of Individuals Undergoing PCR Testing March 1 through August 2.

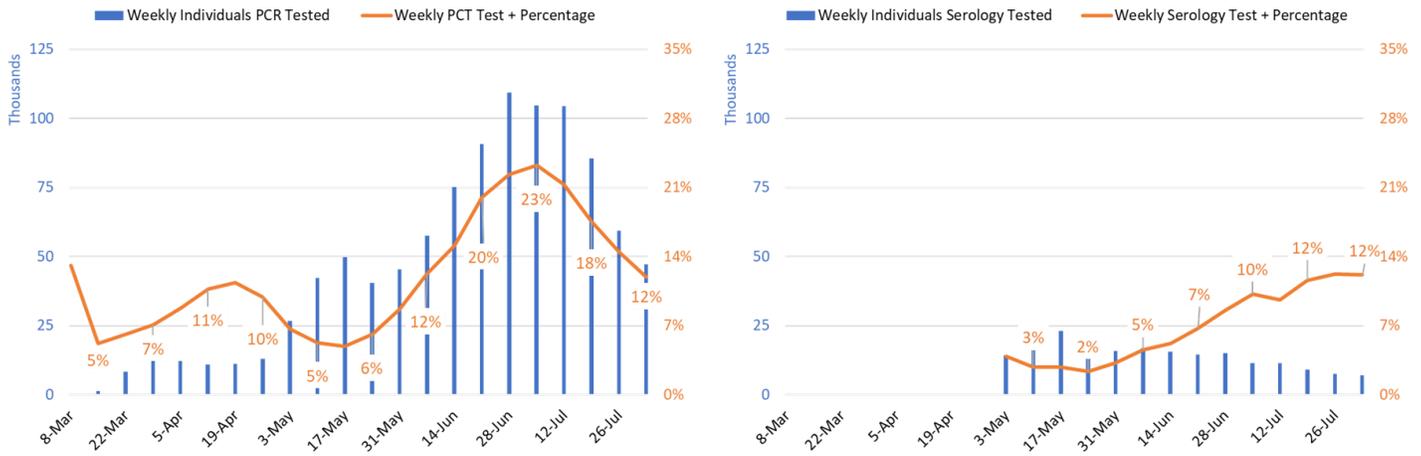


Figure 2. Weekly Number Patients Tested and Percent of Individuals with Positive Covid-19 PCR and Serology Results March 1 - August 2.

The 7-day moving average of doubling time for cumulative Covid-19 cases shortened from a peak of 29 days on May 25th to a trough of 12 days on June 21st (Figure 3). As of July 19th, it was 45 days. Because testing lag artificially lengthens doubling time, I am not displaying new case data through July 26th as I normally would. Despite backfilled data, the lengthening doubling indicates improving conditions.

The doubling time for cumulative deaths has shortened from a high-water mark of 41 days on June 5th to a trough of 23 days on July 10th. As of July 19th, it was 30 days. At last, the pace of Covid-19 deaths is slowing.

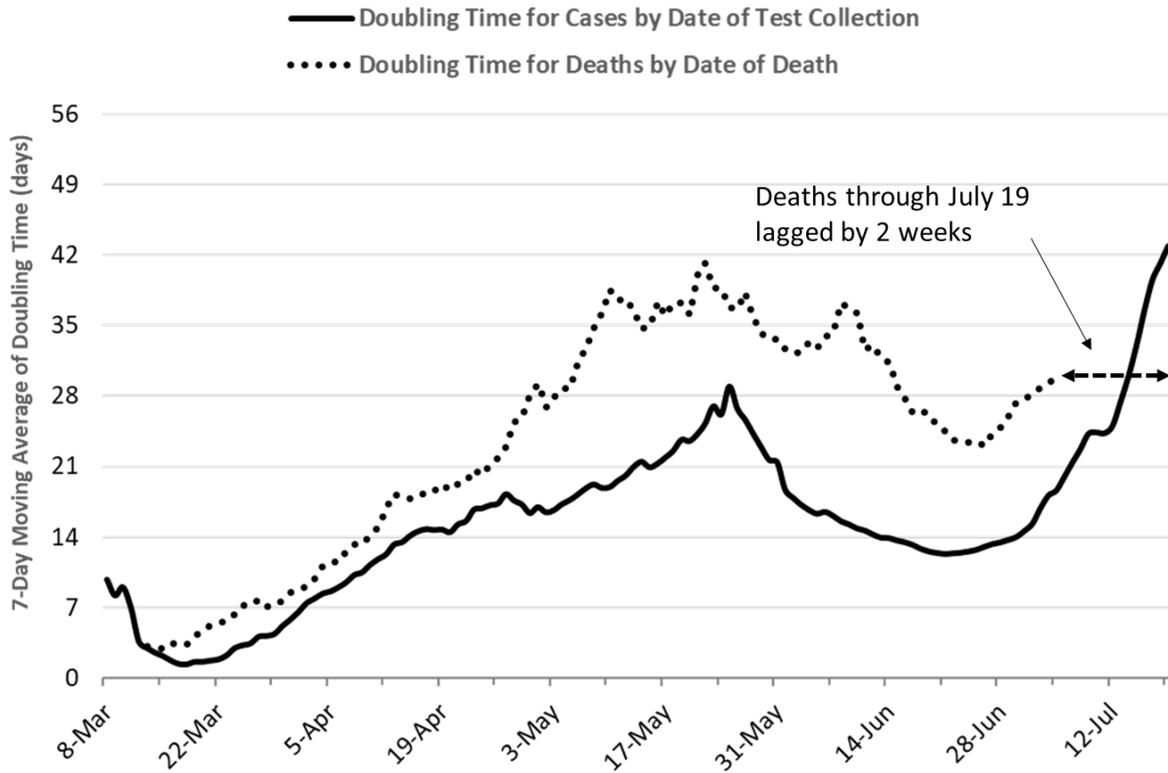


Figure 3. 7-Day Moving Average of Doubling Time of Cumulative Cases through July 19 Superimposed on Lagged (2-week) Doubling Time of Cumulative Deaths through July 19.

From a May 22 plateau to a July 13 plateau, total Covid-19 hospitalization increased 311% from 1093 to 4487 occupied beds (Figure 4). Since last week, total Covid-19 hospitalizations decreased 25% from 2936 to 2198 occupied beds. Hospitals should continue to experience declining Covid-19 occupancy over the coming weeks.

As of August 7th, 1659 (21%) of Arizona's 7938 general ward beds were occupied by patients with suspected or confirmed Covid-19 infection, a 25% decline from last week. An additional 1384 (17%) beds remain available which is higher than last week's 1324 beds. Similarly, 539 (31%) of Arizona's 1740 ICU beds were occupied for Covid-19 care, a 24% decrease from last week. An additional 293 beds (17%) beds remain available which is higher than last week's 255 beds.

Now that Covid-19 hospital occupancy is declining, Arizona will not exceed its listed capacity of non-surge general ward or ICU beds unless improvements reverse (Figure 5). Due to the longer length of stay for critically ill ICU patients, strain on general ward beds should be relieved sooner than strain on ICU beds. Similarly, regional referral centers may remain at or near capacity longer than other hospitals. A [recent JAMA article](#) suggests allowing our hospitals to exceed their normal capacities may have led to some preventable deaths as Covid-19 mortality was 3-times higher in hospitals with <50 ICU beds as compared to those with >100 beds. Under normal circumstances, some of these patients might have been transferred to regional referral centers.

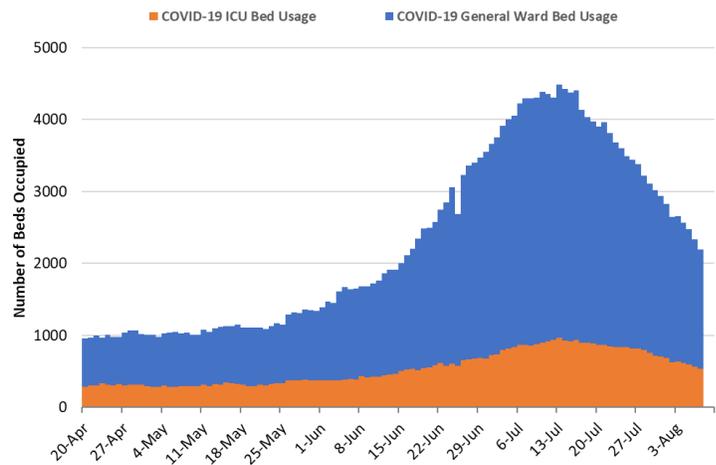


Figure 4. Arizona Daily Covid-19 General Ward and ICU Census April 20 – August 7.

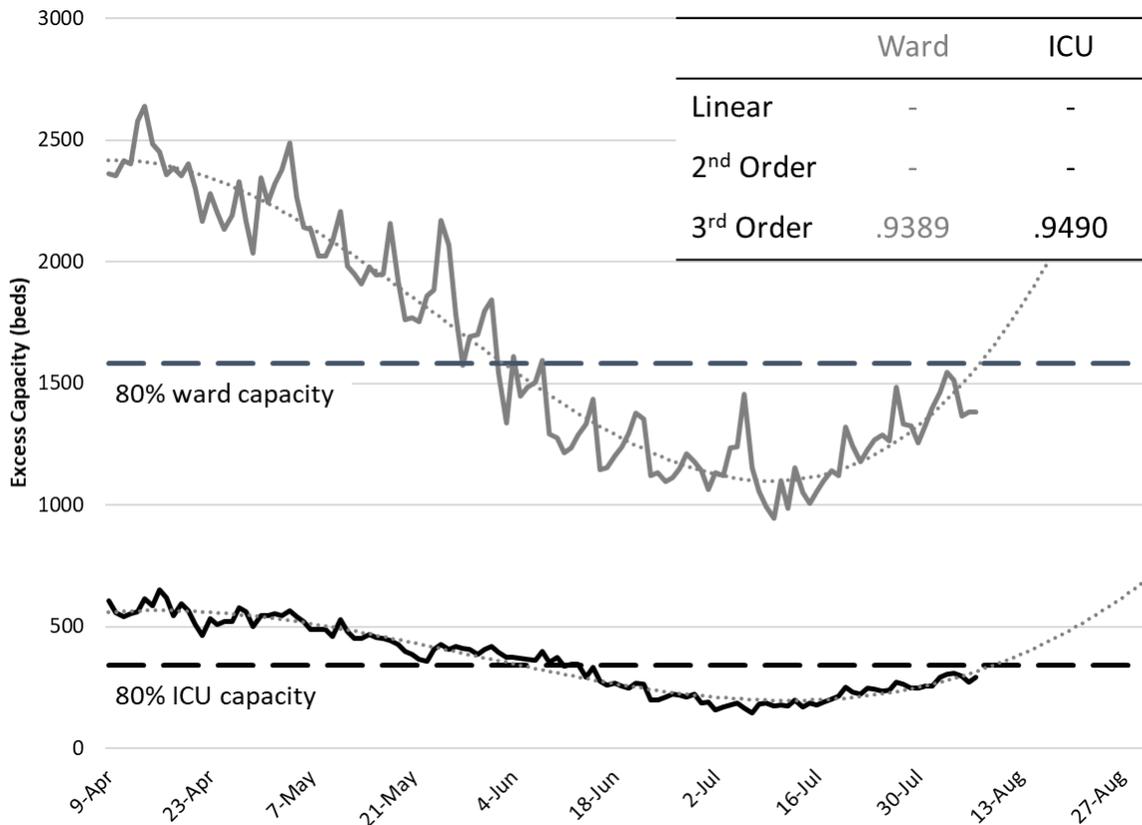


Figure 5. Observed and Projected Excess Non-Surge General Ward and ICU Capacity Apr 20 – Aug 31.

With 522 deaths reported to date, the week ending July 12th remains the week with the largest number of Covid-19 deaths to date (Figure 6). However, 516 deaths have been reported for the week ending July 19th suggesting it may set a new record once additional deaths are reported.

As mentioned previously, the doubling time for cumulative deaths is now lengthening indicating that a peak in weekly deaths is likely to occur soon. This would be a welcomed reprieve and a sure indicator that sustained progress has been made.

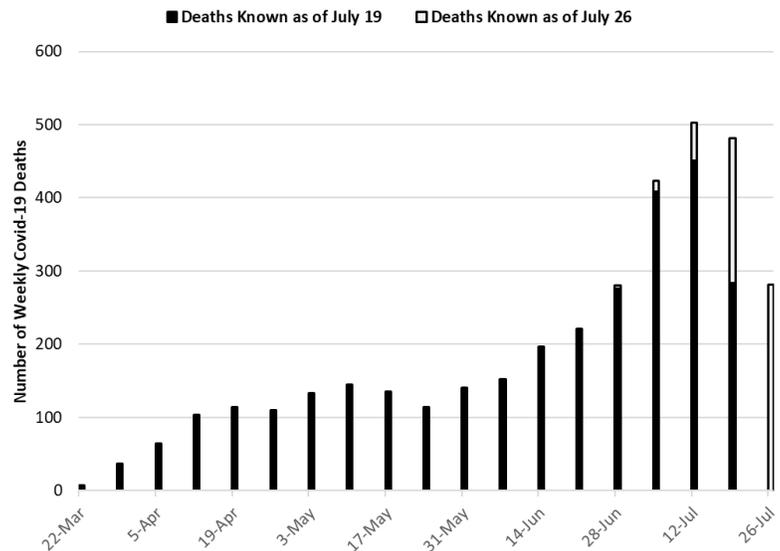


Figure 6. Weekly Arizona Covid-19 Deaths March 1 – August 2 by Date of Death

Pima County Outlook

For the week ending July 26th, 874 Pima County residents were diagnosed with Covid-19. Like state-wide figures, this count likely underestimates the number of diagnosed cases owing to the reemergence of a sizable testing lag. For example, last week's count of 782 cases was revised to 997 cases this week, a 27% increase (Figure 7). Likewise, the preceding week was upwardly revised by 8%. Nevertheless, the pace of new case counts is slowing.

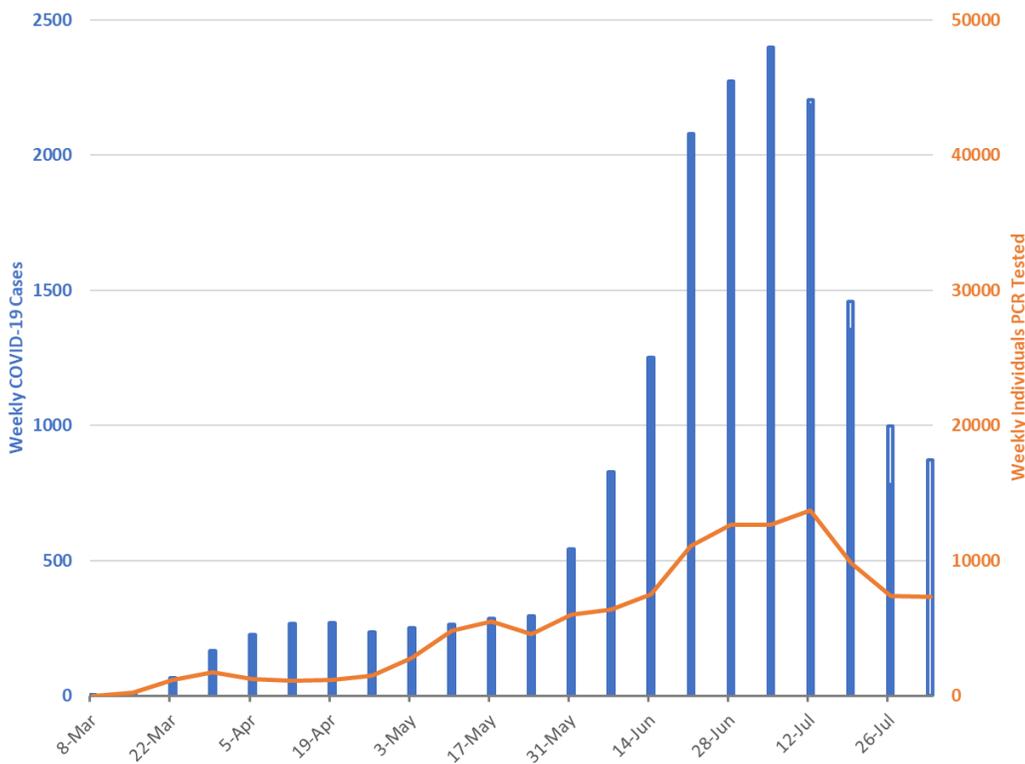


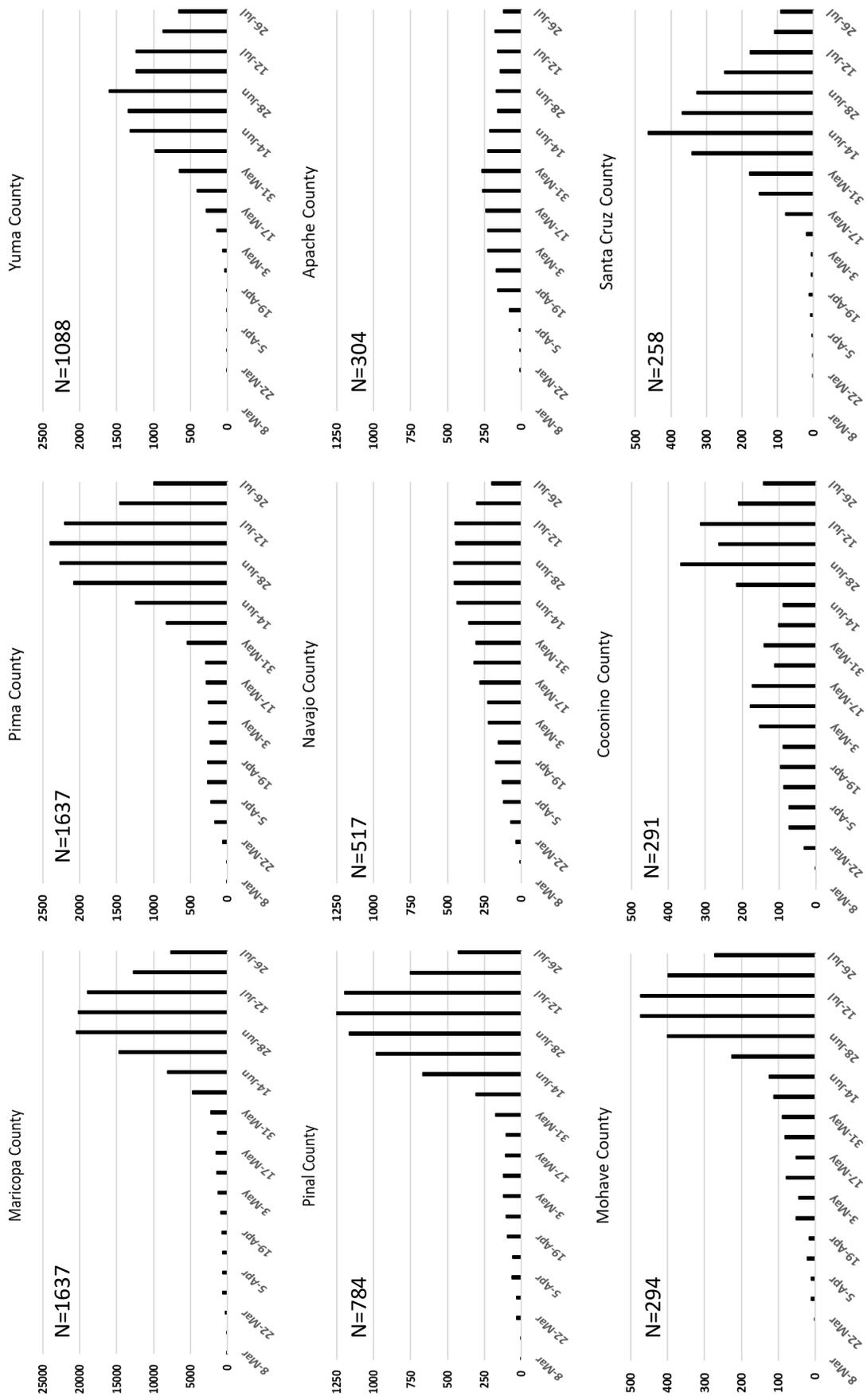
Figure 7. Newly Diagnosed Covid-19 Cases in Pima County and Individuals PCR Tested through August 2.

Summary:

- The pace of viral transmission continues to slow appreciably as indicated by declining case counts and hospital utilization. While a peak has not been clearly reached, deaths appear to be moderating as well. Nevertheless, Covid-19 remains more prevalent now than during early-May plateau.
 - Reporting lag for PCR results is still complicating efforts to precisely gauge changes in viral transmission and conduct timely case identification, contact tracing, and isolation.
 - Absolute levels of community-driven viral transmission remain comparatively high as evidenced by large numbers of weekly Covid-19 cases.
 - For most locales, government-mandated social distancing restrictions and mask-wearing will be needed for the foreseeable future to “claw back” excess hospital capacity and restore some of the lost safety margin.
- Covid-related hospital utilization continues to moderate while excess capacity is being slowly replenished. Adequate capacity should be available for the foreseeable future. Personnel shortages and fatigue will still be problematic, especially in critical care settings.
 - From now until January, non-Covid hospitalizations are expected to increase putting additional strain on hospital capacity.
 - Many ICUs will remain at or near capacity for the next several weeks due to long length-of-stays for many; maintaining an adequate supply of health care workers will continue to be a challenge. Nevertheless, state-wide average hospital and ICU occupancy could fall below 80% this week or next which would be an important milestone.
- Current Covid-19 test capacity is inadequate to meet both clinical and public health demands as the test positive percentage is 12%, well above the recommended 3 – 5%. With about half of results taking ≥5 days, public health efforts to respond to this outbreak remain constrained by inadequate capacity.

Next update scheduled for August 14.

County Data appear in Appendix.



Appendix Figure 1. Weekly Covid-19 Cases by County March 1 – July 26 (Note: Typically, data would be displayed through the week ending August 2; however, the reemergence of a sizable reporting lag makes data from the most recent week unreliable).