Covid-19 Disease Outbreak Outlook
Arizona State and Pima County
Updated July 24, 2020

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For the week ending July 19th, 10684 new Covid-19 cases were reported in Arizona (Figure 1). However, this tally likely undercounts the actual number of new cases owing to persistent reporting delays for PCR results. For example, last week's tally has been upwardly revised from 15160 to 22721 cases this week, a 50% increase. Even with backfill, the most of the 17% improvement from July 5th to July 12th is likely to stand.

However, the magnitude of the current declines should be viewed cautiously as the number of PCR tests being conducted have been stable or declining for the past two weeks instead of increasing by 15 – 35% as they had been. It is unclear how much of this change is attributable to shortages of critical supplies or personnel (supply side) versus fewer patients seeking care (demand side).

While testing results for this past week are still incomplete, the percent of patients testing positive has declined from a peak of 23% the week ending July 5th to 17% the week ending July 19 (Figure 2 following page). A declining test positive percentage in the face of declining testing capacity lends additional evidence that viral transmission is in fact slowing. The seroprevalence percentage increased to 10.5% the week ending July 19th.

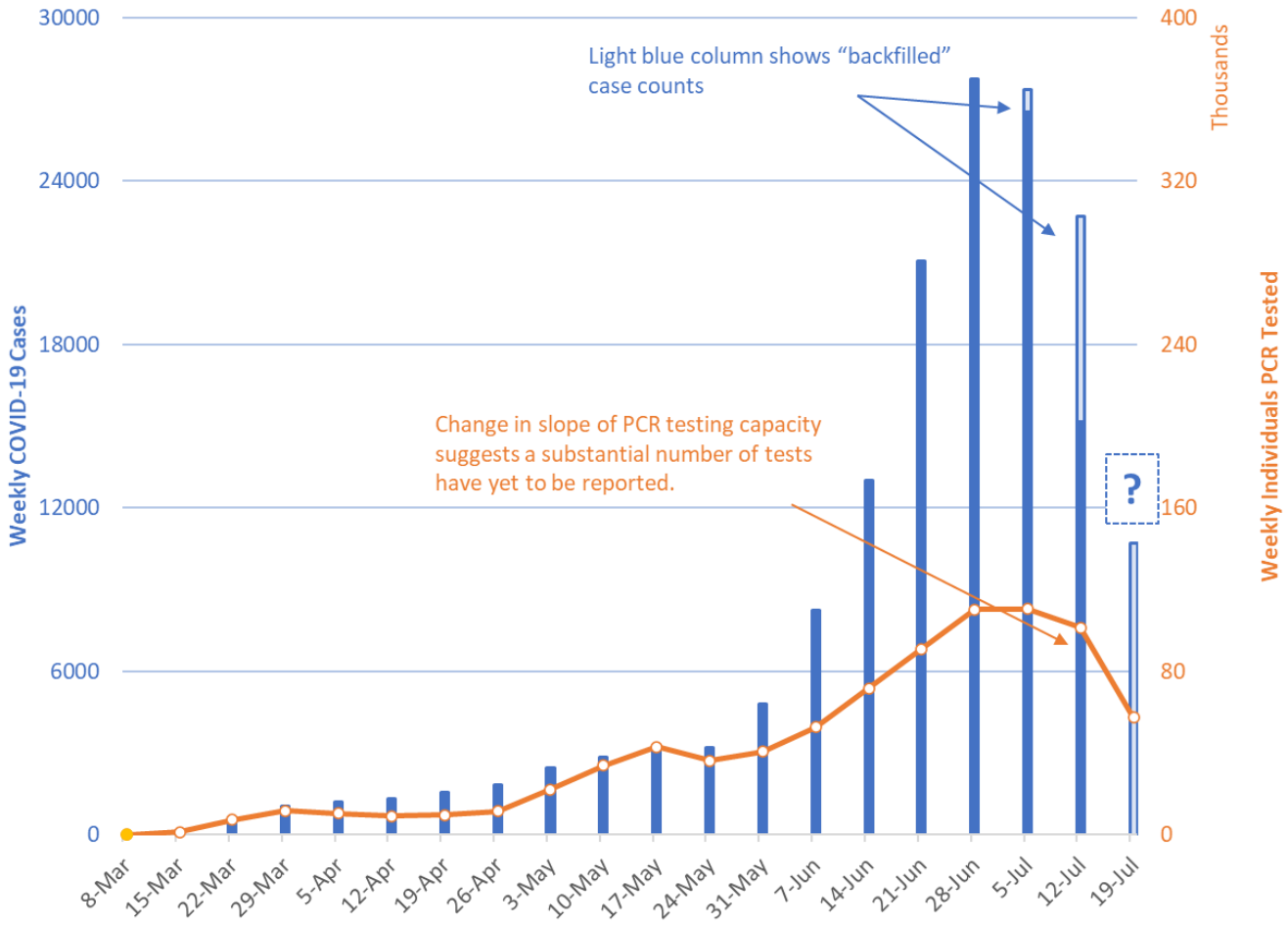

Figure 1. Newly Diagnosed Covid-19 Cases in Arizona and Number of Individuals Undergoing PCR Testing March 1 through July 19.

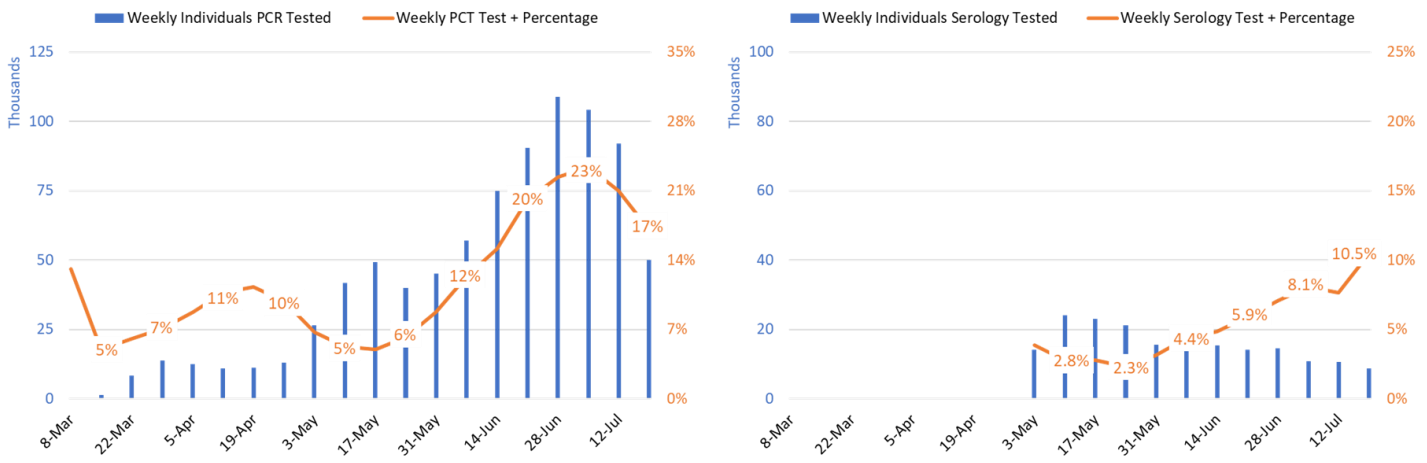

Figure 2. Weekly Number Patients Tested and Percent of Individuals with Positive Covid-19 PCR and Serology Results March 1 - July 19

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 12th, it was 22 days. Because testing lag artificially lengthens doubling time, I am not displaying new case data through July 19th as I normally would. Despite backfilled data, the doubling time for cases is lengthening indicating generally improving conditions.

The doubling time for cumulative deaths has shortened from a high-water mark of 42 days on June 5th to a trough of 29 days on July 1st. As of July 5th, it was 31 days. During this period, trends in deaths lagged changes in case counts by approximately 10 - 11 days. If this holds, the pace of new deaths should begin to moderate providing additional evidence that the improving trends in case counts are real.

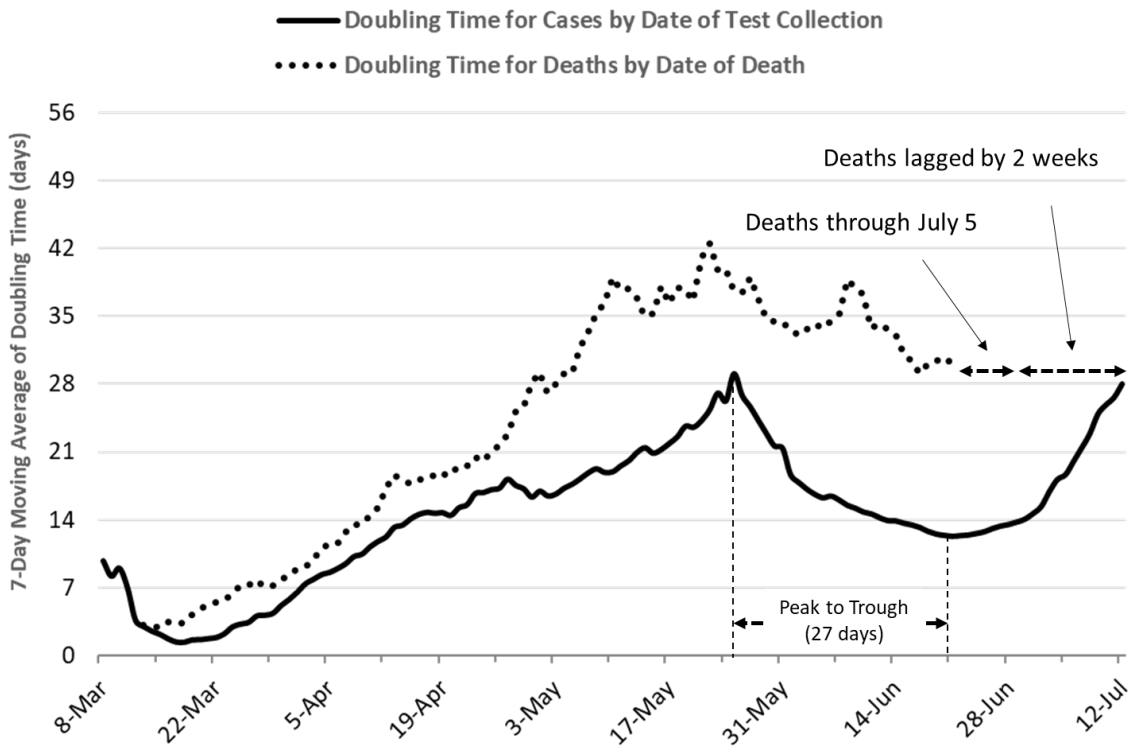

Figure 3. 7-Day Moving Average of Doubling Time of Cumulative Cases through July 12 Superimposed on Lagged (2-week) Doubling Time of Cumulative Deaths through July 5.

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.

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 13% from 4132 to 3600 occupied beds. Hospitals should continue to experience declining Covid-19 occupancy over the coming weeks.

As of July 24, 2758 (35%) of Arizona's 7902 general ward beds were occupied by patients with suspected or confirmed Covid-19 infection, a 15% decline from last week. An additional 1266 (16%) beds remain available which is higher than last week's 1100 beds. Similarly, 842 (50%) of Arizona's 1699 ICU beds were occupied for Covid-19 care, a 6% decrease from last week. An additional 243 beds (14%) beds remain available which is higher than last week's 189 beds.

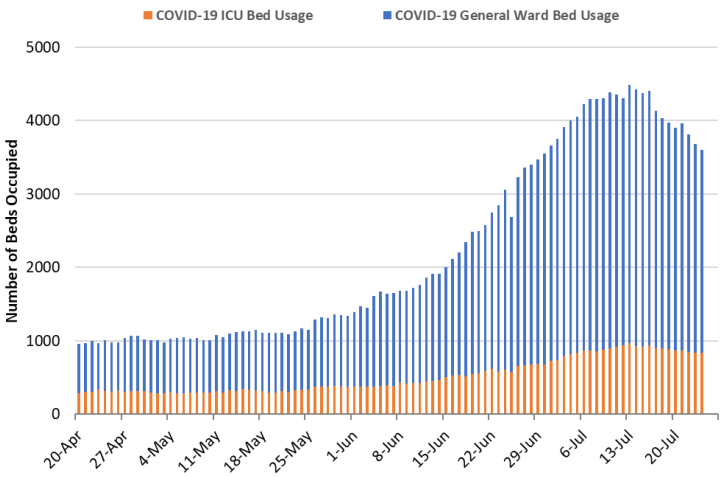

Figure 4. Arizona Daily Covid-19 General Ward and ICU Census April 20 – July 24.

Now that Covid-19 hospital occupancy is declining, Arizona will not exceed its listed capacity of non-surge general ward or ICU beds in the near future unless recent 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.

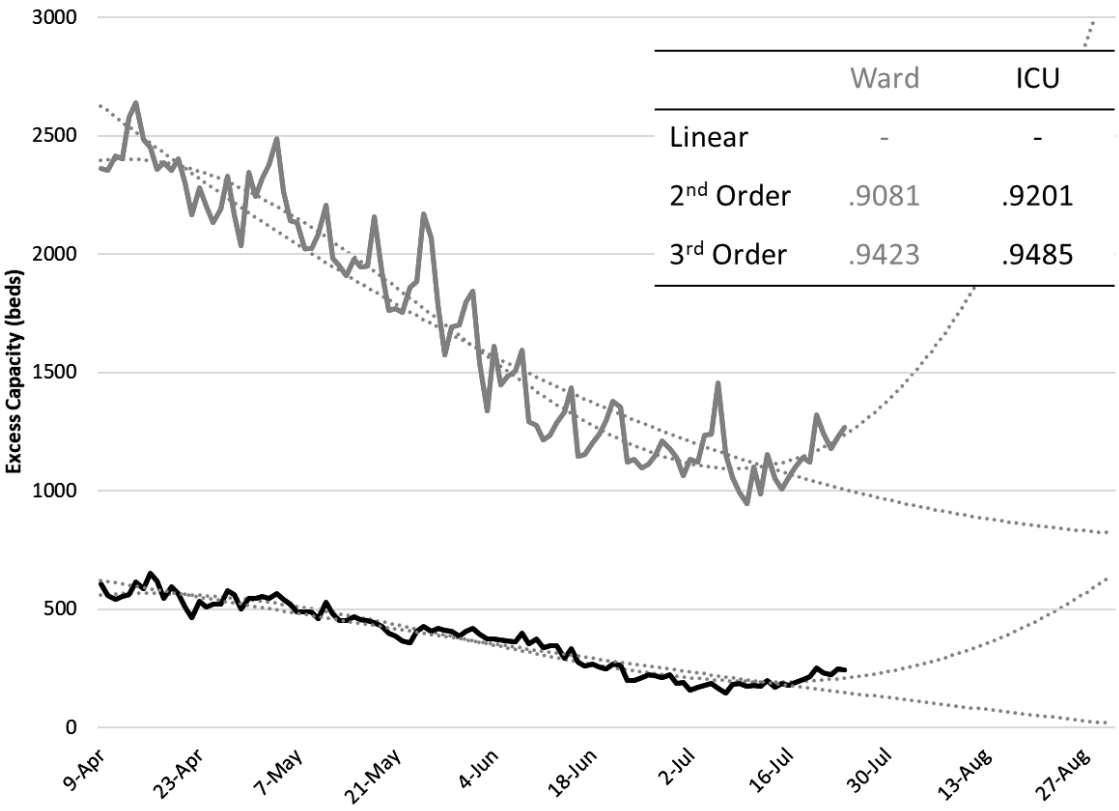

Figure 5. Observed and Projected Excess Non-Surge General Ward and ICU Capacity Apr 20 – Aug 31.

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With 451 deaths reported to date, the week ending July 12th is now the week with the largest number of Covid-19 deaths eclipsing the 408 deaths the week ending July 5th (Figure 6). However, 284 deaths have already been reported for the week ending July 19th suggesting it may set a record once additional deaths are reported next week.

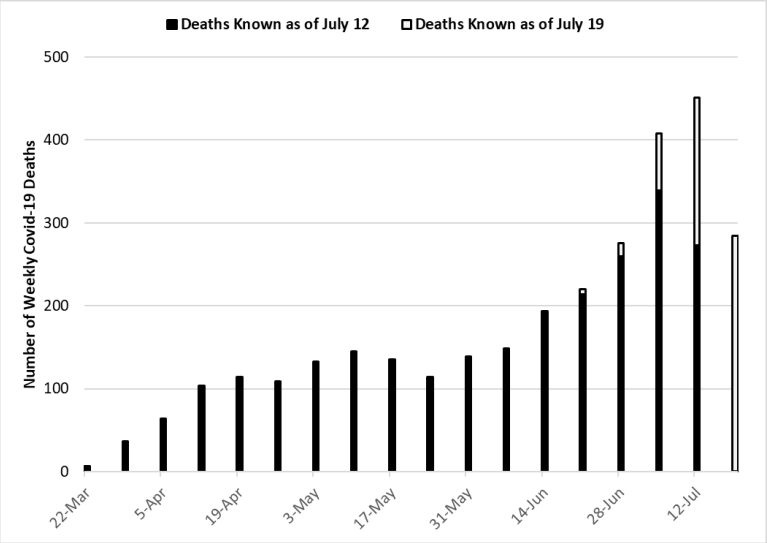

Figure 6. Weekly Arizona Covid-19 Deaths March 1 – July 12 by Date of Death

Pima County Outlook

For the week ending July 19th, 884 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 1228 cases was revised to 1787 cases this week, a 46% increase (Figure 7).

Nevertheless, the week-to-week increase from June 28 to July 5 was 2257 to 2382 was smaller than the previous weeks' increase providing evidence that the pace of new case counts is slowing. Given that Pima County and Tucson instituted face mask ordinances quickly after being permitted to on June 17th, it supports their important role in our public health response.

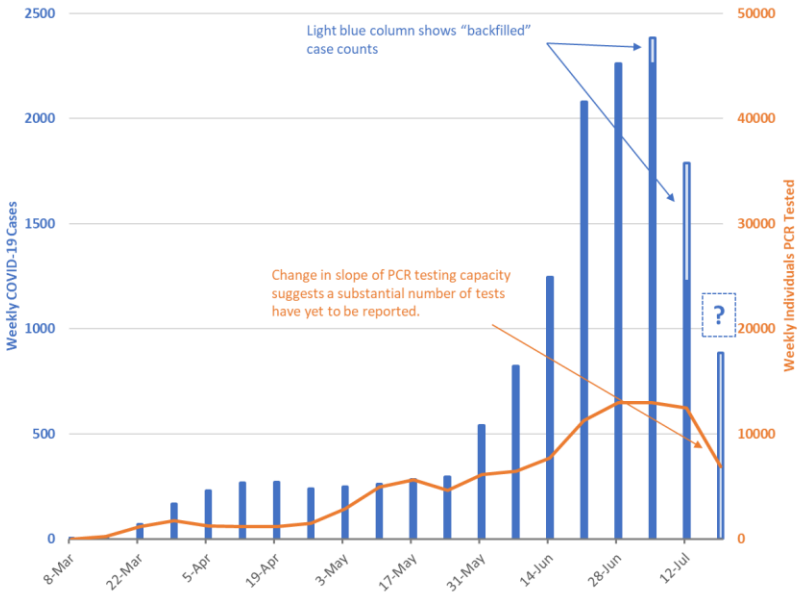

Figure 7. Newly Diagnosed Covid-19 Cases in Pima County and Individuals PCR Tested through July 19.

Summary:

- Compelling evidence indicates the pace of viral transmission has appreciably slowed over the past weeks indicating that recent mitigation efforts are working. If true, deaths should moderate within the next week or so. Nevertheless, Covid-19 remains widespread in Arizona.
    - Reporting lag for PCR results and stalled increases testing capacity still complicate efforts to precisely gauge changes in viral transmission; reporting delays also make it difficult to conduct timely case identification, contact tracing, and isolation.
    - Absolute levels of community-driven viral transmission remain high as compared to historical levels as evidenced by large numbers of weekly Covid-19 cases.

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    - For most locales, government-mandated social distancing restrictions and mask-wearing will be needed for the foreseeable future to relieve overcrowded hospitals.

- 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 over 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.
- Current Covid-19 test capacity is inadequate to meet both clinical and public health demands as the test positive percentage is 17%, 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 July 31.

County data follows in the Appendix.

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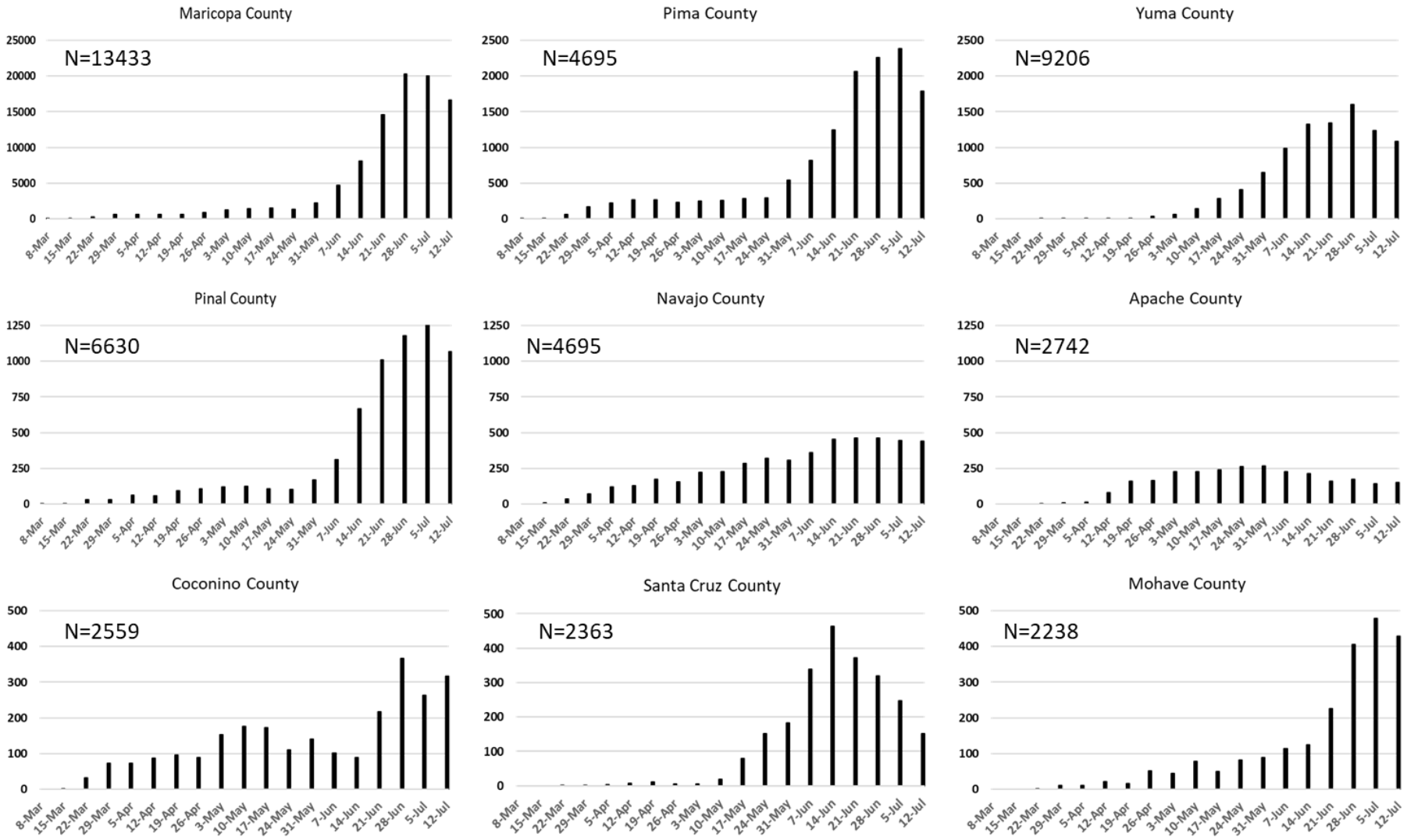

Appendix Figure 1. Weekly Covid-19 Cases by County March 1 – July 12 (Note: Typically, data would be displayed through the week ending July 19; however, the reemergence of a sizable reporting lag makes data from the most recent week unreliable).

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