

Arizona and COVID-19

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Abstract

Of the United States 50 states, Arizona is the sixth largest in size. It is about the same size as Italy. After six weeks of reopening the state, the COVID-19 cases had spiked. Arizona's state COVID-19 ranking had rose from one of the states with the lowest number of reported cases to the top 7th in the total reported cases. The state took aggressive actions to address the rising cases. This longitudinal study examined the impacts of the actions taken. The study examined the changes in the numbers of new reported COVID-19 cases, the number of cases that required hospitalization, and the number of deaths. The data source used was from the Arizona Department of Health Services COVID-19 dashboard database. During the two-month study period, Arizona aggressive actions had slowed down the overall state rates of new COVID-19 cases and number of deaths.

Keywords: COVID-19, Arizona, Aggressive Action, Longitudinal Study, Arizona and COVID-19

Introduction

The COVID-19 has been spreading rapidly throughout the world and the United States. It is a respiratory disease (attacks primarily the lungs) that spreads by person to person through respiratory droplets (coughs, sneezes, and talks) and contaminated surfaces or objects. On August 22, 2020, Johns Hopkins University reports that there are 23,205,331 total confirmed cases and 804,431 deaths associated with the virus in the world [1]. It appears in 188 countries and regions. During the past week (August 16 through August 22), there has been an increase of 1,744,939 cases. The United States (U.S.) has 24.4 percent of all the reported cases (5,668,105 with 176,362 deaths).

Arizona is the sixth largest in size of the U.S. 50 states (113,990 square miles / 295,233 square kilometers) [2]. It is about the same size as Italy (301,340 square kilometer) [3]. The U.S. Census reports that Arizona population estimate was 7,278,717 on July 1, 2019 [4]. There are 15 counties in the state in which the two of the largest population counties are Maricopa and Pima.

On March 2, 2020, Arizona was one of many states that had the lowest number of COVID-19 cases -- 2 cases and no hospitalization [5]. Since then, Arizona's state COVID-19 ranking had rose to 7th in the total reported cases and 11th in the number of deaths on August 22 [1]. On March 11, the World Health Organization had declared COVID-19 outbreak a pandemic [6]. Soon after, the United States declared the COVID-19 pandemic as a national emergency on March 13 [7].

To address the COVID-19, the United States required a partnership between the federal government and each of the 50 states. The federal government provided the national guidance and needed logistical support (e.g., provide federal supplemental funding, needed medical personnel and resources, and other needed assistance), while the states decided on what actions to take and when to carry out those actions. These were the *Executive Orders* issued by Arizona's Governor Ducey to address the rise of COVID-19 in the state:

- March 30 (196 new cases) – the Governor issued a Stay-at-Home Executive Order that was in effect from March 31 to April 30.
- April 29 (393 new cases) – the Governor extended his Stay-at-Home Executive Order until May 15.
- May 12 (488 new cases) – the Governor confirmed that his Stay-at-Home *Executive Order* would end on May 15 and began the state reopening.
- June 29 (5,486 new cases) – the Governor issued a new Executive Order that would address the COVID-19 outbreaks that delayed the opening of bars, gyms, and theaters and prohibited large gathering until July 27.
- July 23 (1,743 new cases) – the Governor extended his June

29 Executive Order for another 2 weeks until August 10 and would review at that time whether to extend it for another two weeks.

- August 10 (921 new cases) – the Governor continued the state reopening, laid out plans for the next reopening phase, and established reopening health benchmarks (e.g., for bars, gyms, and schools).

During Governor Ducey’s *Stay-at-Home Executive Orders* (March 31 to May 15), Arizona residents had to stay at home except for going out for essential services (e.g., grocery stores, pharmacies, doctor offices and gas stations) and working at approved essential service settings. The state encouraged the practicing physical and social distancing such as avoid close person to person contact by maintaining a distance of at least 6 feet and avoid crowds of people; not touching ones nose, mouth, and eyes with uncleaned hands; and washing hands frequently with soap and water or using hand sanitizers. Potentially contaminated surfaces or objects needed to be cleaned and disinfected often. One needed to avoid contact with individuals who have the virus.

The state encouraged individuals with the highest risks (65-year-old or older who has more than one serious underlying medical conditions such as chronic lung disease, cardiovascular disease, cancer, and diabetes, has immunocompromised conditions, and/or takes immunosuppressive drugs) to stay home until the coronavirus crisis is over – unless they need go out for essential services. Those under 65-year-old with more than one of the above medical conditions and who are sick were also encouraged to stay home.

In addition to the above preventive measures, several action steps were taken to address the spiking of the COVID-19 cases in Arizona (June 10 – first time exceeded 2,000 cases – 2,074). Governor Ducey had issued Executive Orders that would reduce COVID-19 outbreaks by delaying the opening of some businesses, limiting the business occupancy numbers, prohibiting large gathering, delaying the first day of school for in-person learning, and allowing counties to issue their own preventative measures (e.g., face covering requirement). Several counties implemented their own preventative measures such as Pima County required the wearing of face covering when in public if 6 feet of physical

distancing cannot be maintained for anyone who is over the age of 5. The Arizona health care system built up its medical capacity (e.g., hospitals added more medical personnel and created more bed capacity). Many retail businesses required face covering inside their stores.

The remainder of the paper described the impact of the above actions on the virus in Arizona during (June 29 to August 22, 2020). June 29 was the date that Governor Ducey issued the Executive Order that addressed the state’s spiking of COVID-19 cases.

Methods

This was a longitudinal study. The data source for this study was from the Arizona Department of Health Services (the state health department) COVID-19 dashboard database. This study examined the changes in the numbers of new reported COVID-19 cases, the number of cases by age groups, the number of cases hospitalized by age groups, and the number of deaths by age groups. These variables were monitored for a two-month period.

There were several data limitations. The COVID-19 case numbers represented the numbers of positive tests reported. The cases reported did not separate out those who had newly acquired the virus from those who no longer had active virus. More than one test may be given to the same person (e.g., during hospitalization and at work) – possible individual case duplications. There were delays in the data submitted daily to the state health department that caused fluctuations in the number of cases, hospitalizations, and deaths reported. The state health department continued to adjust the reported numbers that may take more than a month to correct the numbers. The deaths associated with the coronavirus may be caused by more than one serious underlying medical conditions, and the virus may not be the primary cause of death.

Results

Table 1 tracks the total and weekly numbers of COVID-19 cases, cases hospitalized, and deaths during the two-month period. There were increases in the numbers of cases – 123,362, hospitalization – 16,637, and deaths – 3,168 during the study period. The largest weekly cases occurred during June 28 to July 4 and hospitalizations occurred during August 2 to August 8. The week of July 12 to July 18 had the largest numbers of deaths.

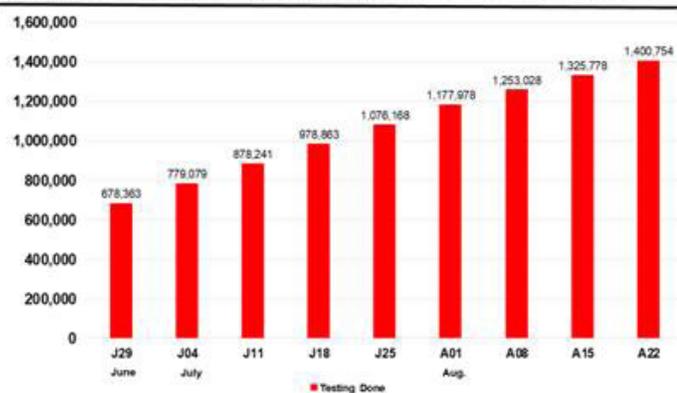
Table 1: Arizona Total and Weekly Numbers of COVID-19 Cases, Hospitalizations, and Deaths

Week	Total Cases	Wk. Case	Total Hospital	Wk. Hospital	Total Deaths	Wk. Deaths
6-28 to 7-4	98,337	23,804	5,097	463	1,785	197
7-5 to 7-11	121,845	23,756	6,045	884	2,219	410
7-12 to 7-18	141,265	21,335	6,567	817	2,730	579
7-19 to 7-25	160,041	18,776	7,627	1,060	3,286	556
7-26 to 8-1	177,002	16,961	11,346	3,719	3,747	461
8-2 to 8-8	186,107	9,105	19,244	7,898	4,137	390
8-9 to 8-15	192,654	6,547	20,795	1,551	4,492	355
8-16 to 8-22	197,895	5,241	21,271	476	4,756	264

Source: Arizona Department of Health Services Coronavirus Database. Wk. = Weekly

During the two-month period, the number of COVID-19 tests done in Arizona had increased by 722,391 (see Figure 1) and reached a high of 1,400,754 total tests done as of August 22 and of these 11.8% were tested positive. Arizona implemented an aggressive testing program following the cases had reached a daily high of 5,486 on June 29. Several new testing locations were established throughout the state. Unlike, the early testing restrictions limited to individuals who exhibited the coronavirus symptoms, to first responders and medical personnel, and to those recommended to get tested by the Centers for Disease Control and Prevention (CDC) Self-Checker, the testing was available to anyone who wanted to get tested.

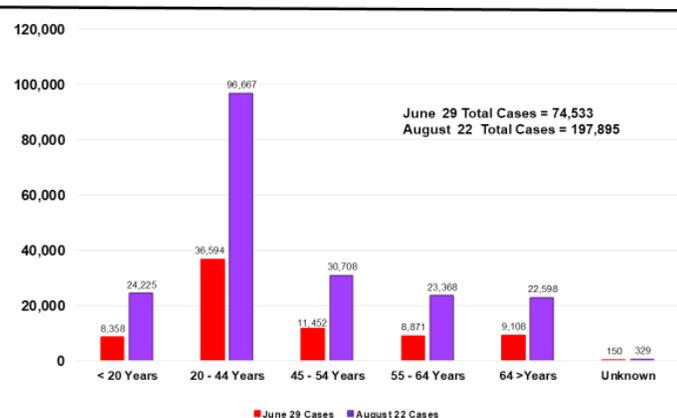
Figure 1. Arizona COVID-19 Testing: June 29 to August 22, 2020



Sources: Arizona Department of Health Services: June 29, to August 22, 2020 COVID-19 Testing Done Statistics. June 29 – 678,363 total tests done with 9.6% tested positive and August 22 – 1,400,754 total tests with 11.8% tested positive.

There were 74,533 COVID-19 cases on June 29 and 197,895 cases on August 22. This was an increase of 123,362 during the two-month period. A case could be mild (no symptoms), moderate (sick, but can recover at home), and severe (require hospitalization and/or result in death). Most people recovered and did not require hospitalization. The 20-44 years age group had the largest number of cases and had an increase of 60,073 during June 29 to August 22. Figure 2 compares the numbers of COVID-19 cases by age groups on June 29 and August 22.

Figure 2. Arizona COVID-19 Cases by Age on June 29 and August 22, 2020

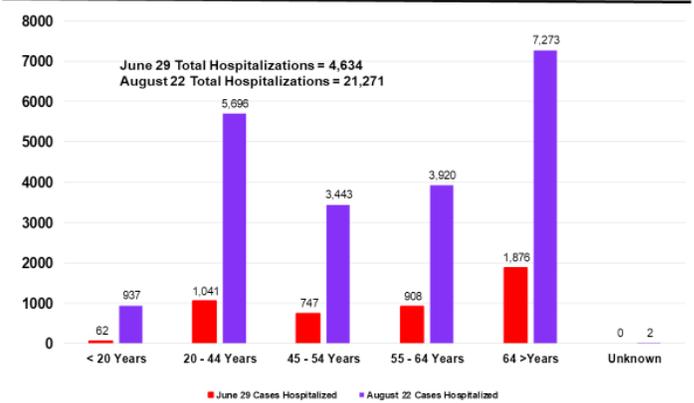


Sources: Arizona Department of Health Services: June 29 and August 22, 2020 COVID-19 Cases by Age Group Statistics

The percent of total cases that were hospitalized (severe cases) on June 29 was 6% and on August 22 was 11%. The cases hospitalized

had increased from 4,634 to 21,271. As expected, seniors had the highest numbers of the hospitalizations and those under 20 years of age had the lowest numbers. Figure 3 shows the hospitalization numbers for each age group with the virus on June 29 and August 22.

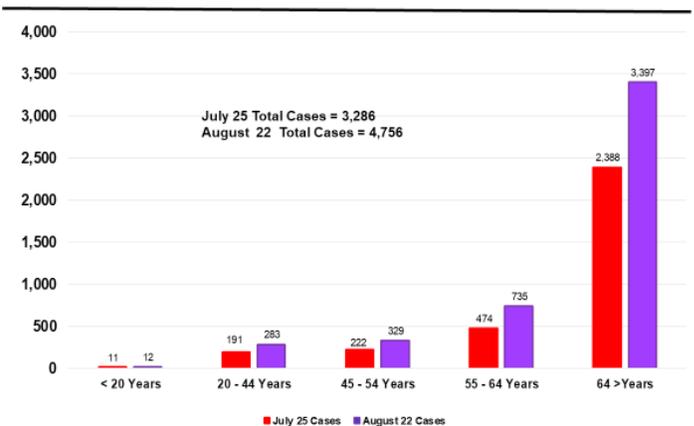
Figure 3. Arizona COVID-19 Cases Hospitalized by Age Group on June 29 and August 22, 2020



Sources: Arizona Department of Health Services: June 29 and August 22, 2020 COVID-19 Cases Hospitalized Statistics

The numbers of deaths had increased from 1,588 on June 29 to 4,756 on August 22. The rates of death per 100,000 population (1,036.8 to 2,752.7) and rates of fatalities per 100,000 population (22.09 to 66.16) also increased. As expected, seniors had the highest numbers of deaths and those under 20 years of age had both the lowest numbers. Figure 4 shows the death numbers for each age group with the virus on July 25 and August 22.

Figure 4. Arizona COVID-19 Deaths by Age on July 25 and August 22, 2020



Sources: Arizona Department of Health Services: July 25 and August 22, 2020 COVID-19 Deaths by Age Group Statistics

Discussion

During the two-month study, there were increases in the numbers of COVID-19 cases and deaths in Arizona. On March 2, 2020, Arizona was one of the states with the lowest number of cases of coronavirus and no deaths. Since then, Arizona's state coronavirus ranking had rose to 7th in the total COVID-19 reported cases and 11th in the number of deaths on August 22 [1].

Many factors had contributed to the increases. These were the results of aggressive COVID-19 testing (more 1.4 million), the

state reopening, and individuals who did not adhere to social distancing and other preventative measures. The exposure to large crowds during Memorial Day, the Fourth of July celebrations, and the George Floyd's protests and the riots that followed. The weekly hospitalization numbers had begun to decrease during the past two weeks, while the numbers of cases and deaths had been decreasing during the past five weeks that may be an indication that Arizona hospitals were becoming more successful in treating coronavirus patients. The most important health outcome trend indicator was the number of weekly deaths.

Conclusion

Arizona aggressive actions had slowed down the overall state rates of new COVID-19 cases and number of deaths. These trends were seen during the two-month study period. As the state continued to reopen (e.g., more businesses are opening, the business occupancy number restrictions are lifted, and schools and universities are reopened), the state downward trends may change.

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