

COVID-19 Disease Outbreak Outlook

Arizona State and Pima County

Updated April 28, 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.

As of April 28th, 6948 COVID-19 cases and 293 deaths have been reported on the Arizona Department of Health Services (ADHS) [website](#). When case counts through April 19th are aggregated by week and test collection date, newly reported cases have yet to peak (Figure 1). Complete data for the week ending Sunday, April 26th will not be available until Friday, May 1st. To more consistently account for this 5-day lag, future updates will be released only on Fridays. The number of daily tests being performed has been trending upwards since mid-April with the percent reported positive continuing to rise (Figure 2). Testing still appears to fall short of that needed to meet clinical and surveillance demands.

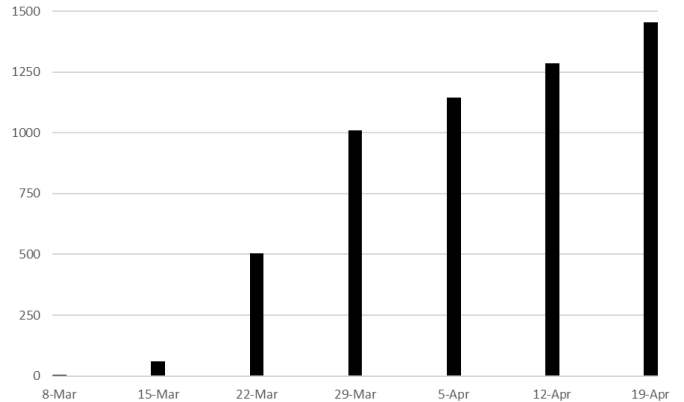


Figure 1. Weekly Arizona COVID-19 Cases through April 19 Presented by Test Collection Date.

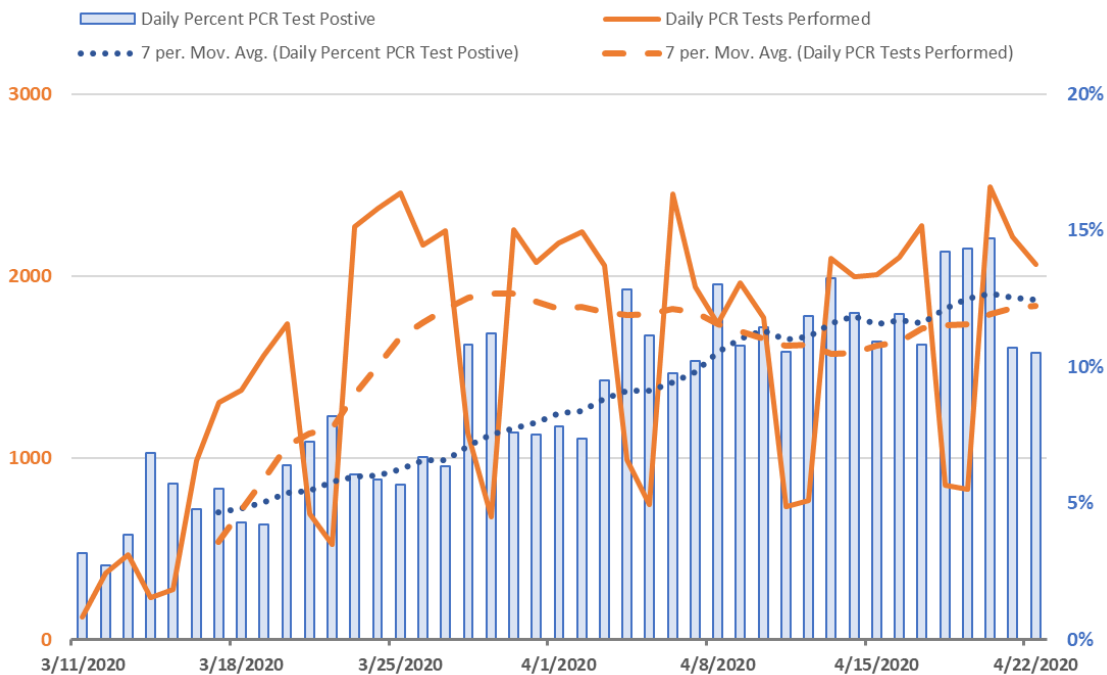


Figure 2. Daily Number of COVID-19 PCR Tests and Percent of Positive Tests March 11 – April 22.

Table 1. Arizona COVID-19 Reported Cases by Date of Test Collection, April 13 – Apr 22.

	Apr 13	Apr 14	Apr 15	Apr 16	Apr 17	Apr 18	Apr 19	Apr 20	Apr 21	Apr 22
Total Reported Cases	4285	4524	4747	4993	5221	5352	5466	5815	6082	6310
Newly Reported Cases	273	239	223	246	228	131	114	349	267	228
Doubling Time (days)*	13.21	13.52	14.13	14.75	15.21	15.35	15.46	15.67	16.18	16.83

*7-day moving average of doubling time based on day-to-day increases in cumulative cases. Because reporting lag spans more than a week, counts in newer updates will not match past updates.

Update from Publicly Available Forecast Models

On April 27, the IHME made another minor revision to their [estimates](#). The date of peak hospitalization is now predicted to peak on May 1st versus April 22nd on the previous update (Figure 3). Similarly, ICU utilization is predicted to now peak on May 1st versus April 21st (Figure 4). Peak hospital usage increased to 539 beds up from 439 beds previously and peak ICU utilization increased to 159 beds up from 125 beds previously. These changes were driven by refitting the prediction curve to account for a greater number of observed deaths. Since all model parameters are driven by this, all were upwardly revised including total deaths by August 4th, 793 up from 583 previously.

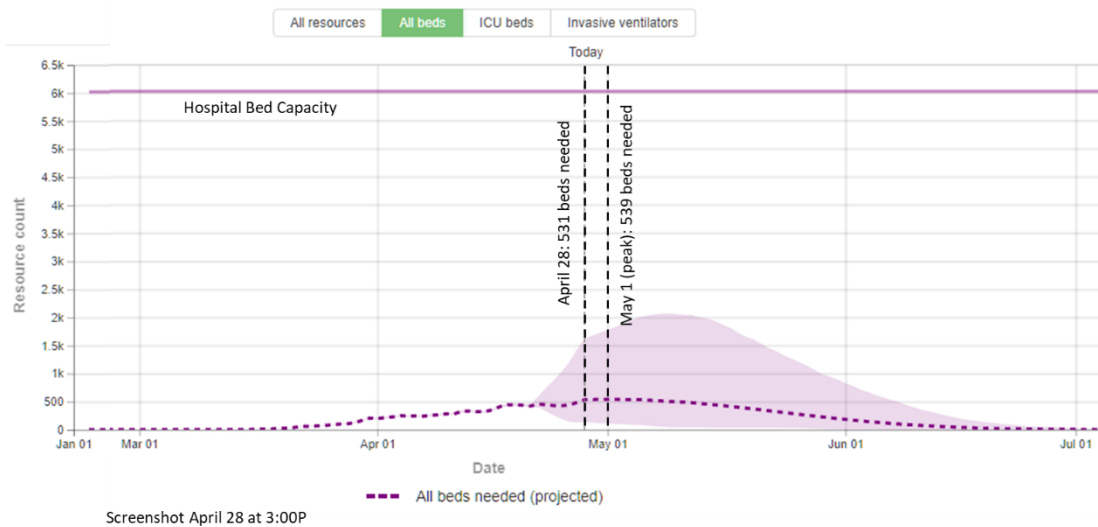


Figure 3. IHME Estimated COVID-19 Hospitalizations and Capacity (from <https://covid19.healthdata.org>).

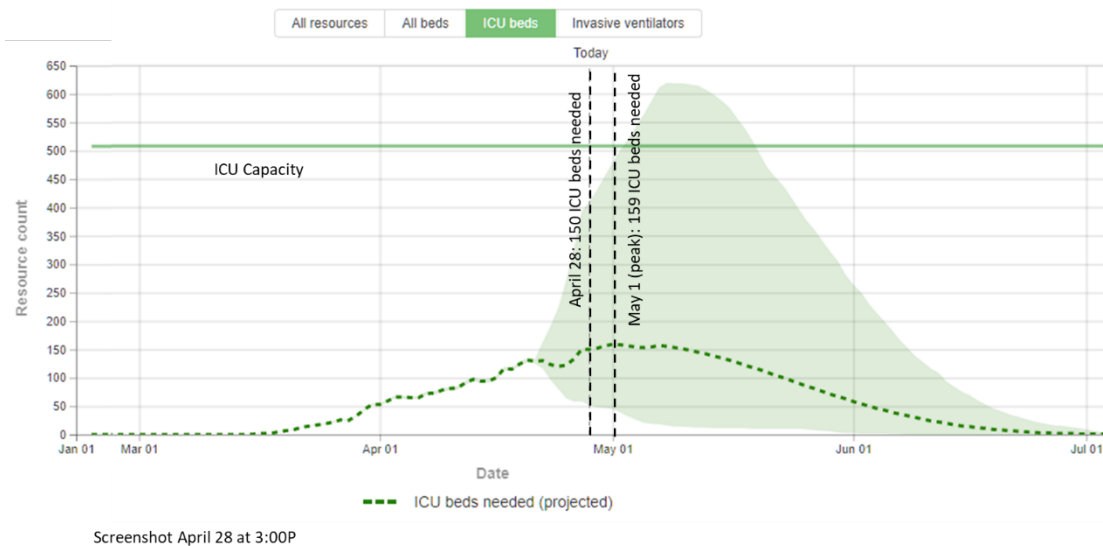


Figure 4. IHME Estimated COVID-19 ICU Utilization and Capacity (from <https://covid19.healthdata.org>).

According to the [University of Texas COVID-19 Modeling Consortium](#) model, the probability that Arizona has passed the peak in reported deaths increased to 84% from 62% previously. However, like the IHME model, these projections likely overestimate precision. This is due to reporting lags that may accentuate variation in day-to-day deaths. For example, both the IHME and UT model use the daily number of announced deaths on the ADHS website; however, the date the deaths are announced is rarely the day they actually occurred (Figure 5, Table 2) owing to reporting lag. Basically, there is a trade-off between using “real-time” data versus using data that may be more accurate, but older.

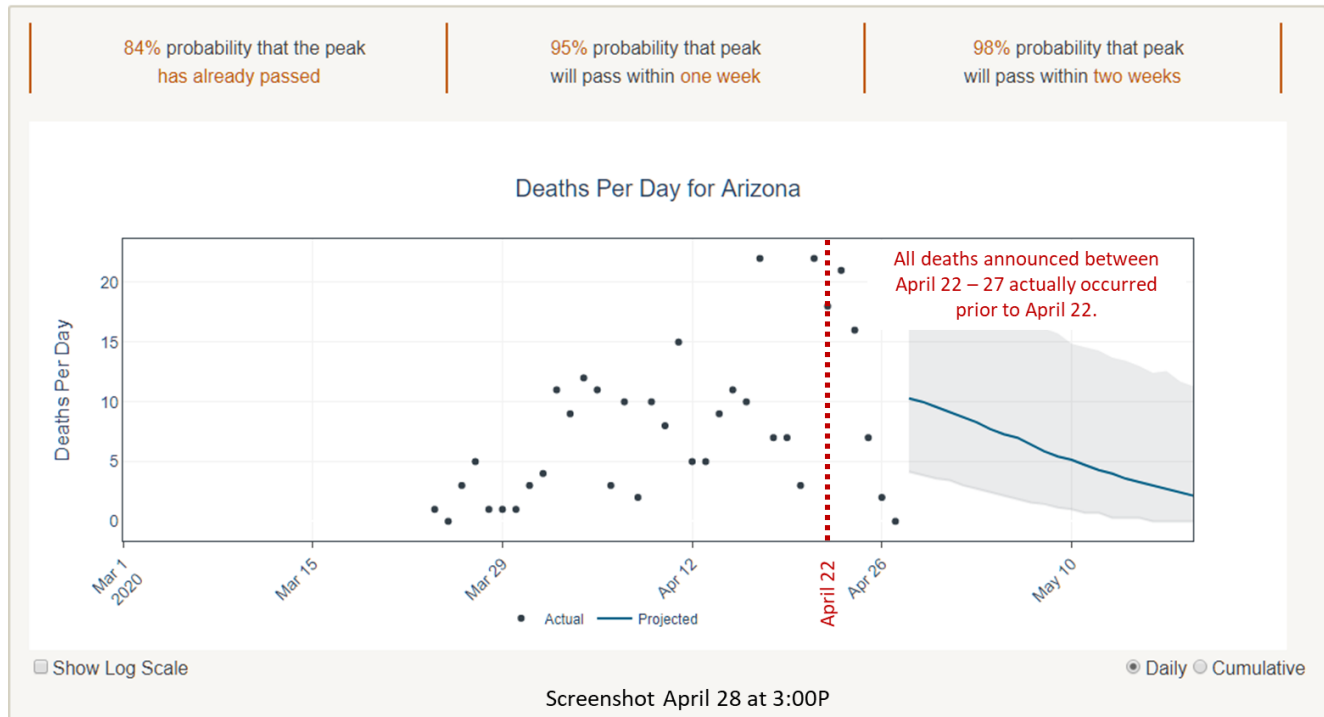


Figure 5. Projected Arizona COVID-19 Deaths from the University of Texas COVID-19 Modeling Consortium

As of April 28th, 293 deaths have been announced (Table 2). What is most noticeable, is 3 consecutive days with 20 or more announced deaths, April 20 - 22. However, few of these announced deaths actually occurred during that 3-day period. In fact, most occurred some days in the past. We won't truly know what happened on April 20 – 22 until some 10 – 15 days have passed. This reporting lag makes it difficult to interpret these data in real-time or to use them to predict the future.

Table 2. Arizona COVID-19 Deaths by Date of Announcement for April 13 – 22.

	Apr 18	Apr 19	Apr 20	Apr 21	Apr 22	Apr 23	Apr 24	Apr 25	Apr 26	Apr 27
Announced Deaths	184	187	208	229	249	266	273	275	275	293
Daily Announced Deaths	7	3	21	20	20	17	7	2	0	18
Daily Deaths by Date	7	10	6	-	-	-	-	-	-	-
Doubling Time (days)*	10.0	11.0	10.2	9.8	9.2	10.4	10.9	11.7	12.2	13.8

*7-day moving average of doubling time based on day-to-day increases in cumulative deaths.

Pima County

As of April 28, 1188 COVID-19 cases have been reported on the ADHS website for Pima County (Table 3). General trends follow those of Arizona as a whole. Based on aggregated weekly case counts based on the time of test collection also indicate that new case counts continue to increase (Figure 6).

Table 3. Pima County COVID-19 Cases by Date of Test Collection for April 13 – Apr 22.

	Apr 13	Apr 14	Apr 15	Apr 16	Apr 17	Apr 18	Apr 19	Apr 20	Apr 21	Apr 22
Total Reported Cases	787	833	873	919	972	985	1000	1046	1069	1108
Newly Reported Cases	58	46	40	66	33	13	15	46	23	39
Doubling Time (days)*	11.6	11.9	12.4	12.2	13.9	14.3	15.1	16.8	19.2	20.1

*7-day moving average of doubling time based on day-to-day increase in cumulatives cases. Because reporting lag spans more than a week, counts in newer updates will not match past updates.

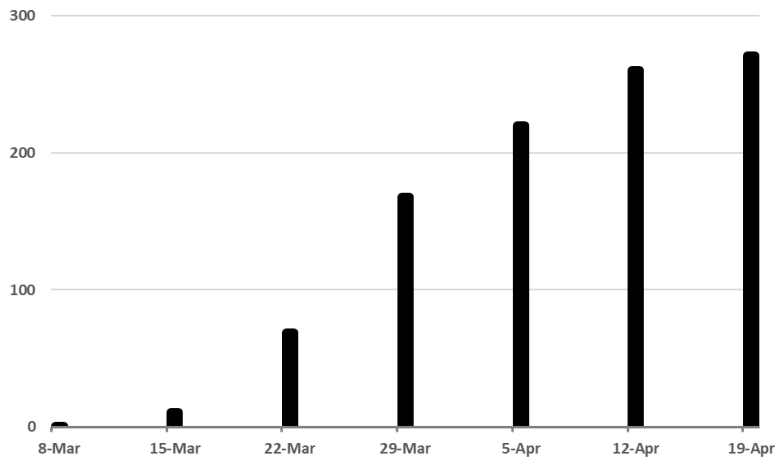


Figure 6. Weekly Pima County COVID-19 Cases through April 19 Presented by Test Collection Date.

Summary:

- Social distancing has slowed / continues to slow viral transmission; however, reported cases, hospitalizations, or ICU utilizations have yet to clearly peak.
 - Community-driven viral transmission remains high as evidenced by substantial numbers of newly reported cases. Accordingly, maintaining or increasing social distancing should remain our highest priority or we risk a resurgence fueled by these active cases.
 - Lifting social distancing restrictions when the April 30 stay-at-home order expires poses a substantial risk of reigniting faster growth.
 - While current social distancing restrictions may be sufficient to prevent exponential growth, they may not be enough to extinguish viral transmission.
- COVID-19 testing (Figure 2, Page 1 above) remains constrained. The lack of testing for both clinical diagnosis and public health surveillance is another challenge that must be overcome before social distancing restrictions can be safely lifted.

Next update scheduled for May 1 and the each Friday.