

## Arizona Reopening Phase 3 and COVID-19: Returning to Normal

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### Abstract

Arizona is about the same size as Italy, and the sixth largest in size of the United States 50 states. The state's Reopening Phase 3 began on March 5, 2021. There were declines in the weekly COVID-19 cases from March through June. In July and August, the cases rose as the Delta variant spread throughout the United States. Arizona had passed one million case milestone. This six-month longitudinal study examined the changes in the numbers of vaccinations given, new COVID-19 cases, hospitalized cases, deaths, testing given, and the weekly positive percentages during Reopening Phase 3. The data source used was from the Arizona Department of Health Services COVID-19 dashboard database. Even with the case surges, the new normal was low number of severe cases, manageable hospitalization numbers, and very low number of deaths.

**Keywords:** COVID-19, Arizona Returning to Normal, Longitudinal Study, Arizona, COVID-19.

### Introduction

COVID-19 (coronavirus) 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 September 2, 2021, Johns Hopkins University [1] reports that there are 219,017,517 total COVID-19 cases and 4,541,048 deaths associated with the virus in the world. The United States has the highest total cases (39,549,299) and deaths (643,669) in the world [1].

The world combats the virus with vaccines and therapeutics as well as encourages the public to practice health behaviors that reduces the risks of getting respiratory infections (e.g., coronavirus, flu, and cold). The behaviors include, but not limited to, practicing physical and social distancing, washing hands frequently and thoroughly, and wearing face masks. Johns Hopkins reports that more than 5.37 billion vaccine doses have been administered in the world (September 2) [1]. The United States (U.S.) is ranked third in the world in vaccine doses administered-370,955,041 following China and India [1].

Of the 50 U.S. states, Arizona is ranked 13<sup>th</sup> in total COVID-19 cases (1,005,764) and 11<sup>th</sup> in total deaths (18,779) on August 28 [1]. During Arizona's Reopening Phase 2 winter surge, ABC and NBC News report that the state has the highest new cases per capital in the world [2,3]. Arizona is the sixth largest in size (113,990 square miles/ 295,233 square kilometers) of the U.S. 50 states [4]. It is about the same size as Italy (301,340 square kilometer) [5]. The

state population estimate is 7,294,587 on July 1, 2020 [6].

The United States requires a partnership between the federal government and each of the 50 states to address the COVID-19 pandemic [7]. The federal government provides 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 decide on what actions to take and when to carry out those actions; the state COVID-19 restrictions; and when to carry out each reopening phase; and the state vaccination plan.

On March 5, 2021, Arizona Governor Douglas Ducey begin Reopening Phase 3 after the state had administered more than two million vaccine doses and several weeks of declining cases [8]. This begins the next phase of easing of COVID-19 restrictions. As more people are vaccinated and those infected recovered and have immunity against the virus; the numbers of cases, hospitalizations, and deaths will be low; COVID-19 will be manageable; and the state will be able to return to normal.

There are several factors that could reduce the effectiveness of the vaccines. A large percentage of the state population do not get the vaccines. Significant number of persons who receive their first vaccine shot (Pfizer/BioNTech and Moderna) do not to get their second shot. The vaccines are not 100% effective in preventing one from getting the virus; those who are vaccinated can get the virus (breakthrough infections). The vaccines are not effective against the new variants (e.g., Delta) that appear in the state. A

large influx of infected and/or unvaccinated people moves into the state. A significant number of the state population do not adhere to preventive recommendations before the state reaches herd immunity.

To get back to normal, the state needs to reach high enough population immunity to reduce the ease of the virus transmission and to overcome the above factors. The remainder of the paper examined Arizona Reopening Phase 3 (March 5 to August 28, 2021) looking at changes in the number new COVID-19 cases, hospitalizations, and deaths.

### Methods

This was a six-month longitudinal study. It examined the changes in the numbers of vaccines given, new COVID-19 cases, hospitalized cases, deaths, tests given, and the weekly positively percentages. The data source for the study was from the Arizona Department of Health Services (the state health department) COVID-19 dashboard database.

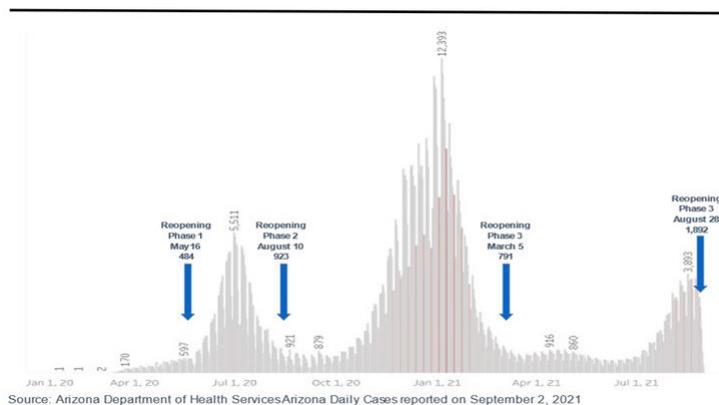
There were several data limitations. The COVID-19 case numbers

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 vaccinations, cases, hospitalizations, deaths, and tests given 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 COVID-19 may be caused by more than one serious underlying medical conditions, and the virus may not be the primary cause of death.

### Results

Unlike Reopening Phase 1 case surge, there was no June surge in the Reopening Phase 3. There was a late summer surge in July and August. Figure 1 shows the Arizona daily COVID-19 cases during January 1, 2020 to August 28, 2021.

**Figure 1:** Arizona Reopening Phases 1-3 COVID-19 Daily Cases: January 1, 2020 to August 28, 2021



Tables 1 and 2 track bi-weekly total and weekly numbers of fully vaccinated persons, COVID-19 cases, hospitalized cases, deaths, testing, and weekly positively percentages during the six-month study. There were increases in the numbers of fully vaccinated persons-2,797,462, cases-180,645, and hospitalizations-13,893

during March 6 to August 28. The largest numbers of fully vaccinated persons occurred in the week of April 17 to 23 (249,755). The last week of Arizona Reopening Phase 3 study period (August 22 to 28) had the largest weekly number of cases (22,989) and hospitalizations (1,613).

**Table 1: Arizona Reopening Phase 3 Bi-Weekly State Total and Weekly Numbers of Fully Vaccinated Persons, COVID-19 Cases, and Hospitalizations: March 6 to August 28, 2021.**

Week	Tot. Vac.	Wk. Vac.	Week	Tot. Cases	Wk. Cases	Tot. Hosp.	Wk. Hosp.
03-06 to 03-12	870,899	159,825	03-07 to 03-13	832,094	6,975	58,323	460
03-20 to 03-26	1,211,279	136,567	03-21 to 03-27	839,334	3,569	58,912	242
04-03 to 04-09	1,615,029	234,599	04-04 to 04-10	849,021	5,183	59,322	230
04-17 to 04-23	2,061,845	249,755	04-18 to 04-24	858,076	5,026	59,933	329
05-01 to 05-07	2,416,859	144,358	05-02 to 05-08	868,382	4,811	60,700	369
05-15 to 05-21	2,698,696	125,779	05-16 to 05-22	876,411	3,915	61,274	246
05-29 to 06-04	2,856,017	96,840	05-30 to 06-05	883,314	2,848	61,885	234
06-12 to 06-18	3,041,625	85,694	06-13 to 06-19	889,342	2,938	62,518	305
06-26 to 07-02	3,155,748	53,413	06-27 to 07-03	896,518	3,807	65,678	261
07-10 to 07-16	3,280,377	87,411	07-11 to 07-17	907,268	6,632	66,185	234
07-24 to 07-30	3,341,364	28,211	07-25 to 07-31	927,235	11,575	67,191	608

08-07 to 08-13	3,407,296	42,218	08-08 to 08-14	962,410	18,995	68,923	906
08-21 to 08-27	3,508,536	101,240	08-22 to 08-28	1,005,764	22,989	71,756	1,613

Source: Arizona Department of Health Services COVID-19 Database.

Arizona 2020 population estimates is 7,294,587.

Key: Tot.: Total; Wk.: Weekly; Vac.: Fully Vaccinated Persons; Hosp.:Hospitalizations

There were increases in the numbers of deaths-2,456 and testing-1,351,275 during the study period. The first week of Arizona Reopening Phase 3 (March 7 to 13) also had the largest weekly number of deaths (223), and the largest weekly numbers

of tests done was August 22 to 28 (106,645). The lowest weekly positively percent occurred in week (May 30 to June 5) at 4% then had increased to 15% high (July 25 to 31).

**Table 2: Arizona Reopening Phase 3 Bi-Weekly State Total and Weekly Numbers of Deaths, COVID- 19 Testing, and Weekly Positivity Percentage: March 7 to August 28, 2021.**

Week	Tot. Deaths	Wk. Deaths	Tot. Testing	Wk. Testing	Weekly Positivity %
03-07 to 03-13	16,546	223	4,363,793	92,368	5%
03-21 to 03-27	16,912	179	4,473,079	51,621	5%
04-04 to 04-10	17,092	101	4,579,217	53,321	5%
04-18 to 04-24	17,260	109	4,683,186	52,696	6%
05-02 to 05-08	17,407	69	4,783,625	50,407	6%
05-16 to 05-22	17,547	78	4,875,651	44,416	5%
05-30 to 06-05	17,698	70	4,962,439	41,133	4%
06-13 to 06-19	17,838	77	5,039,927	38,162	5%
06-27 to 07-03	17,975	61	5,112,574	38,716	7%
07-11 to 07-17	18,114	85	5,180,989	36,486	11%
07-25 to 07-31	18,246	76	5,273,201	51,388	15%
08-08 to 08-14	18,462	86	5,418,375	81,396	12%
08-22 to 08-28	18,779	182	5,622,700	106,645	11%

Source: Arizona Department of Health Services COVID-19 Database.

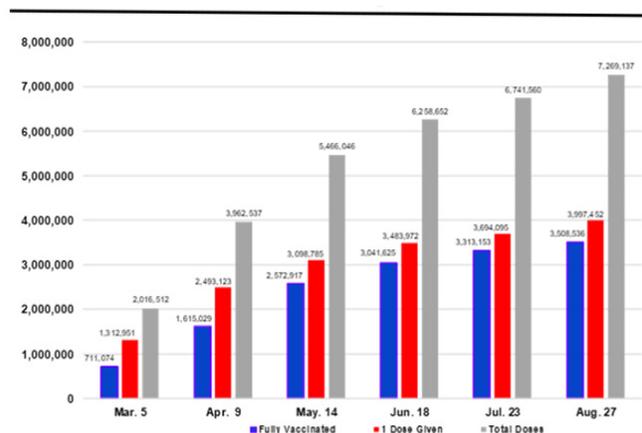
Arizona 2020 population estimates is 7,294,587.

Key: Tot.: Total; Wk.: Weekly.

The first U.S. COVID-19 vaccine, Pfizer/BioNTech, was approved for emergency use authorization on December 11, 2020. In late December, Arizona began to administer vaccines. During Reopening Phase 3 (March 5 to August 27, 2021), there were 5,252,625 vaccine doses were administered, and 2,797,462 who were fully vaccinated against the virus. Three vaccines were available in Arizona (Pfizer/

BioNTech, Moderna, and Johnson & Johnson). The vaccines provide different levels of protection against COVID-19 and its variants. Figure 2 shows the numbers of COVID-19 vaccines that were given in Arizona (total doses given, persons receiving at least 1 dose, and persons fully vaccinated) during Reopening Phase 3.

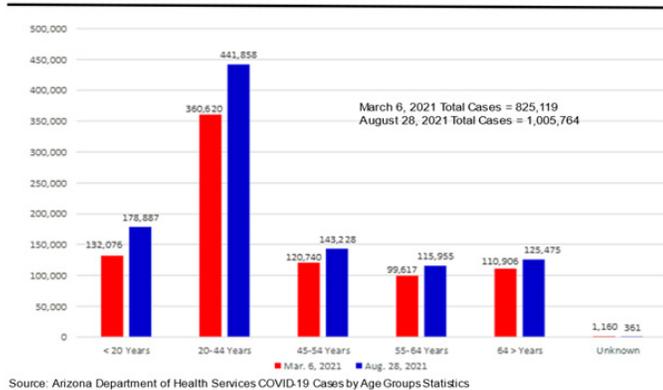
**Figure 2: Arizona Reopening Phase 3 COVID-19 Vaccination Numbers: March 5 to August 27, 2021\*.**



Source: Arizona Department of Health Services Arizona COVID-19 Vaccination Statistics  
\*Dates at six-week intervals.

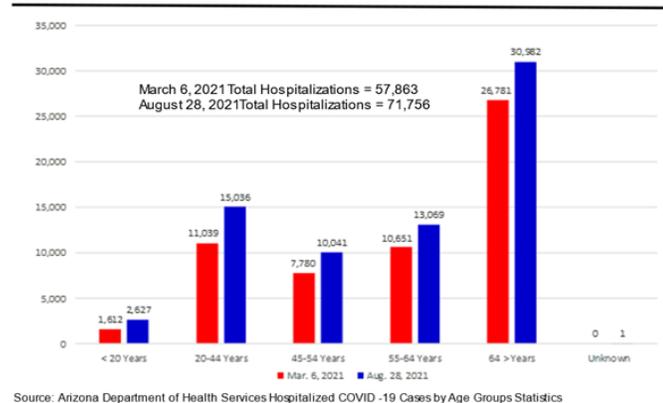
Figure 3 to Figure 5 compare the numbers of COVID-19 cases, hospitalized cases, and deaths by age groups on March 6 and August 28, 2021. A case could be *mild* (no symptoms), *moderate* (sick, but can recover at home), and *severe* (require hospitalization and/or result in death). Most people recovered and did not require hospitalization. There was an increase of 180,645 cases during the study period. The 20-44 years age group had the largest number of cases and had an increase of 81,238 (Figure 3). There were more females (52%) than males (48%) who got the virus.

**Figure 3:** Arizona Reopening Phase 3 COVID-19 Cases by Age Groups on March 6 and August 28, 2021



The percentages of total hospitalized cases (severe cases) were the same on March 6 and August 28 at 7%. The case hospitalizations had increased from 57,863 to 71,756. As expected, seniors had the highest numbers of the hospitalizations (43.2% of total hospitalizations on August 28) and those under 20 years of age had the lowest numbers (3.7% hospitalizations). There were more males (52%) than females (48%) who were hospitalized. Figure 4 shows the hospitalization numbers for each age group with the virus on March 6 and August 28.

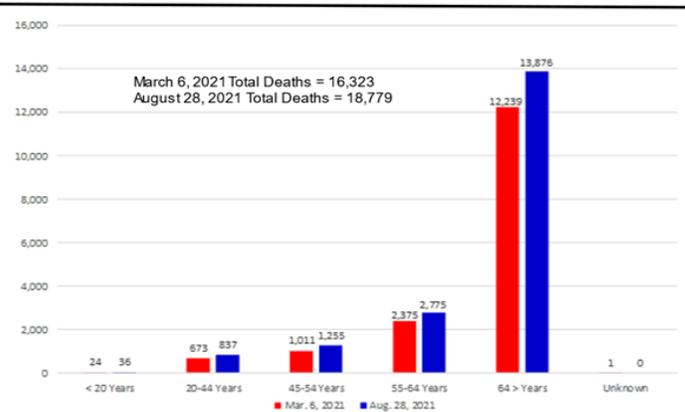
**Figure 4:** Arizona Reopening Phase 3 Hospitalized COVID-19 Cases by Age Groups on March 6 and August 28, 2021



The numbers of deaths had increased from 16,323 on March 6 to 18,779 on August 28. The rates of fatalities per 100,000 population increased 227.05 to 261.22. As expected, seniors had the highest numbers of deaths (73.9% of total deaths on August 28) and those under 20 years of age had the lowest numbers-0.19% of total deaths

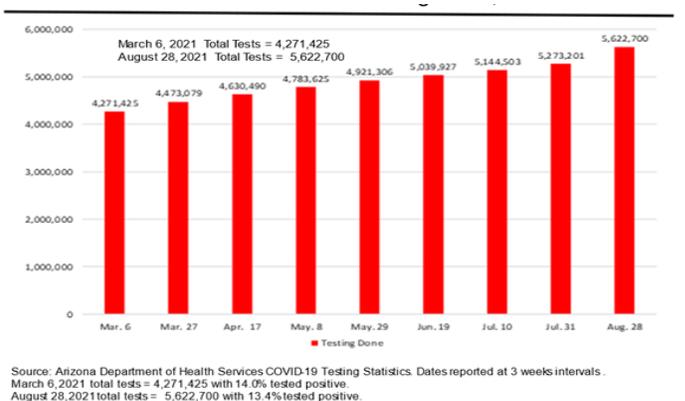
(Figure 5). There were more males (58%) than females (42%) who died.

**Figure 5:** Arizona Reopening Phase 3 COVID-19 Deaths by Age Groups on March 6 and August 28, 2021.



The number of COVID-19 tests done in Arizona had increased by 1,351,275 from March 6 to August 28 (see Figure 6). On August 28, there were 5,622,700 total tests done. During the Reopening Phase 3, the positively percentages were 14.0% on March 6 and 13.4% on August 28.

**Figure 6:** Arizona Reopening Phase 3 COVID-19 Testing Numbers: March 6 and August 28, 2021



## Discussion

During the Reopening Phase 3, Arizona continued its efforts to vaccinate its population. The state had more than tripled the number of vaccine dosages administered from 2,016,512 on March 5 to 7,269,137 on August 28, 2021. Forty-eight percent (3,508,536) of the state population were fully vaccinated. The largest numbers of fully vaccinated persons occurred in the week of April 17 to 23 (249,755). The pace of vaccination began to slow down in June.

Even though the state had not reach herd immunity levels, there was enough population immunity to prevent the reoccurrence of the summer case surge that occurred in June 2020 (see Figure 1). Arizona case numbers had decreased in the spring and early summer, but rose in July and August as the Delta variant spread throughout the state.

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There were many factors that contribute to the increase of cases. At the end of June, the Arizona State Legislature and Governor had rescinded many of the state COVID-19 restrictions. Even through 3,508,536 were fully vaccinated, there were significant number of state residents who were not vaccinated (45.3% as of August 28). Some of these unvaccinated had acquired natural immunity. During the month of July, the highly contagious Delta variant appeared in the state. Most of new cases were unvaccinated individuals. There were breakthrough infections. Many of the state businesses had changed their mandatory face mask wearing policies to voluntary wearing or required only those who were not vaccinated to wear face mask. There was influx of out-of-state visitors who had or had been exposed to the virus.

The state and local health departments increased their vaccination efforts as the Delta variant rose. The number of vaccination sites expanded throughout the state that included pharmacy chains, doctor offices, and community centers and clinics. The state targeted vaccination efforts to hard-to-reach minority and rural communities.

As results of the rising cases, local governments, schools and universities, and private employers acted on their own to address the virus increases. Many of them either encouraged or mandated their employees to get vaccinated and restated the wearing the face masks by their employees and customers/clients. The schools and universities required their students to wear face masks. Many of these actions did not follow state laws (e.g., the state does not require wearing of face masks or employees required to get vaccinated and does not require students to wear face masks).

Two recent national vaccine policies may increase the vaccination rates in Arizona. On August 13, the Centers for Disease Control and Prevention (CDC) had recommended those who are moderately or severely immunocompromised get the COVID-19 booster vaccine. The Pfizer/BioNTech was the first vaccine received fully approval from the Food and Drug Administration (FDA) on August 23. This could reduce the hesitation by those who did not get vaccinated because the vaccines are not fully approved by the FDA they considered the vaccines are experimental.

On August 26, Arizona Governor Douglas Ducey appointed former U.S. Surgeon General Richard Carmona to be his new senior health advisor on COVID-19 matters. One of Dr. Carmona's tasks is to reduce the unvaccinated numbers in the state.

Even though the case numbers rose, the numbers of hospitalizations and deaths were low because of COVID-19 vaccines and therapeutic drugs. The number of severe cases were low because significant numbers of the high-risk individuals and elderly were vaccinated. On August 28, there were 89.8 percent of adults 65 and older had received 1 or 2 COVID-19 vaccine shots. There were several drugs approved by the FDA for treating COVID-19 (e.g., remdesivir, imdevimab, casirivimab, tocilizumab, and baricitinib) that reduced hospital length of stay and deaths.

The weekly case numbers are expected to rise as the Delta variant infect the population, those working at home return to their workplaces, children and college students return to in person classroom learning, fans attend sport and entertainment events, and holiday gatherings (e.g., Labor Day). The numbers of severe case numbers and deaths are expected to be low.

### Conclusion

The new normal was low number of severe cases, manageable hospitalization numbers, and very low number of deaths. Those fully vaccinated can return to a normal life and not require wearing a face mask all the time, while those who are not fully vaccinated needed to practice preventive health behaviors that reduce their risks in getting the virus and to wear their face masks all the time.

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