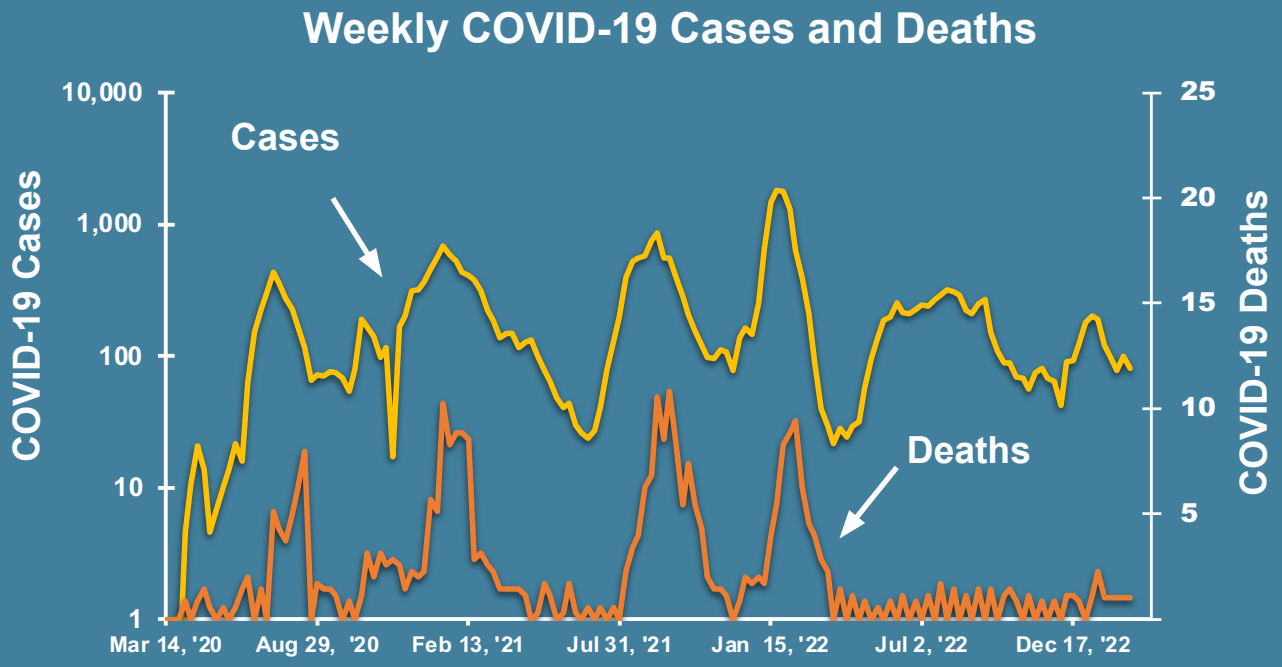
Wilson Consulting Services, LLC

A Look at COVID-19 as a Stochastic Virus

South Carolina, Horry County, and Georgetown County



Stochastic Path

February 27, 2023

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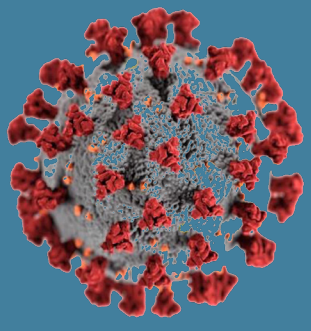
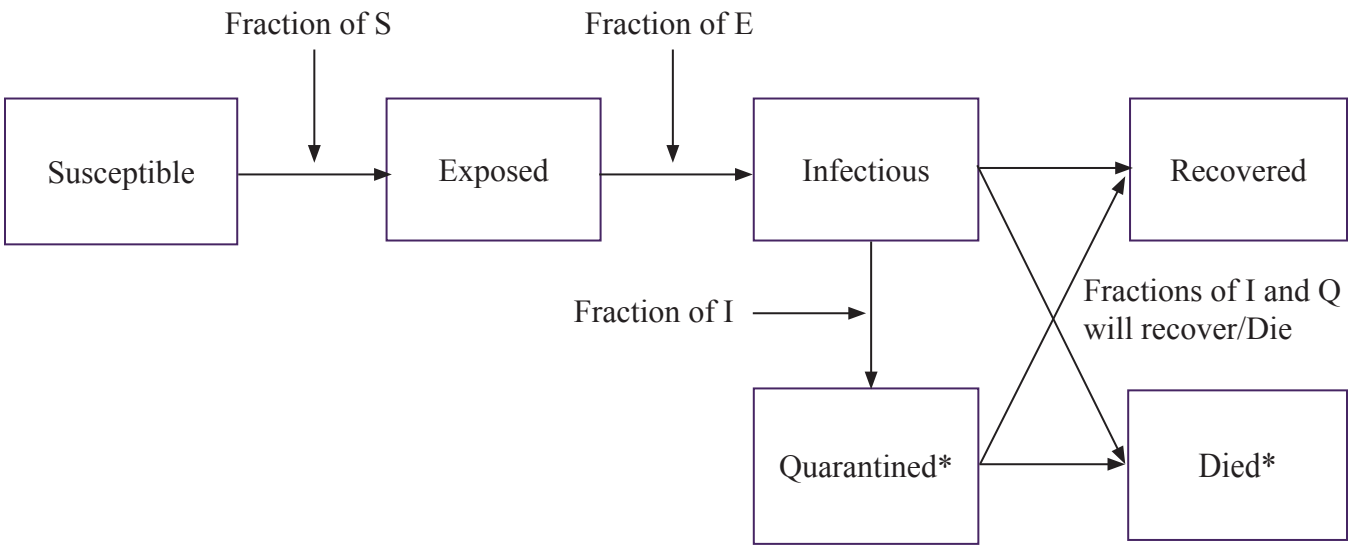
Founder / CEO
Conway, South Carolina



"Without data, you are just one more person with an opinion"

Our organization is committed to a reasonable degree of statistical certainty in the accuracy of our data analyses.

SEIR Stochastic Epidemic Block Diagram Model*



*The SEIR model has two additional compartments as follows: Died and Quarantined.

Researched and compiled by David C. Wilson

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DISCLAIMER

The information provided in this report is for general information purposes only about COVID-19. It is not to be used for any medical decisions regarding COVID-19; rather, the report findings are strictly statistical inferences based on data obtained from the South Carolina Department of Health and Environmental Control (SCDHEC) and the Centers for Disease Control and Prevention; therefore, the author holds no responsibility for any medical decisions you might make based on this report and the accuracy of the data provided by SCDHEC. Also, this report is not intended to be a reservoir of detailed data on COVID-19. Rather, its purposes are to provide a close look at the data collected about COVID-19 cases, deaths, and vaccination completion and the impact the virus has had on South Carolina as a whole, Horry County, and Georgetown County.

Executive Summary

This report profiled the COVID-19 virus in terms of measurements per 100,000 relative to Black and White residents in South Carolina as a whole, Horry County, and Georgetown County. The data used to generate this report are from the South Carolina Department of Health and Environmental Control (SCDHEC). This executive summary is to recap the report with emphasis on the takeaways.

The most notable takeaways from this report are the following:

- The COVID-19 virus exhibits the behavior of stochastic processes because of its randomness and nondeterministic nature.
- Based on statistical evidence, the vaccines did not stop the spread of the COVID-19 virus.
- On average, younger people experienced a higher rate of COVID-19 infection than older people.
- Black residents were infected with the COVID-19 virus at a statistically higher rate than White residents in South Carolina as a whole, Horry County, and Georgetown County.
- Older people (65+) experienced substantially higher death rates from COVID-19 than younger people. On average, a person 65 or older living in South Carolina, Horry County, or Georgetown County has died from COVID-19 at a rate of about 17 times the rate of the age range 18 to 49.
- There is no difference in the statistical death rate of Black and White residents in South Carolina as a whole and Georgetown County. Although Black residents in Horry County experienced a statistically higher rate of cases, the death rate for Black residents in the county was statistically lower than White residents from COVID-19 per 100,000.
- Black residents completed vaccinations at a statistically lower rate than White residents in South Carolina as a whole, Horry County, and Georgetown County.
- There is a strong statistical inference that wearing masks; social distancing; and closing schools, churches, businesses, and so on did not stop the spread of the COVID-19 virus.
- The effect of vaccines most likely reduced the death rate; however, an examination of the data could not discern if herd immunity played a role along with the vaccines in the reduction of deaths.
- There is a reasonable degree of statistical certainty in the accuracy of these takeaways.
- The takeaways listed above differ very little from John Hopkins University findings on the COVID-19 virus. Additionally, George Mason University most recent study has similar results to this report, plus other organizations.

Table E. Summary of cases, deaths, and vaccinations completion as of 02/11/2023.

State/County	Race	Cases per 100k*	Deaths 100k	Completion Vaccinations/Perce
South Carolina	White	22,060	315	43.6%
	Black	24,598	315	41.8%
	Grand Total**	34,944	372	53.9%
Horry County	White	21,005	307	47.3%
	Black	22,590	218	35.5%
	Total**	32,929	348	55.6%
Georgetown County	White	20,197	326	58.7%
	Black	25,864	386	54.1%
	Grand Total**	31,026	380	67.4%

*The notation per 100k and per 100,000 are used interchangeably in this report. The rate refers to total populations or discrete population estimates for a particular race, age category when applicable.

**Grand Total used in this report includes White, Black, unknown, and, others as shown in SCDHEC data tables.

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I. Introduction

The COVID-19 virus has been on the world stage for more than three years. According to the Center for Disease Control (CDC), the COVID-19 (coronavirus disease 2019) is a disease caused by a virus named SARS-CoV-2 and was discovered in December 2019 in Wuhan, China. The virus that causes COVID-19 is constantly changing. Controlling the virus has been elusive at best and devastating at worst. It has caused more than one million deaths in the United States, more than 18,000 deaths in South Carolina, and more than 1,200 and 237 deaths in Horry and Georgetown counties, respectively.* Additionally, about one-third of the total population of the state and two counties examined in this report tested positive for COVID-19 since the start of collecting data on cases.

There have been several vaccines developed for the virus and its variants and administered to people, including boosters. Nevertheless COVID-19 persists, which can be seen in the graphs in this report. Therefore, the title of this report is "A Look at COVID-19 as a Stochastic Virus." I gave the report this title after collecting and analyzing COVID-19 data on cases and deaths across the past three years or so and observed that the spread was basically random or nondeterministic. Stochastic or nondeterministic refers to the inability to objectively predict the outcome or result of a process due to a lack of knowledge of a cause-and-effect relationship or the inability to know initial conditions. Stochastic processes can be defined as a collection of random variables indexed by some parameter such as time, length, and size (Castaneda 2012). Therefore, the indexed parameters in this report are COVID-19 cases, deaths, and vaccinations completion. These three parameters are the random variables examined in this report. Consequently, because of the randomness of who contracts the virus, becomes ill, and dies from COVID-19, these are examples of stochastic processes or phenomena. Furthermore, stochastic processes entail random probability distribution or patterns that may be analyzed statistically but may not be predicted precisely, as shown in Figures 2.1–2.5. An example of stochastic processes mathematical model is $\{X_t; t \in T\}$ has $T = \{t: 0 \leq t \leq \infty\}$ and $S =$ {state space of the process}, where X_t represents the number of events that happens during an interval. A discrete-state, continuous-time stochastic process is a reasonable fit for COVID-19 cases and deaths. Any attempt to work through stochastic mathematical models is beyond the scope of this report.

You may recall that earlier in the pandemic there were predictions made that were wildly large and provided incorrect information in terms of projected number of cases, hospitalizations, deaths, and so on. These projections never materialized. Many of the best mathematicians in the world grappled with different models to project this nondeterministic or stochastic virus without much success. There was no reasonable degree of medical or statistical certainty as to the accuracy of these models. Consequently, international, national, and many US state efforts applied brute force policies to reduce the spread of the virus. These entailed shutting down the economy, closing schools, employing mask mandates, firing people for not taking the experimental COVID-19 vaccine, and so on. Statistically, the COVID-19 virus is a good example of the uncertainty inherent in nondeterministic behaviors, following stochastic processes or random variables.

Consequently, international, national, and many US state efforts applied brute force policies to reduce the spread of the virus.

The CDC is on record stating that vaccines are an effective way to protect yourself against severe COVID-19. The notion of the vaccine protecting a person from severe COVID-19 is consistent with the findings in this report. Hence, this report depicted the reduction in deaths after vaccinations completion. It is important that people who are moderately to severely immunocompromised exercise caution and recognize the need for additional preventative measures as well as other treatment options.

*The reference to South Carolina in this report means South Carolina as a whole.

II. COVID-19: Weekly Cases and Deaths

The graph shown in Figures 2.1, 2.2, and 2.3 are plotted on a logarithmic scale for COVID-19 cases and a regular scale for deaths. This is done so the larger number of cases versus smaller number of deaths curve will ride above the death rate curve. Hence, the left vertical axis cases are plotted on a logarithmic scale, and the right vertical axis is plotted on a regular scale (base 10) for deaths, which are fewer than cases. COVID-19 weekly cases and deaths per 100k show characteristics of a stochastic or random behavior since start of weekly data collection March 28, 2020. The randomness exists regardless of whether the weekly rates of positive COVID-19 cases or deaths are fewer or higher during any given period. The graphs in this section depict the weekly cases and deaths and exhibit random variations in COVID-19 cases and deaths. For example, deaths are significantly fewer than cases starting about March 26, 2022, to the present; however, the stochastic behavior in variation remains the same (see Figures 2.1–2.5). Although only White and Black categories are depicted in this report, all grand totals used for South Carolina, Horry County, and Georgetown County include the count of cases and deaths for "other" and "unknown" groups. This is true throughout this report to maintain a standard of statistical care.

Since about March 26, 2022, the number of deaths per 100k has remained fewer compared to March 8, 2021. Nevertheless, stochastic or randomness behavior still characterizes the behavior of the virus.

The graphs in Figures 2.4 and 2.5 depict the comparison of weekly cases and deaths per 100k for South Carolina, Horry County, and Georgetown County. The randomness is profoundly displayed in stochastic behavior. Phase 1 of COVID-19 vaccine started about March 8, 2021 (Wilson 2021), at a time when cases and deaths were both decreasing rapidly. By about June 2021, cases and deaths had decreased more or less significantly compared to March 8, 2021, in South Carolina as a whole and across the country (see Figures 2.1–2.3). Since about March 26, 2022, the number of deaths per 100k has remained fewer compared to March 8, 2021. Nevertheless, stochastic or randomness behavior still characterizes the behavior of the virus. The randomness persists not only in South Carolina as a whole also nationally, with various locations exhibiting stochastic behavior, even with fewer cases and deaths. Figures 2.1, 2.2, and 2.3 exhibit significantly fewer reported deaths in the geographies under consideration (i.e., South Carolina, Horry County, and Georgetown County) per week and smaller variations, especially in Georgetown County. Hence, stochastic or random behavior of COVID-19 is apparent, even with fewer cases and deaths per week.

The number of cases and deaths examined in this report were in a free fall when Phase 1 of the vaccine started about March 8, 2021; the cases and deaths were in free fall by about 69% and 75%, respectively, from a high on January 9, 2021, to about March 8, 2021 (see Figures 2.1, 2.2, and 2.3). The phenomenon of rapid increase and subsequent free fall repeated about two other times (August 1, 2020 and March 28, 2022); nevertheless, stochastic behavior continued after vaccinations for the virus began, as indicated in Figures 2.1, 2.2, and 2.3. However, the case and death rates remained high with stochastic behavior (a random variable) until about March 26, 2022, especially the death rates, as indicated in Figures 2.1, 2.2, and 2.3. Note that once again stochastic behavior persists even after significantly fewer deaths since March 25, 2022. Hence, there is evidence COVID-19 cases and deaths follow stochastic processes, leading to the title of this report describing COVID-19 as a stochastic virus. The crucial medical question is as follows: Is the reduction in severity of cases, smaller variation in cases, and fewer deaths because of the vaccine or herd immunity or both?

II. COVID-19: Weekly Cases and Deaths, cont.

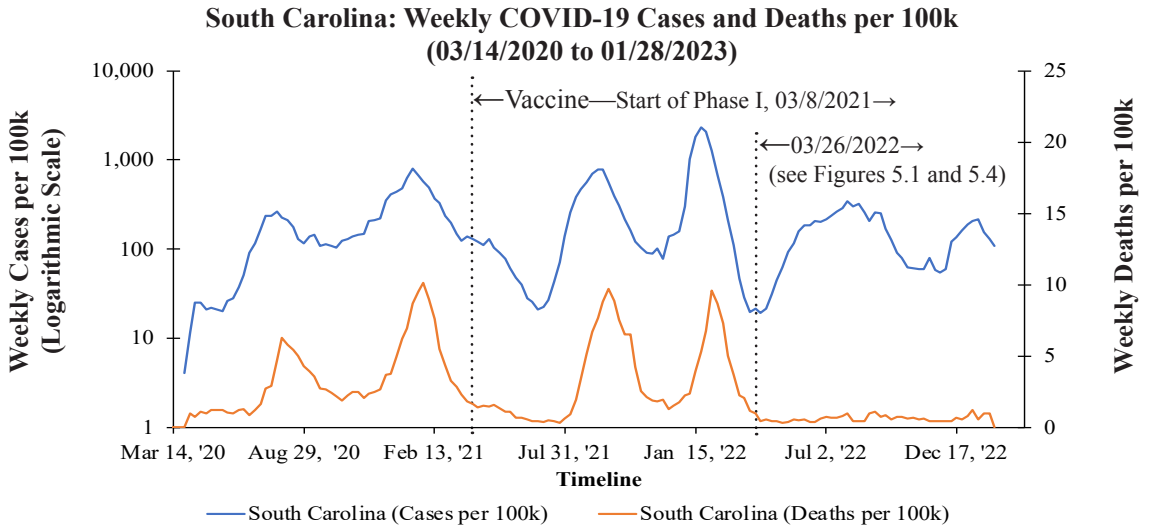

Figure 2.1 South Carolina: Stochastic path of COVID-19 weekly deaths per 100k.*

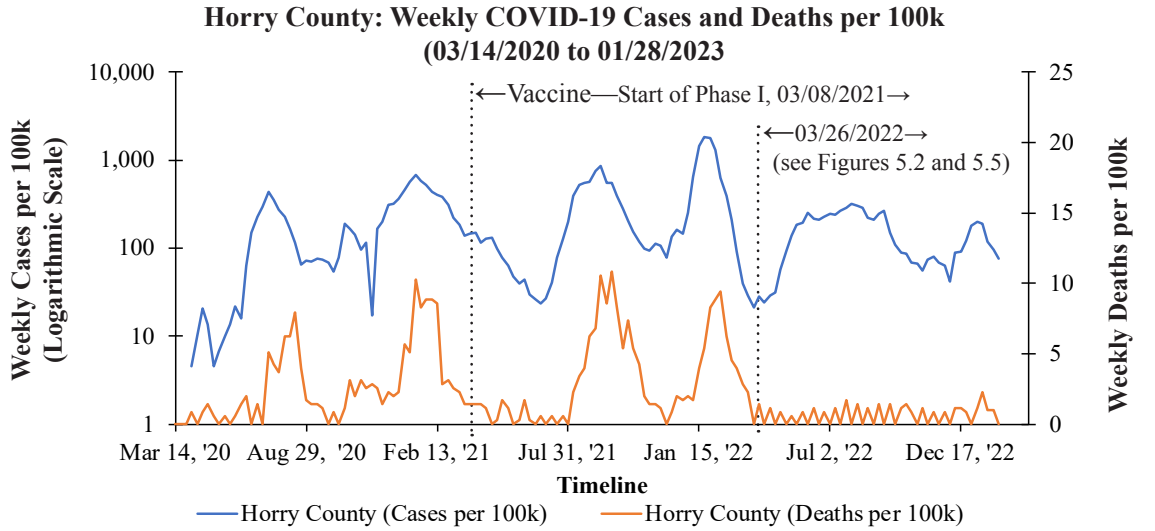

Figure 2.2 Horry County: Stochastic path of COVID-19 weekly cases and deaths per 100k*.

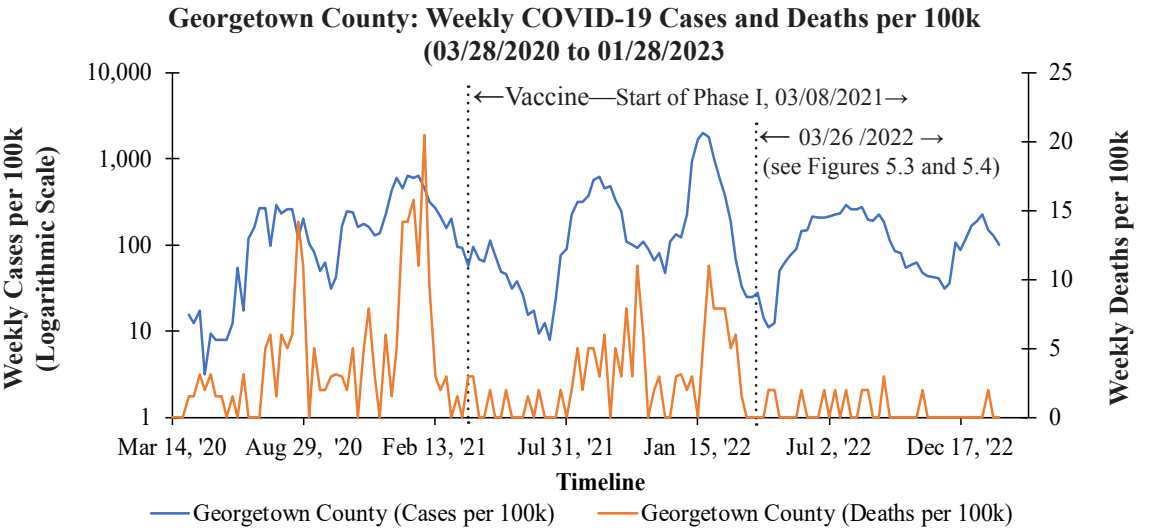

Figure 2.3 Georgetown County: Stochastic path of COVID-19 weekly cases and deaths per 100k.*

*Source: South Carolina Department of Health and Environmental (SCDHEC)

II. COVID-19: Weekly Cases and Deaths, cont.

The graphs in Figures 2.4 and 2.5 depict together on the same chart for COVID-19 cases and deaths for South Carolina, Horry County, and Georgetown County. The pattern are similar and show a considerable pattern of randomness or stochastic behavior. The number of deaths show more of a random variable path than cases. This most likely because the death count is far more accurate than the true number of residents who are affected or at a time in the past. Nevertheless, the sample of cases exhibit randomness.

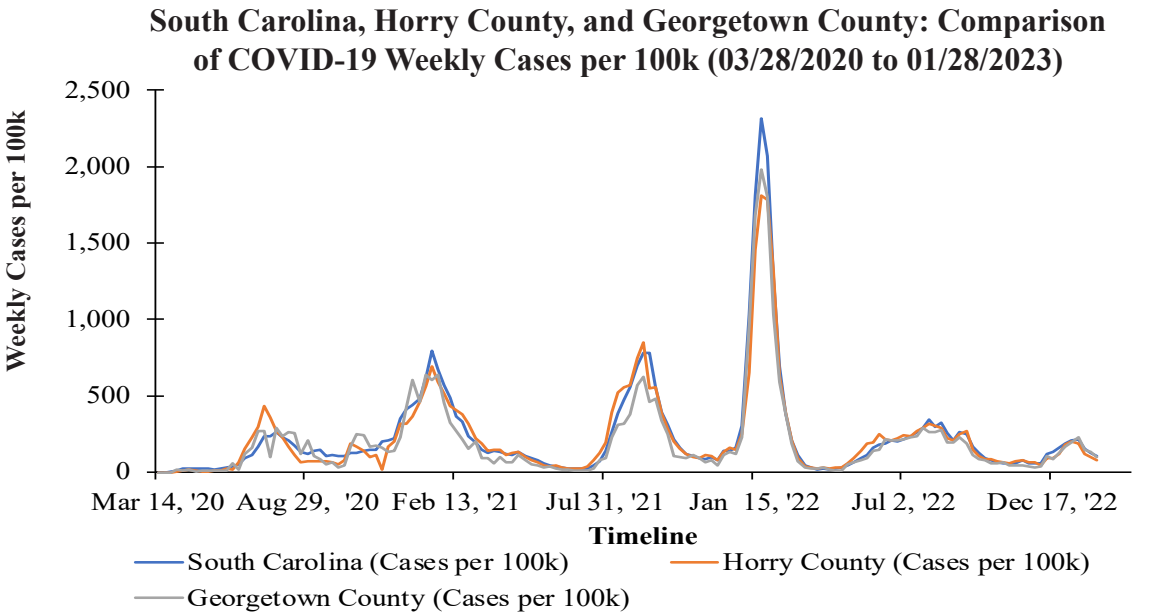

Figure 2.4 South Carolina, Horry and Georgetown counties: COVID-19 weekly cases per 100k.*

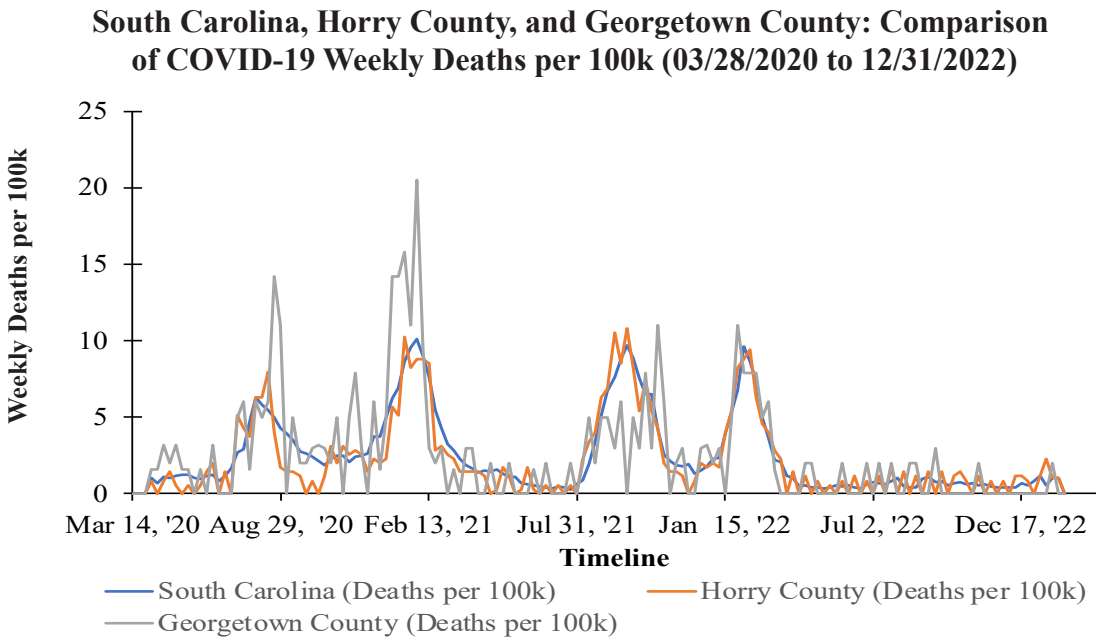

Figure 2.5 South Carolina, Horry and Georgetown counties: COVID-19 weekly deaths per 100k.*

*Source: SCDHEC

II. COVID-19: Weekly Cases and Deaths, cont.

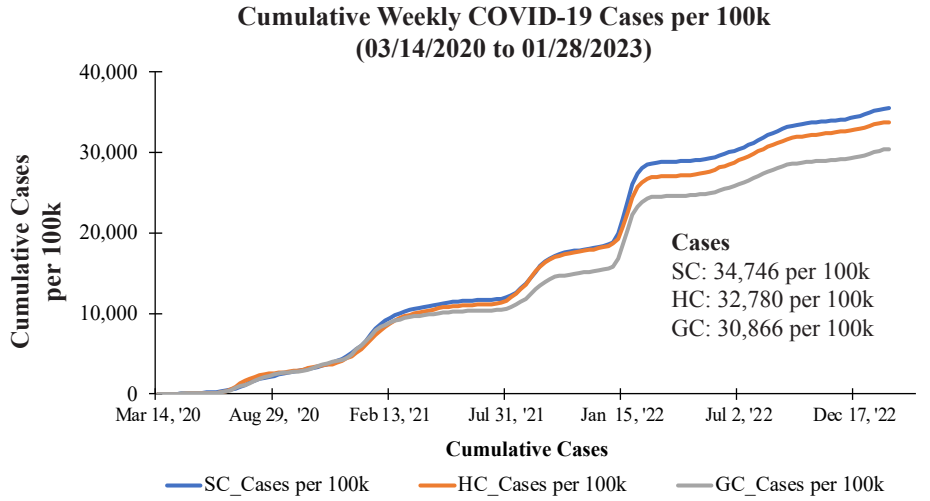

Figure 2.6 SC, HC, and GC: **Cumulative weekly cases** per 100k.*

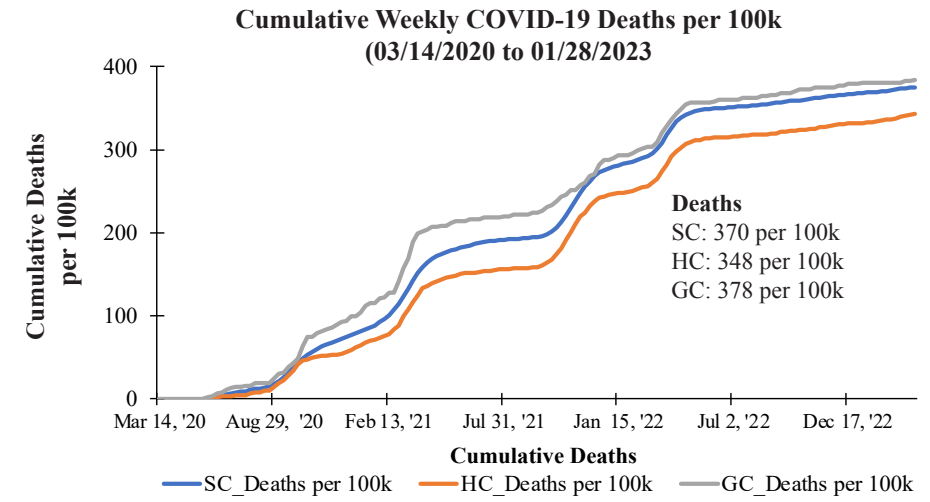

Figure 2.7 SC, HC, and GC: Cumulative weekly deaths per 100k.*

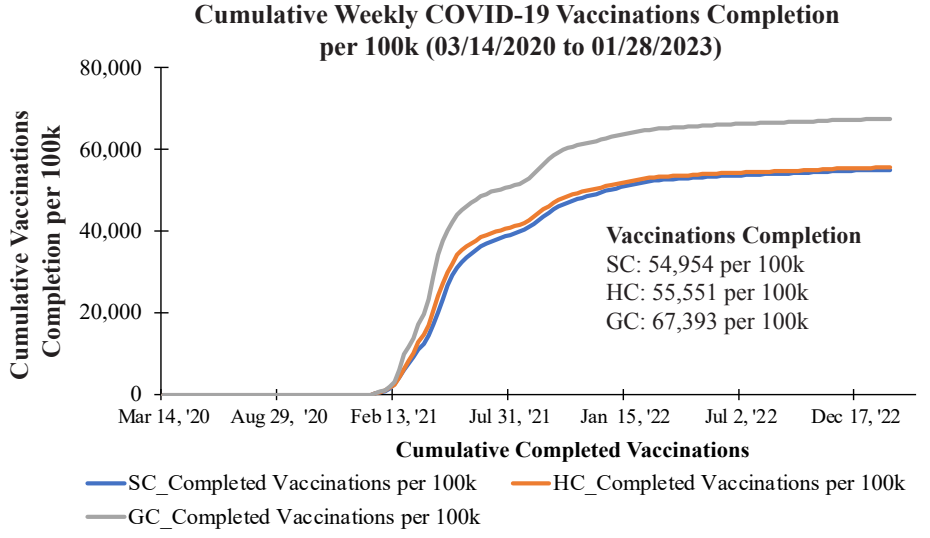

Figure 2.8 SC, HC, and GC: Cumulative weekly vaccinations completion per 100k.*

*Source: SCDHEC

The graphs in Figures 2.6, 2.7, and 2.8 have a slightly different date range than many of the other graphs, ending 01/28/2023 instead of 12/31/2022. This slight difference is inconsequential to the overall analysis shown in this report.

The cumulative cases, deaths, and vaccination completions (per 100k) depicted in Figures 2.6, 2.7, and 2.8 show an exponential growth rate. In Figure 2.6, Georgetown County exhibits the lowest number of cases per 100k and the highest number of deaths per 100k in Figure 2.7. Moreover, in Figure 2.8, Georgetown County depicts the highest vaccination completions per 100k but shows the highest number of deaths per 100k in Figure 2.7. The information in Table 1 highlights the statistical relationship between entities.

Table II-1. Cumulative rate relationship

Parameters	SC vs. HC	SC vs. GC	HC vs. GC
Cases	SS	SS	SS
Deaths	SS	SI	SI
Vaccinations	SI	SS	SI

Table key:
SS= statistically significant (a difference)
SI = statistically insignificant (no difference

III. COVID-19: Vaccinations Completion versus Cases and Deaths

This section intends to depict the number of people who completed vaccinations. Fully vaccinated residents have received a single dose of Janssen or two doses of Pfizer or Moderna. This section shows the number of residents with vaccinations completion by age group and the cumulative result separated into male and female residents. The charts show weekly vaccination completion plotted along with cases and deaths. The graphs showing weekly vaccination completion by age category show no correlation between vaccination completion and cases or deaths.

The graphs in Figures 3.1–3.6 depict the weekly vaccination completion rates associated with the number of cases and deaths. These six graphs do not use a logarithmic scale; rather, both axes of the charts use base 10. Therefore, the height of, for example, the number of cases, will show a different height between the two axes. The vaccination completion and case rates show a stochastic path. Although the death rate has decreased from COVID-19 since March 2022, there is no statistical correlation between the vaccination completion rate and COVID-19 cases or deaths per 100,000.

Judging from the charts in Figures 3.7–3.12, there is no evidence that COVID-19 vaccinations slowed or stopped the spread of the virus. Although the age category 65–84 exhibits the highest vaccination completion rate per 100,000, the cases show a slight downward trend followed quickly by a trend back upward (Figure 3.7). To emphasize, there is no statistical correlation with cases. The age category 85 and older shows a sharp increase in deaths, even though this group is among the highest vaccination completion categories (see Figure 3.7). Judging from the plots in Figures 3.7–3.12, the evidence implies that the vaccines have had little effect on the spread of COVID-19 but may have had some effect on deaths. Once again, the medical question is as follows: Did the vaccines or herd immunity reduce the death rate, or was it both?

The graphs in Figures 3.7–3.12 compute the vaccination completion rate for an age category by taking the number of residents within an age category who were vaccinated and dividing it by the population of persons within that age category. For example, Georgetown County's fully vaccinated population of the age category 65–84 is 91,580 per 100k, and Horry County's vaccination completion rate for the same age category is 82,893 per 100k. The difference between the counties in the vaccination completion rate is statistically significant, with evidence that the vaccination completion rate in Georgetown County for the age category 65–84 is higher compared to Horry County.

A comparison of the overall vaccination completion rates between White and Black residents in South Carolina, Horry County, and Georgetown County is statistically significant in favor of more White residents being vaccinated per 100,000. See Tables 6.11 and 6.12.

Additionally, vaccine completion rates for female residents in South Carolina, Horry County, and Georgetown County are statistically significant. This means that female residents completed vaccinations at a statistically higher rate than their male counterparts. See Figure 3.13 and Table 6.13. The graph in Figure 3.13 agrees with the statistical evidence that female residents were more likely to be vaccinated across all categories. Figure 3.14 shows evidence that Georgetown County recorded a higher number of people with vaccination completion compared to South Carolina as a whole and Horry County for all White and Black residents.

Even though the age group 65 and older received the largest number of vaccinations completion, they experienced the highest number of deaths in South Carolina, Horry County, and Georgetown County per 100,000. This shows evidence that no matter what the older population did, they continued to experience the highest number of COVID-19 deaths.

III. COVID-19: Vaccinations Completion versus Cases and Deaths, cont.

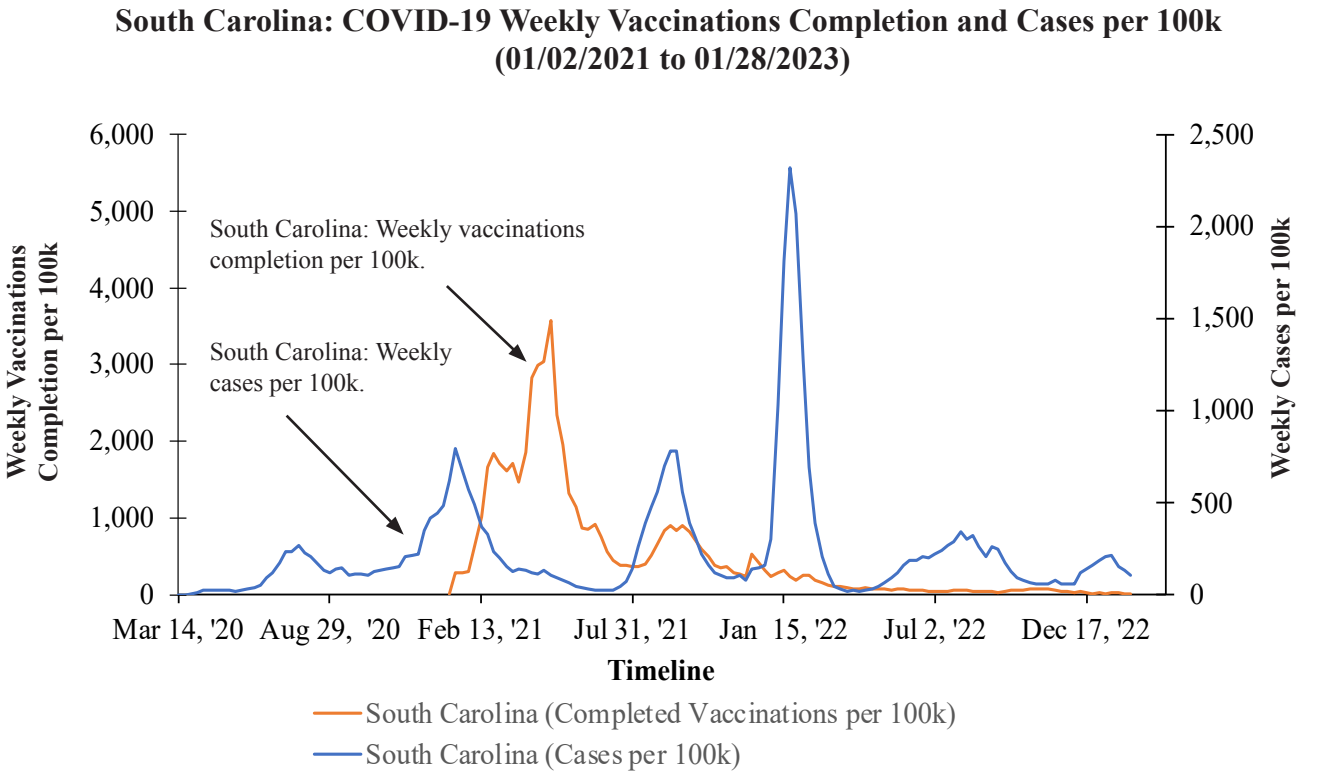

Figure 3.1 South Carolina: COVID-19 weekly vaccinations completion and cases per 100k.*

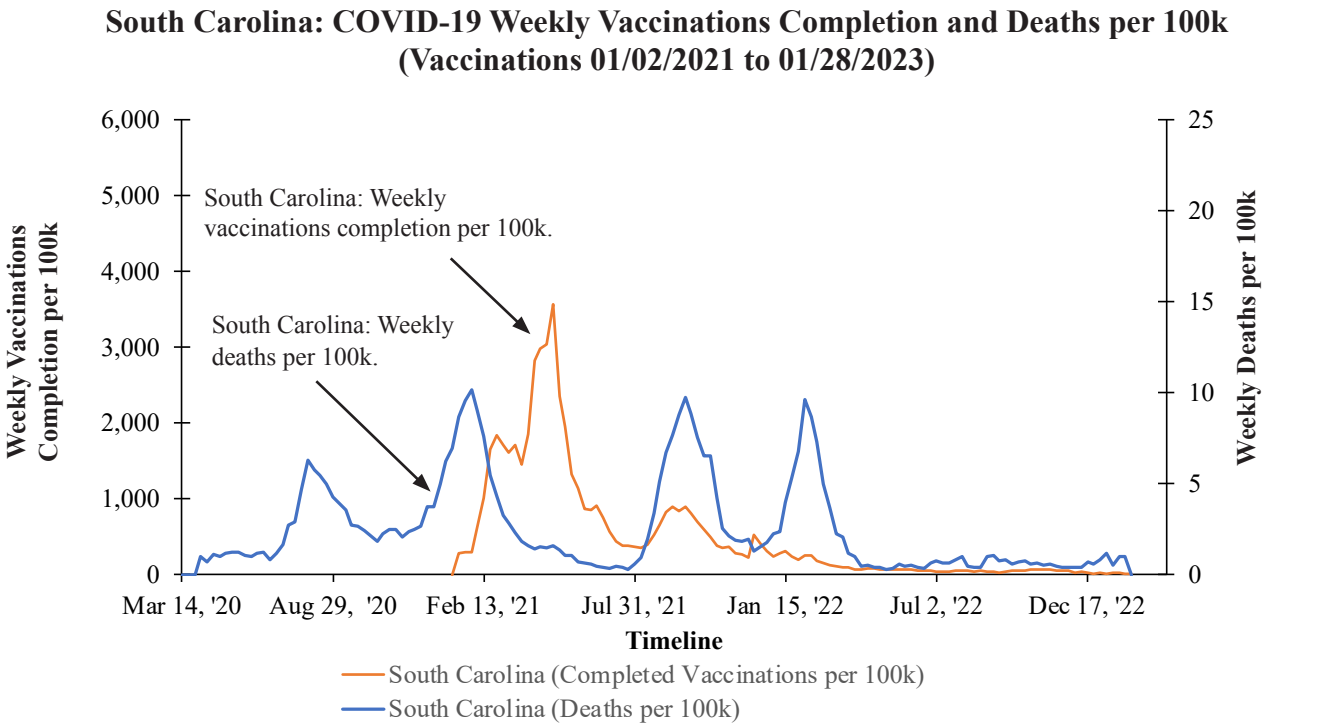

Figure 3.2 South Carolina: COVID-19 weekly vaccinations completion and deaths per 100k.*

•Source: SCDHEC

III. COVID-19: Vaccinations Completion versus Cases and Deaths, cont.

Horry County: COVID-19 Weekly Vaccinations Completion and Cases per 100k
(Vaccinations 01/02/2021 to 01/28/2023)

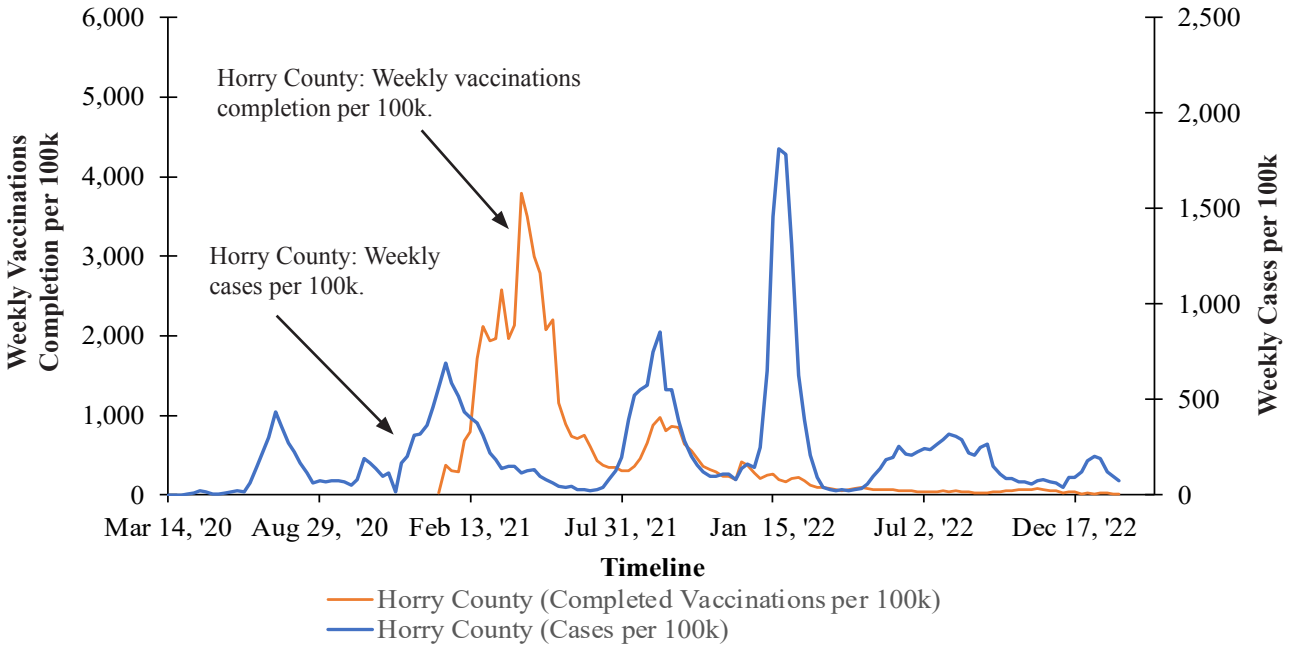

Figure 3.3 Horry County: COVID-19 weekly vaccinations completion and cases per 100k.*

Horry County: COVID-19 Weekly Vaccinations Completion and Deaths per 100k
(Vaccinations 01/02/2021 to 01/28/2023)

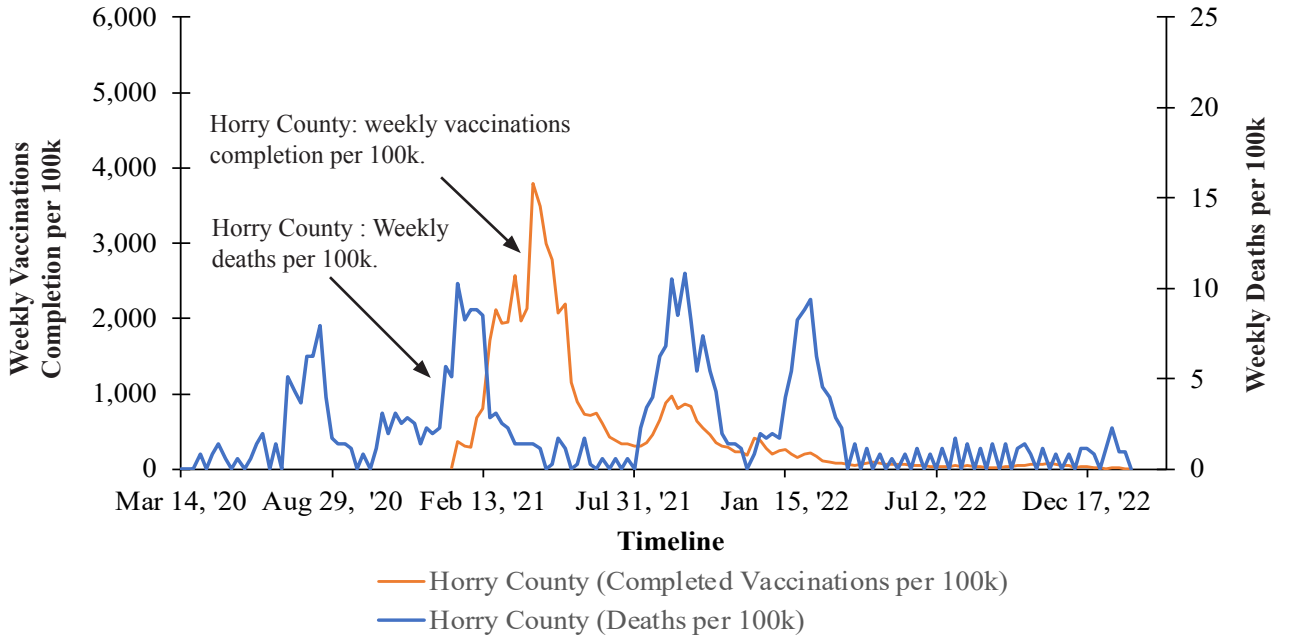

Figure 3.4 Horry County: COVID-19 weekly vaccinations completion and deaths per 100k.*

•Source: SCDHEC

III. COVID-19: Vaccinations Completion versus Cases and Deaths, cont.

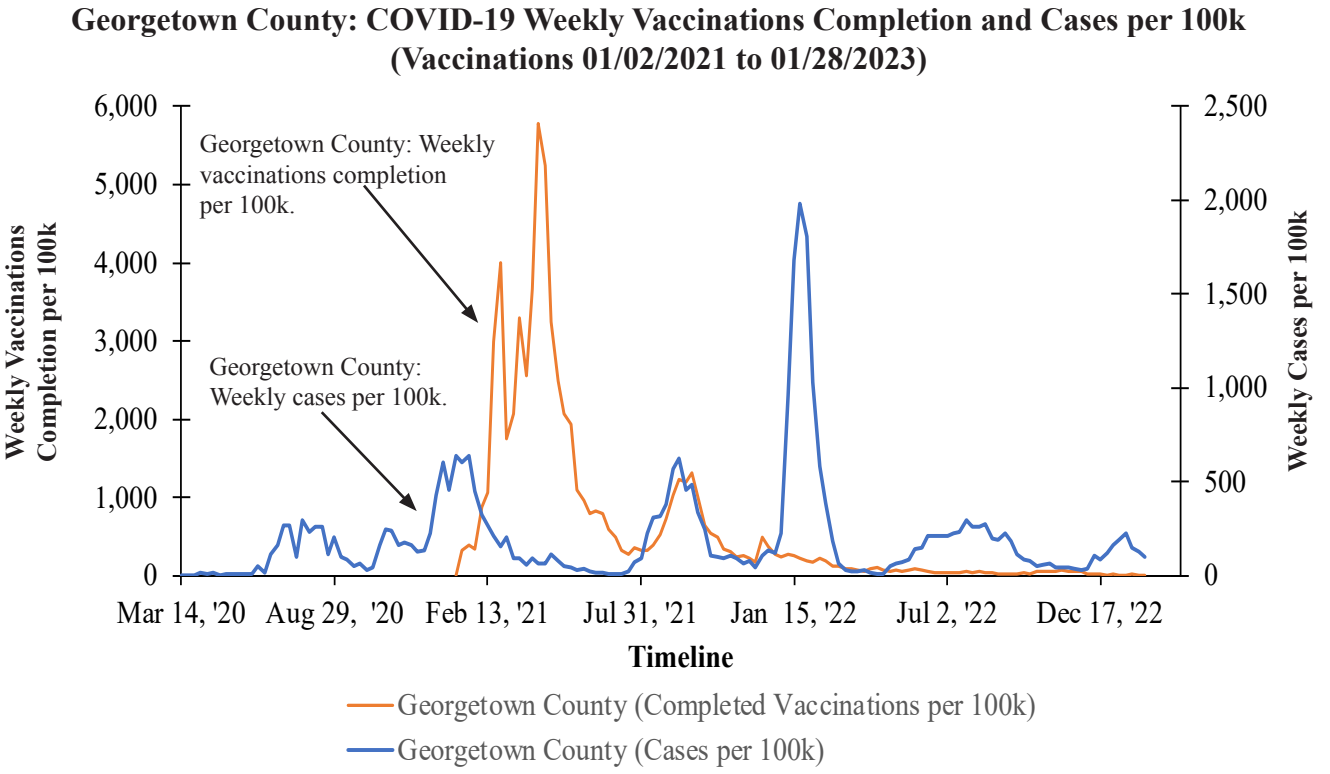

Figure 3.5 Georgetown County: COVID-19 weekly vaccinations completion and cases per 100k.*

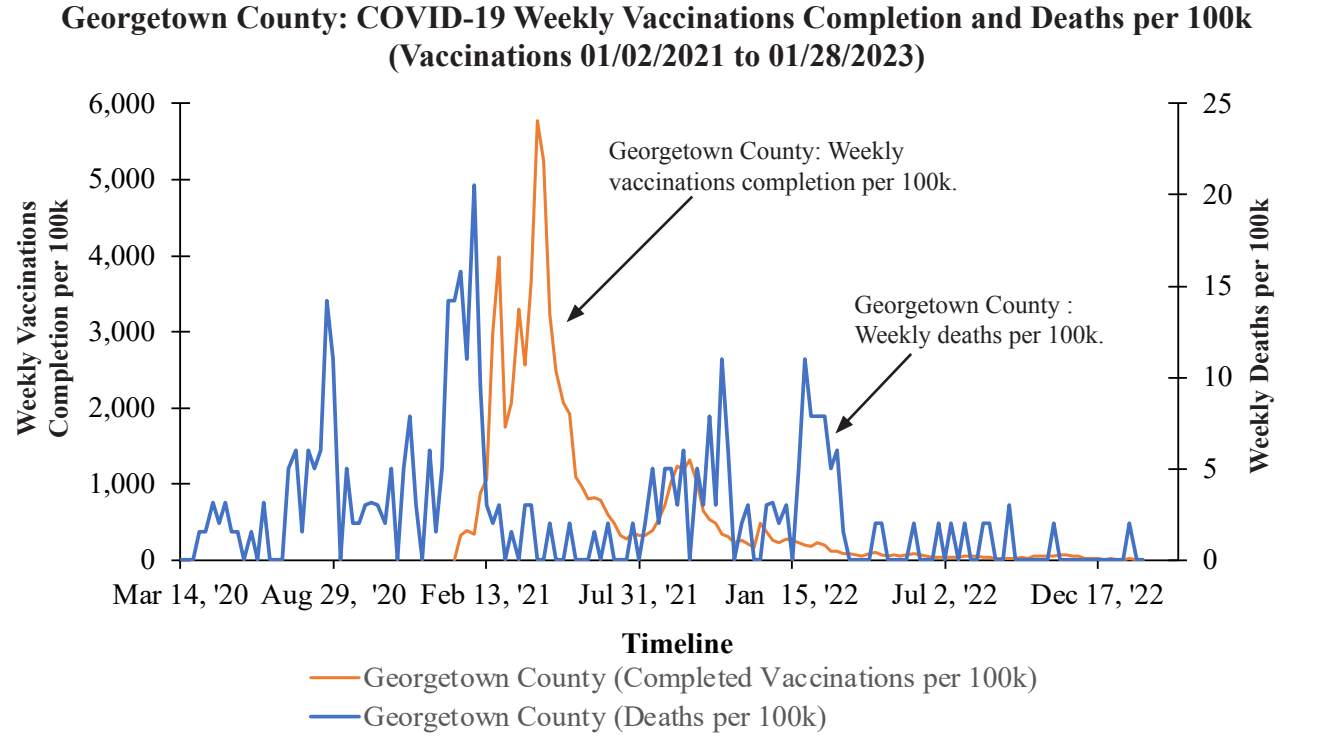

Figure 3.6 Georgetown County: COVID-19 weekly vaccinations completion and deaths per 100k.*

•Source: SCDHEC

III. COVID-19: Vaccinations Completion versus Cases and Deaths, cont.

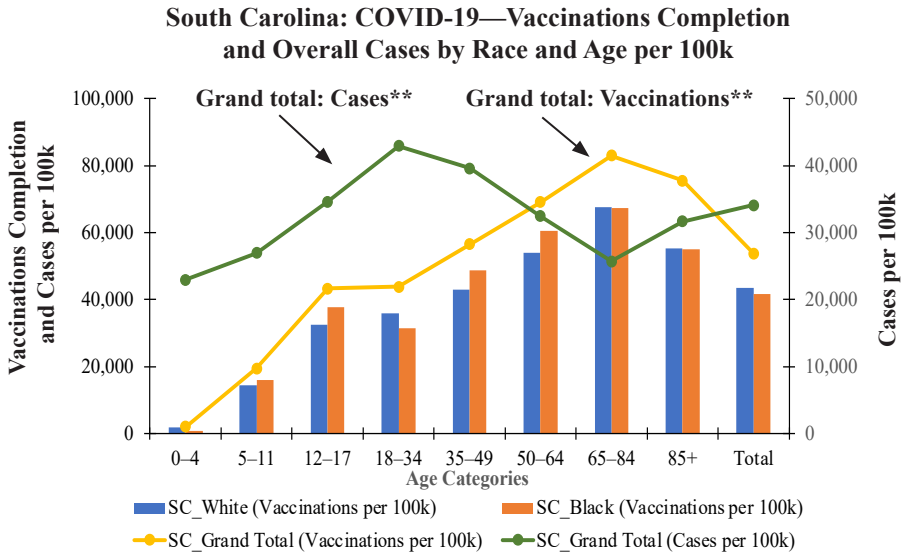

Figure 3.7 South Carolina: vaccinations completion versus cases per 100k.*

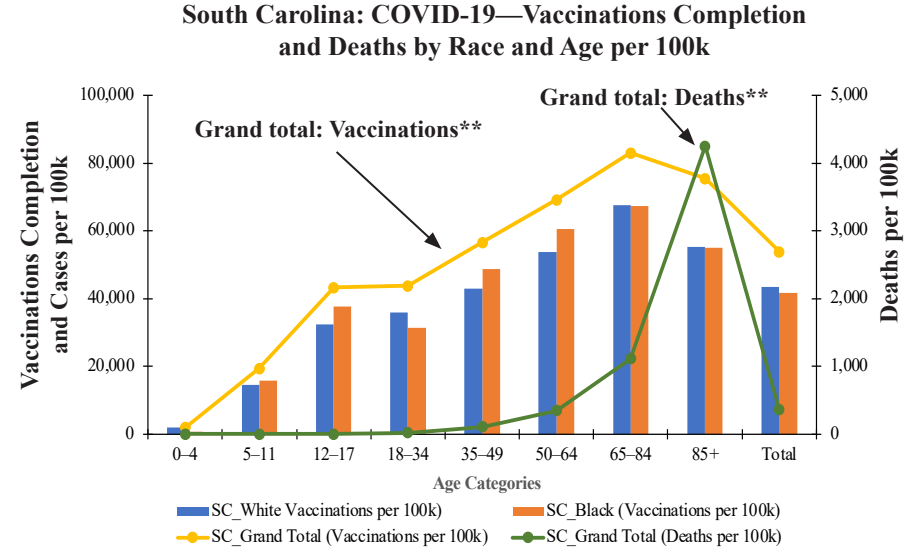

Figure 3.8 South Carolina: vaccinations completion versus deaths per 100k.*

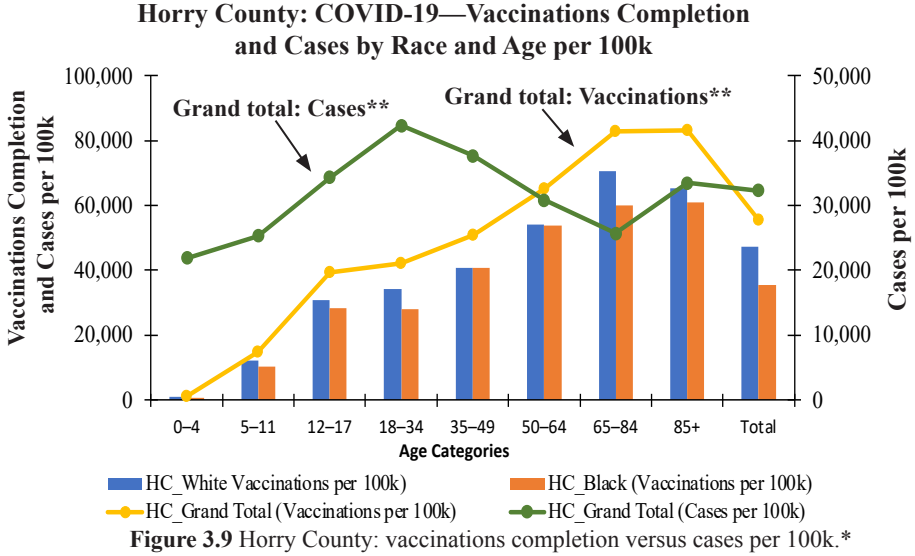

Figure 3.9 Horry County: vaccinations completion versus cases per 100k.*

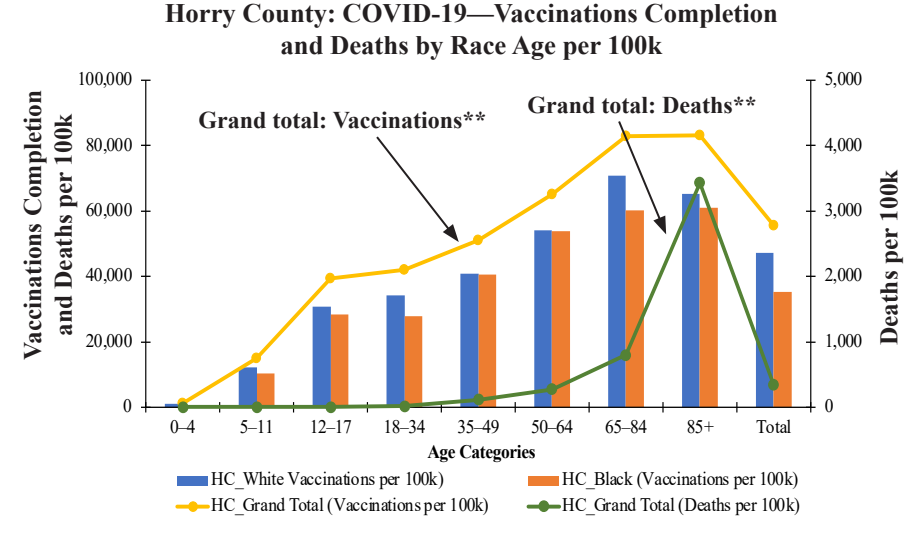

Figure 3.10 Horry County: vaccinations completion versus deaths per 100k.*

*Source: Tables 6.4–6.12

**Grand total includes other and unknown races.

III. COVID-19: Vaccinations Completion versus Cases and Deaths, cont.

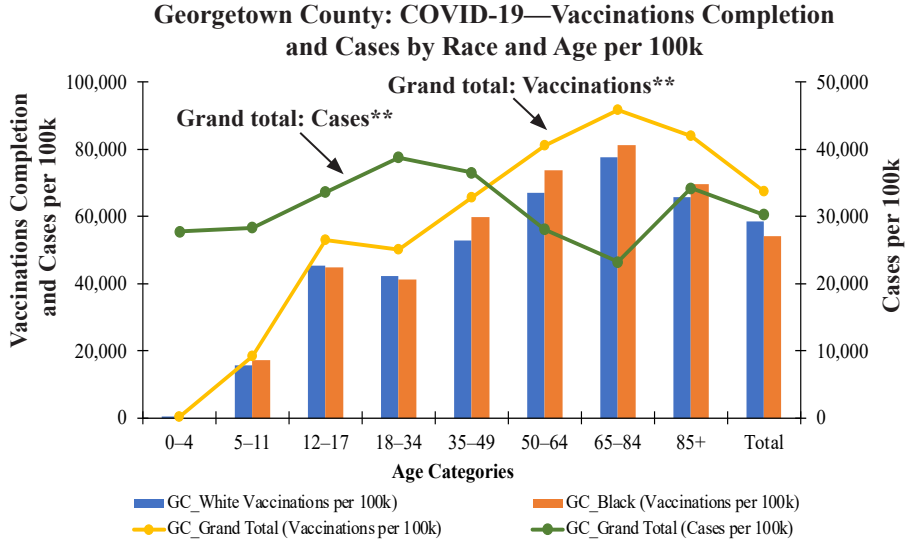

Figure 3.11 Georgetown: COVID-19 vaccinations completion per 100k.*

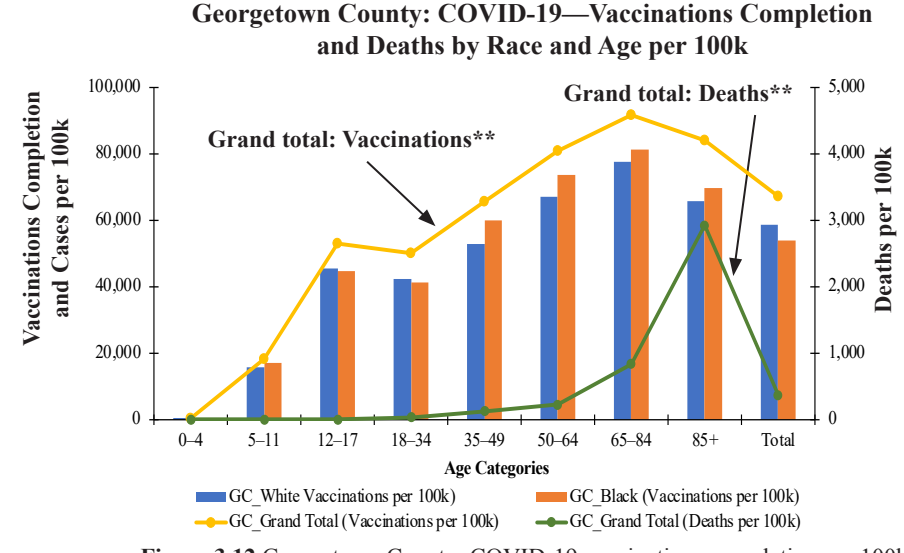

Figure 3.12 Georgetown County: COVID-19 vaccinations completion per 100k.*

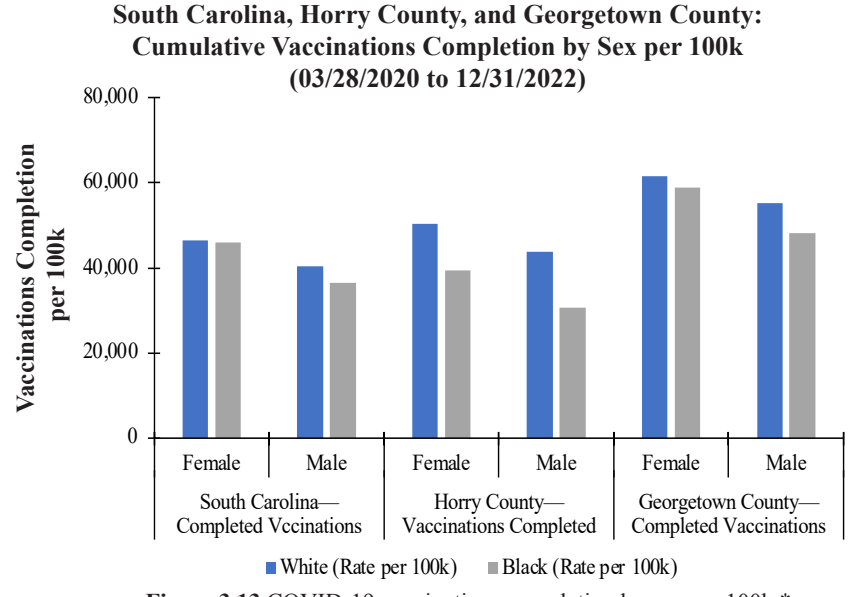

Figure 3.13 COVID-19 vaccinations completion by sex per 100k.*

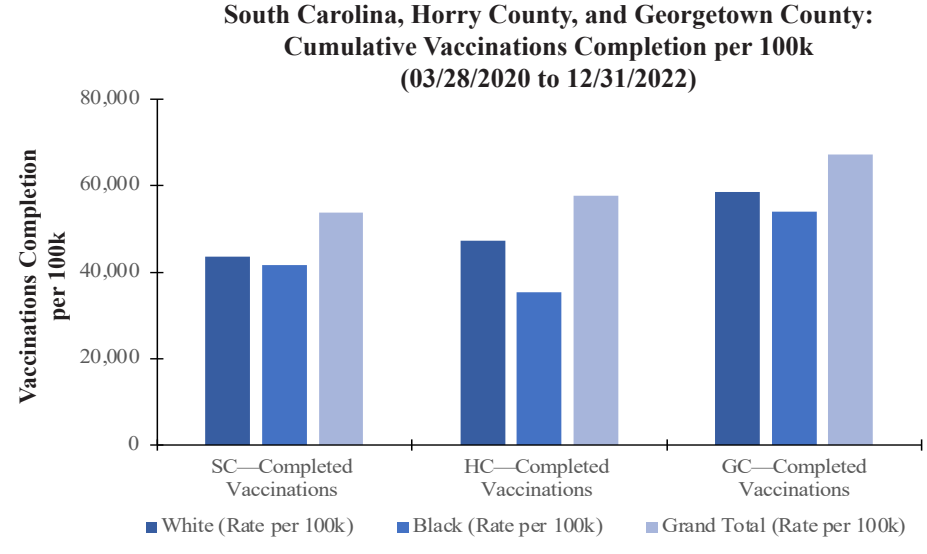

Figure 3.14 COVID-19 vaccinations completion by race per 100k.*

**Grand total includes other and unknown races.

*Source: Tables 6.4–6.13

IV. COVID-19: Cases and Deaths by Race and Age

The purpose of this section is to compare COVID-19 cases and deaths by race and age categories. Although the weekly variation is not seen in cumulative measures, stochastic behavior is present underneath the cumulative data when we observe age categories in time periods of months.

There are two graphs per page in Figures 4.1–4.8. The pair of graphs on each of the following four pages depicts the same information. The two axis graphs depicting COVID-19 cases are plotted on the left axis and the death rate is plotted on the right axis. The two axes were necessary because of the large difference in cases and deaths; therefore, the deaths would not be discernible on the same scale as cases. To that end, cases and deaths are plotted on separate axes in Figures 4.1, 4.3, 4.5, and 4.7 (2D-plot). The same data are plotted in Figures 4.2, 4.4, 4.6, and 4.8 (3D-plot) on a logarithmic scale. A logarithmic scale is an excellent application when plotting data with large differences between data points such as cases and deaths for the COVID-19 virus as observed in Figures 4.2, 4.4, 4.6, and 4.8. The logarithmic gradation is 1, 10, 1,000, 10,000, and 100,000 for a log-10 scale. The log-10 scale is a multiple of 10-squared, 100-squared, and so on. As observed, the number of COVID-19 cases is substantially larger than the number of deaths; therefore, the deaths would not be as discernible if placed on the same axis with COVID-19 cases using a universal base-10 scale. The lines for cases shown in Figures 4.1, 4.3, 4.5, and 4.7 (2D-plot) are more discernible than the bars representing the same cases in Figures 4.2, 4.4, 4.6, and 4.8 because large numbers are less discernible than smaller numbers on a logarithmic scale as depicted in a 3D-plot. Therefore, the plots in the 3D graphs using a logarithmic scale, which allowed the ability to place the large case count and small death count on the same axes. To emphasize, the above-mentioned graphs used a 2D-plot for regular numbers (base-10) and a 3D-plot for the logarithmic scale (log-10). Hence, the logarithmic scale is excellent for comparing small numbers with large numbers on the same scale. Mathematically, small numbers are more discernible on a logarithmic scale when compared with larger numbers.

I performed these computations using the subpopulation of residents for a given category and dividing the number of cases and deaths by the population of the category for the group. For example, I used Black residents in Horry County aged 65 to 84 as the denominator; therefore, the number of cases or deaths for Black residents are divided by the population of Black residents within the category and then multiplied by 100,000 to achieve 100k per capita. The Black population aged 65 to 84 is 5,816, and the death count is 54; therefore, the deaths per 100k for this group by age and race is (54/5,816)×100,000 = 928 deaths per 100k (see Table 6.8). The population of White residents in Horry County for the same age range (65–84) is 81,171 and the number of deaths in the same range is 551, which yields 679 deaths per 100k. Why is this comparison important? The actual death count of White and Black residents in Horry County was 551 and 54, respectively. Judging from the count, it might appear there were more deaths for White residents from COVID-19 than for Black residents, with 54 deaths. To the contrary, the White death rate is 679 per 100k, and the Black death rate is 928 per 100k, as shown in Table 6.9. Thus, the Black death rate is about 31% higher than the White death rate. This is an example of why it is important to compare statistics per capita. Measurements done on a per capita basis allow for meaningful comparisons and permit a better understanding of the magnitude of a problem.

The graphs show that most deaths occurred in the population aged 65 or older. Those aged 65–84 experienced fewer COVID-19 cases than the 18–34 category; however, the death rate for the 65–84 category is significantly higher than that of the 18–34 age category. This is evidence that although younger adults do contract the virus, the probability of death for older adults is significantly higher when afflicted with the virus. This description applies to all figures in this section (Figures 4.1–4.8) and the previous section (3.8, 3.10, and 3.12).

IV. COVID-19: Cases and Deaths by Race and Age, cont.

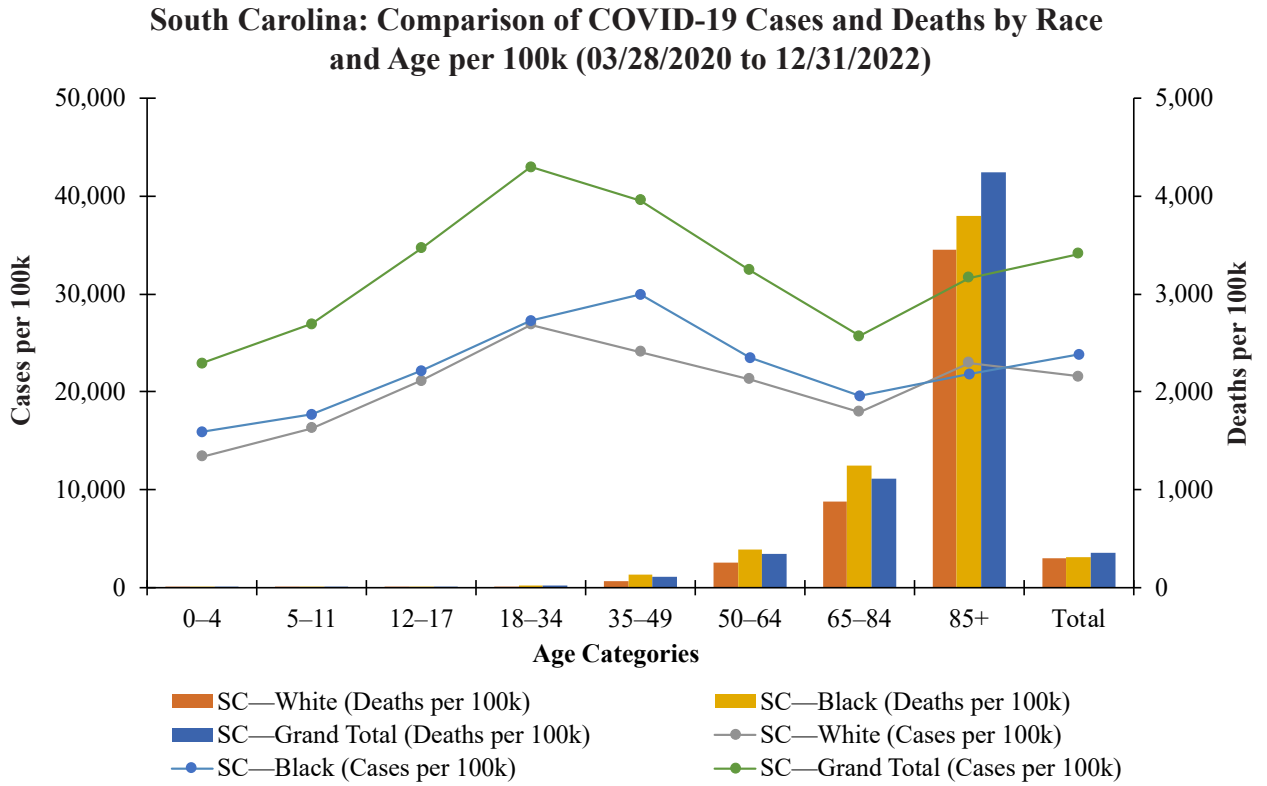

Figure 4.1 South Carolina: COVID-19 cases and deaths by race and age per 100k.*

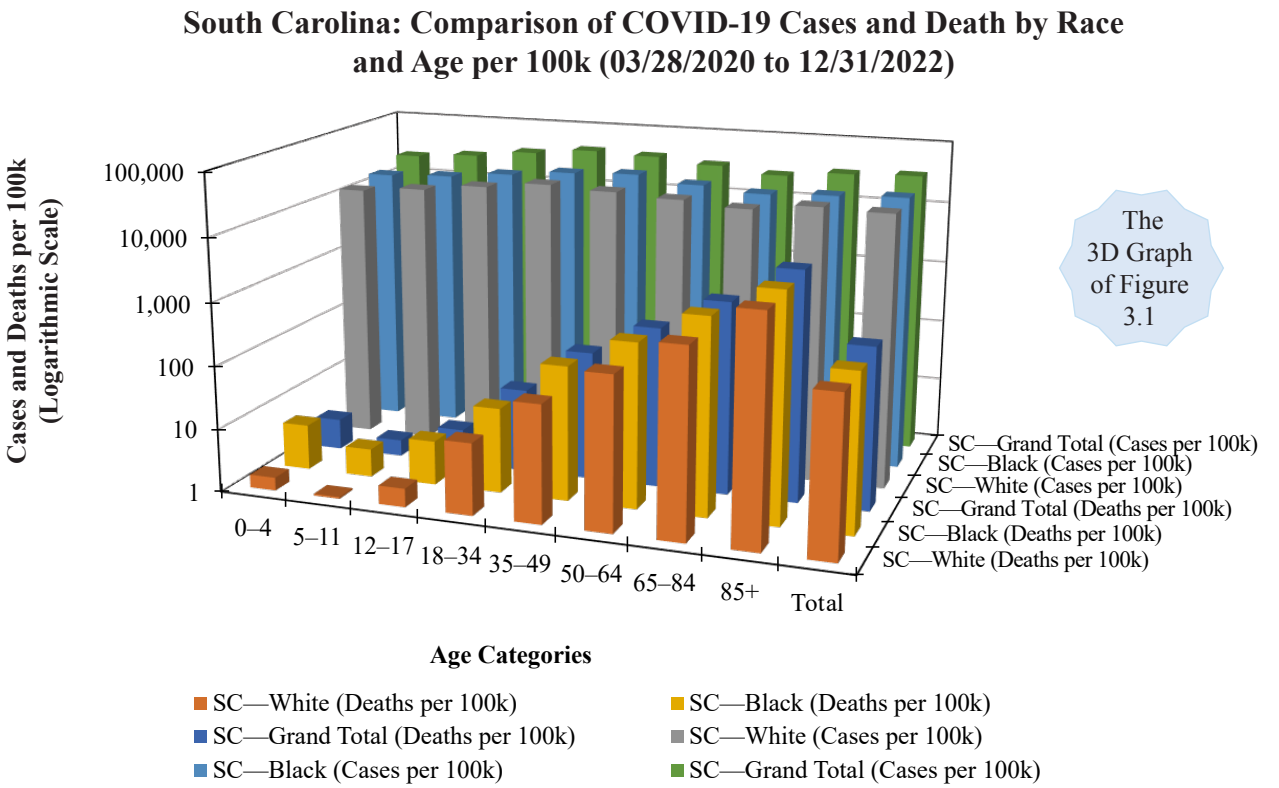

Figure 4.2 South Carolina: COVID-19 cases and deaths by race and age category per 100k.*

*Source: Tables 6.4 and 6.7

IV. COVID-19: Cases and Deaths by Race and Age, cont.

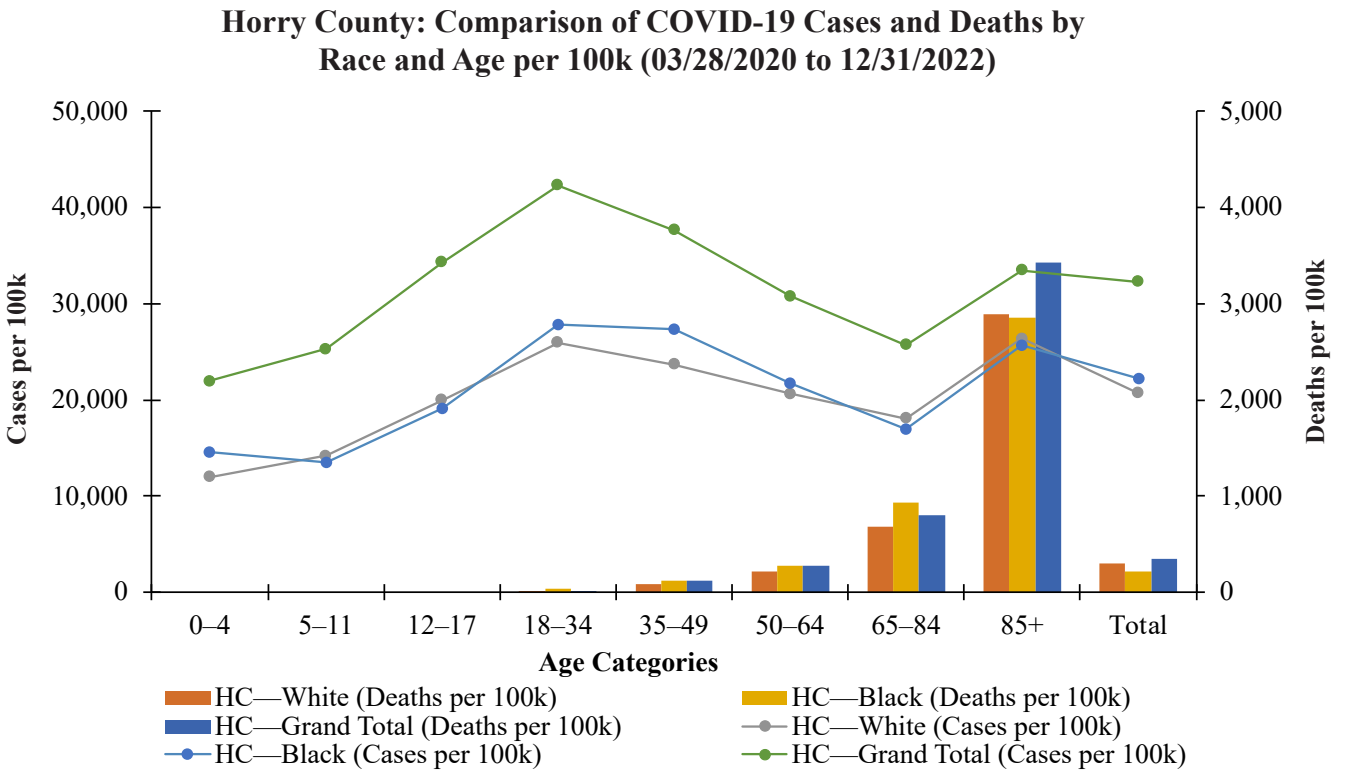

Figure 4.3 Horry County: COVID-19 cases and deaths by race and age category per 100k.*

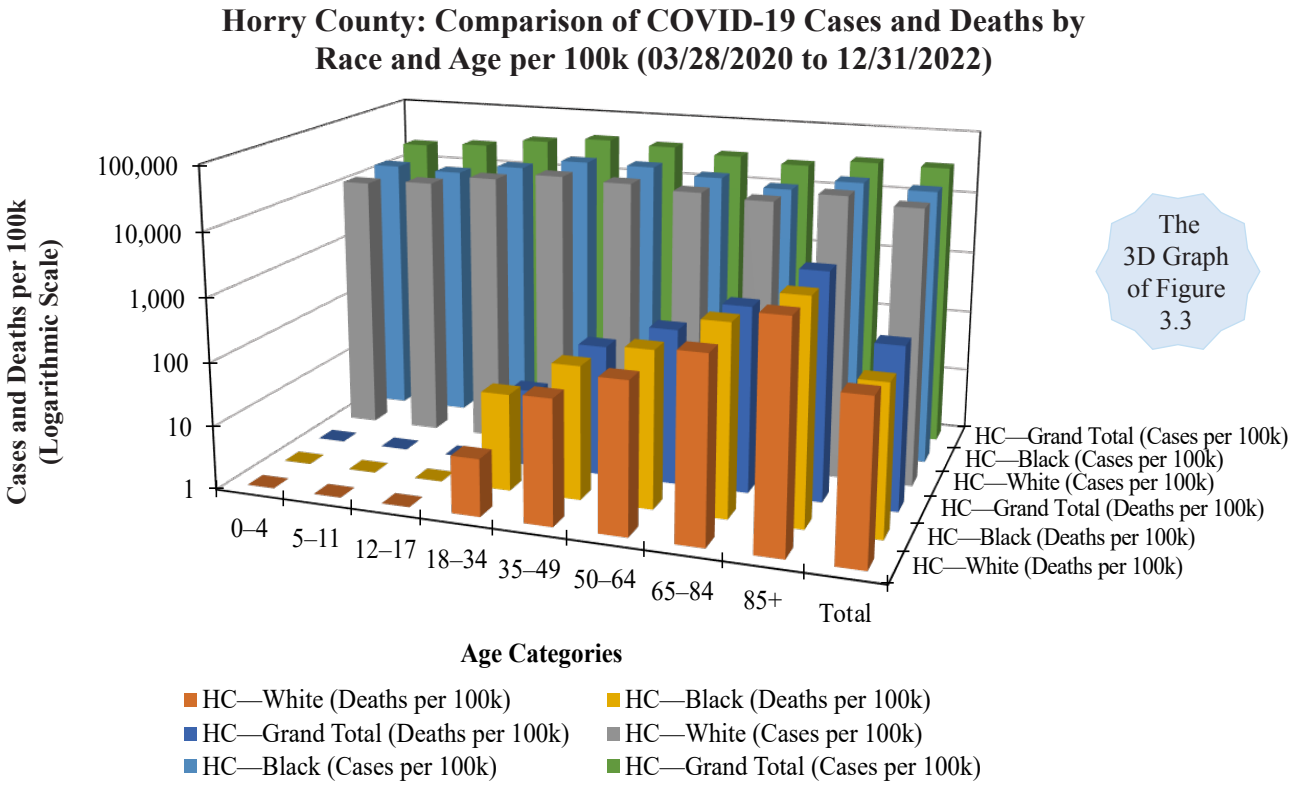

Figure 4.4 Horry County: COVID-19 cases and deaths by race and age category per 100k.*

Source: Tables 6.5 and 6.8

IV. COVID-19: Cases and Deaths by Race and Age, cont.

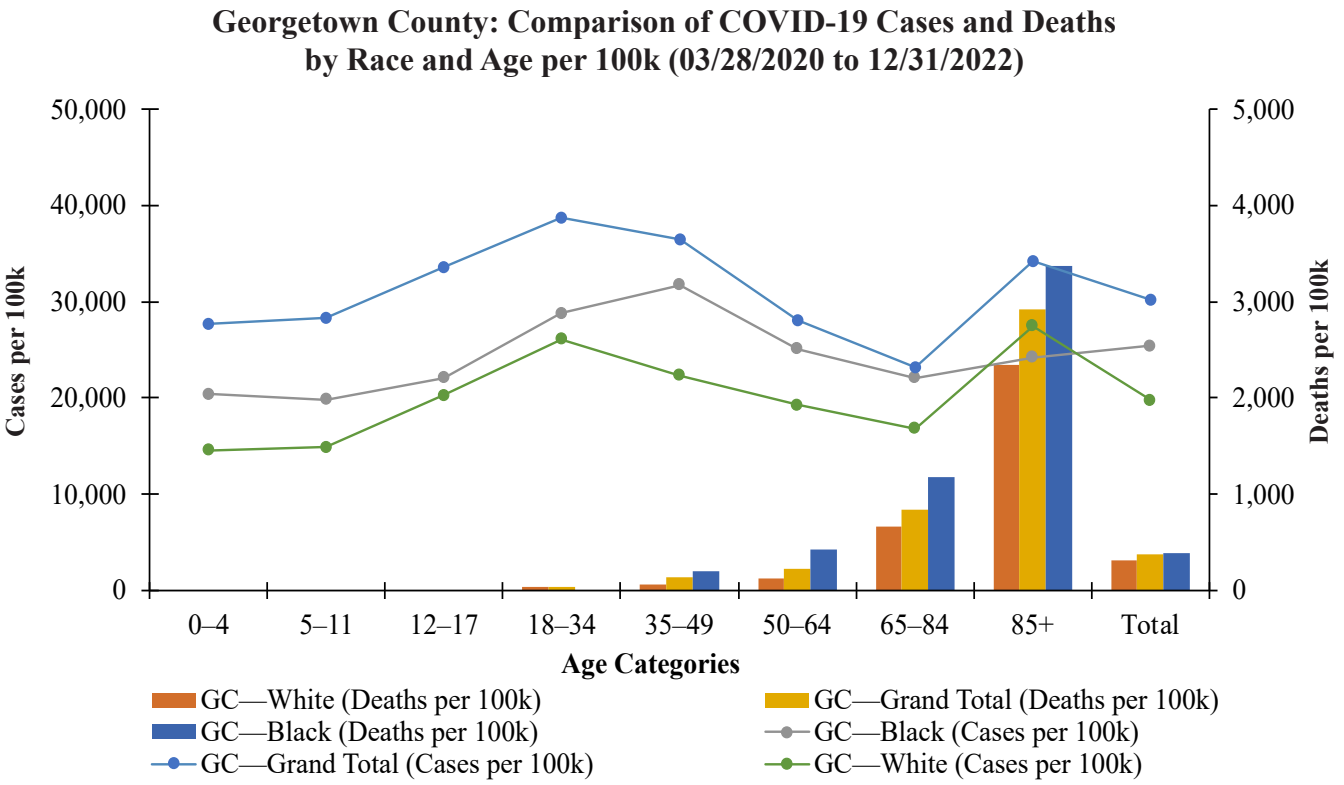

Figure 4.5 Georgetown County: COVID-19 cases and deaths by race and age per 100k.*

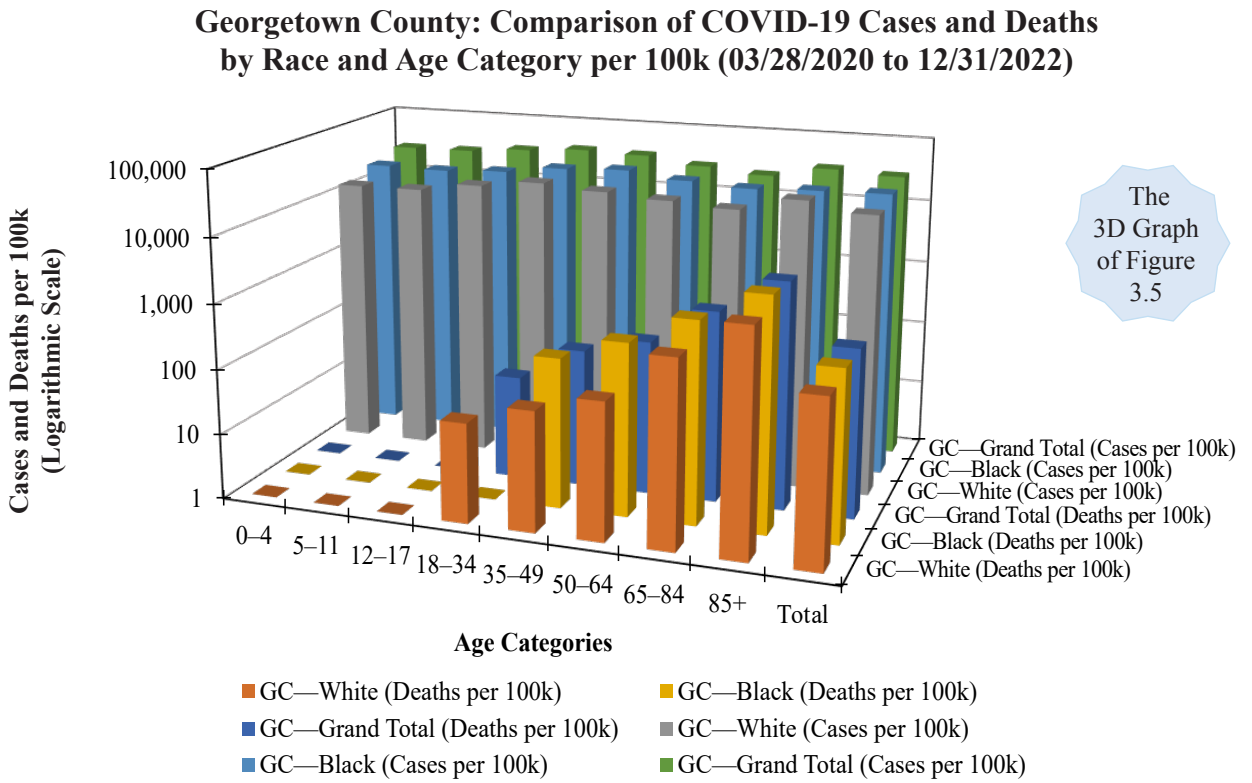

Figure 4.6 Georgetown County: COVID-19 cases and deaths by race and age per 100k.*

*Source: Tables 6.6 and 6.9

IV. COVID-19: Cases and Deaths by Race and Age, cont.

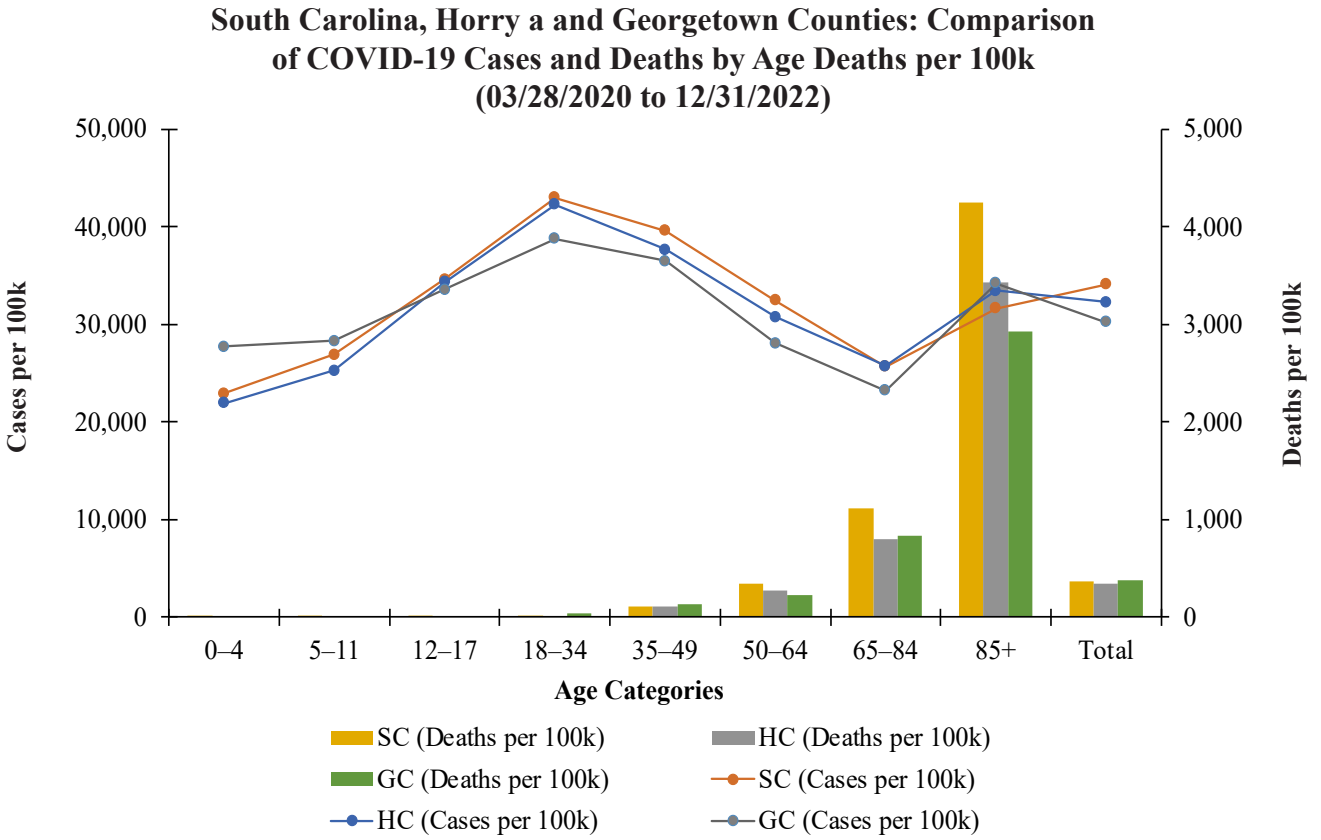

Figure 4.7 South Carolina, Horry County, and Georgetown County: COVID-19 cases and deaths by age per 100k.*

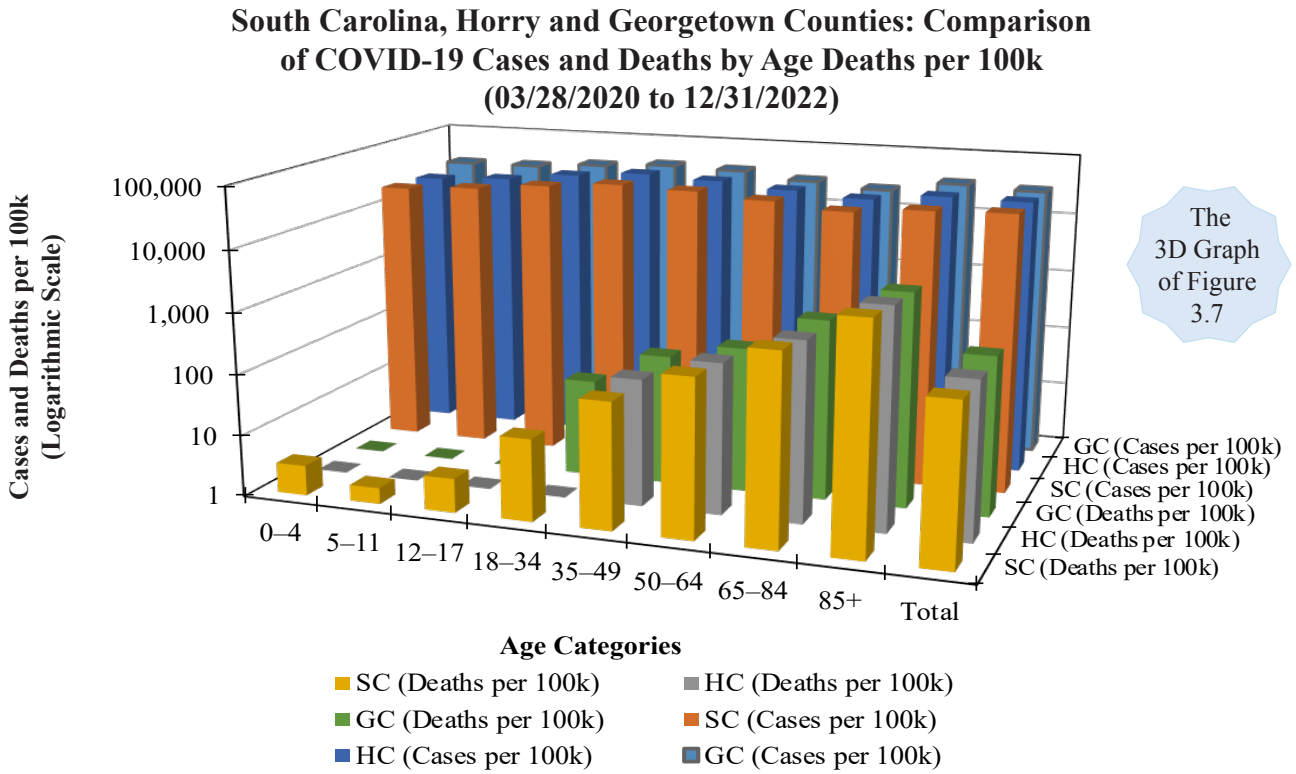

Figure 4.8 South Carolina, Horry County, and Georgetown County: COVID-19 cases and deaths by age per 100k.*

*Source: Tables 6.5 and 6.9

V. COVID-19: Cumulative Cases and Deaths in Three Selected Intervals by Race

The intent of the graphs in this section is to show the changes in cumulative COVID-19 cases and deaths for three selected intervals. The three selected cumulative intervals are (1) March 28, 2020–January 29, 2021; (2) January 30, 2021–March 25, 2022, and (3) March 26, 2022–December 31, 2022. The graphs in Figures 5.1–5.4 modeled the data with 3D charts and used a logarithmic scale to compare cases and deaths per 100k; however, the chart in Figure 4.5 shows only death rates per 100k on a normal scale. As stated previously, a logarithmic scale enables depicting large differences in large and small data values to be discernible on the same scale. As a reminder, the graphs shown in Figures 5.1–5.4 are plotted on a log scale for the purpose of presenting a discernible comparison between COVID-19 cases and deaths.

The computation for the rates per 100k is based on the total population of the group category, such as White and Black residents, divided by the cumulative number of cases and deaths. For example, in South Carolina during the time interval from March 26, 2022, to December 31, 2022, the number of deaths for White residents is 791 out of a White population of 3,631,407, which equates to 22 deaths per 100k. See Figure 5.1 and Table 6.14 for reference to the time intervals cited above.

As a comparison of cumulative deaths during the selected period of March 26, 2022, to December 31, 2022, the death rate from COVID-19 per 100k for Horry County (Figure 5.2) differ from the previous intervals before March 22, 2022 significantly. As a comparison, the stochastic behavior is still present, as shown in Figure 2.2. This is further indication that when experiencing fewer COVID-19 deaths, the stochastic process behavior is present. This is another example that COVID-19 is a stochastic virus. This shows evidence that with this level of randomness, a society cannot be continuously closing and reopening by chasing the randomness of a virus such as COVID-19. See Figures 2.1–2.3 for weekly cases and deaths for the three intervals in this section.

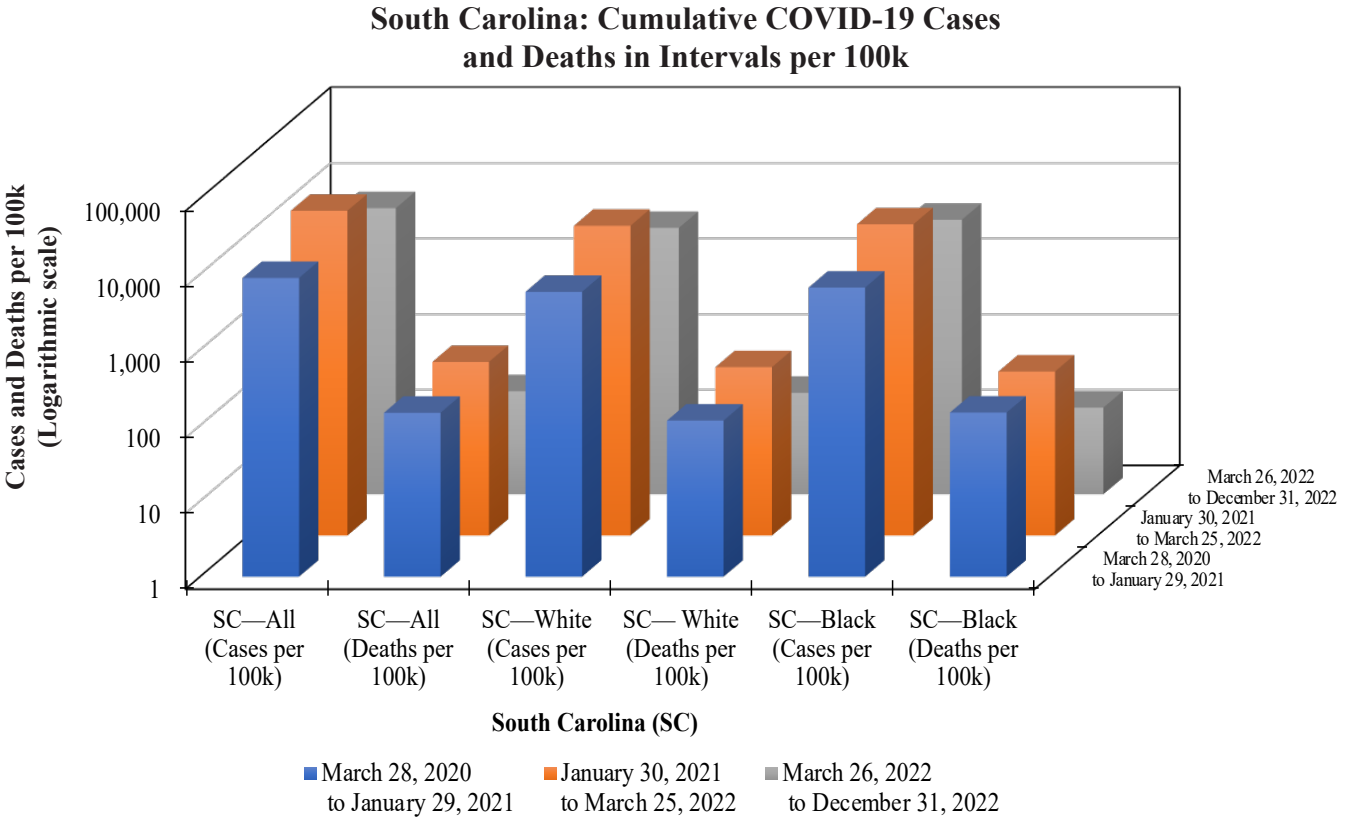

Figure 5.1 South Carolina: Intervals of COVID-19 cases and deaths by race per 100k.

Source: Tables 6.14

V. COVID-19: Cumulative Cases and Deaths in Three Selected Intervals and Race

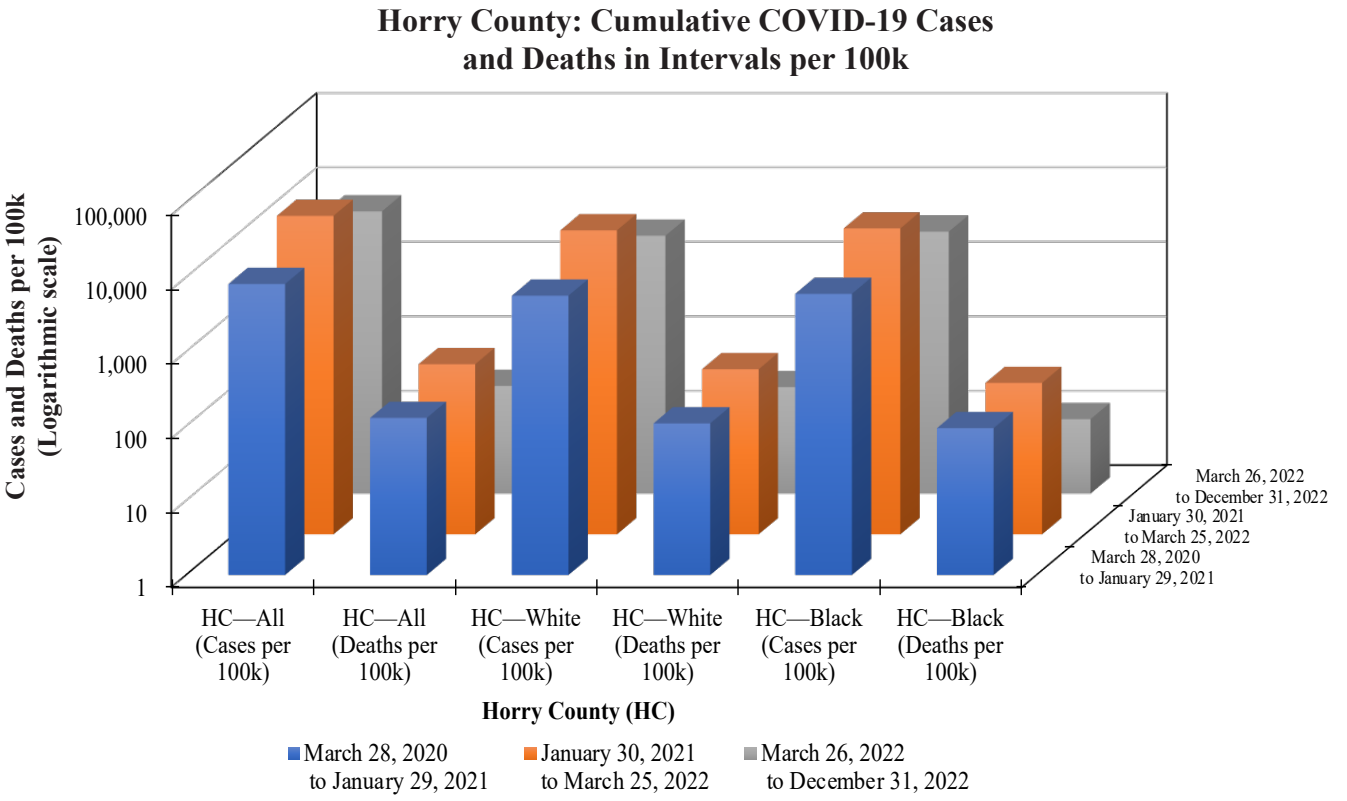

Figure 5.2 Horry County: COVID-19 cases and deaths by race per 100k.*

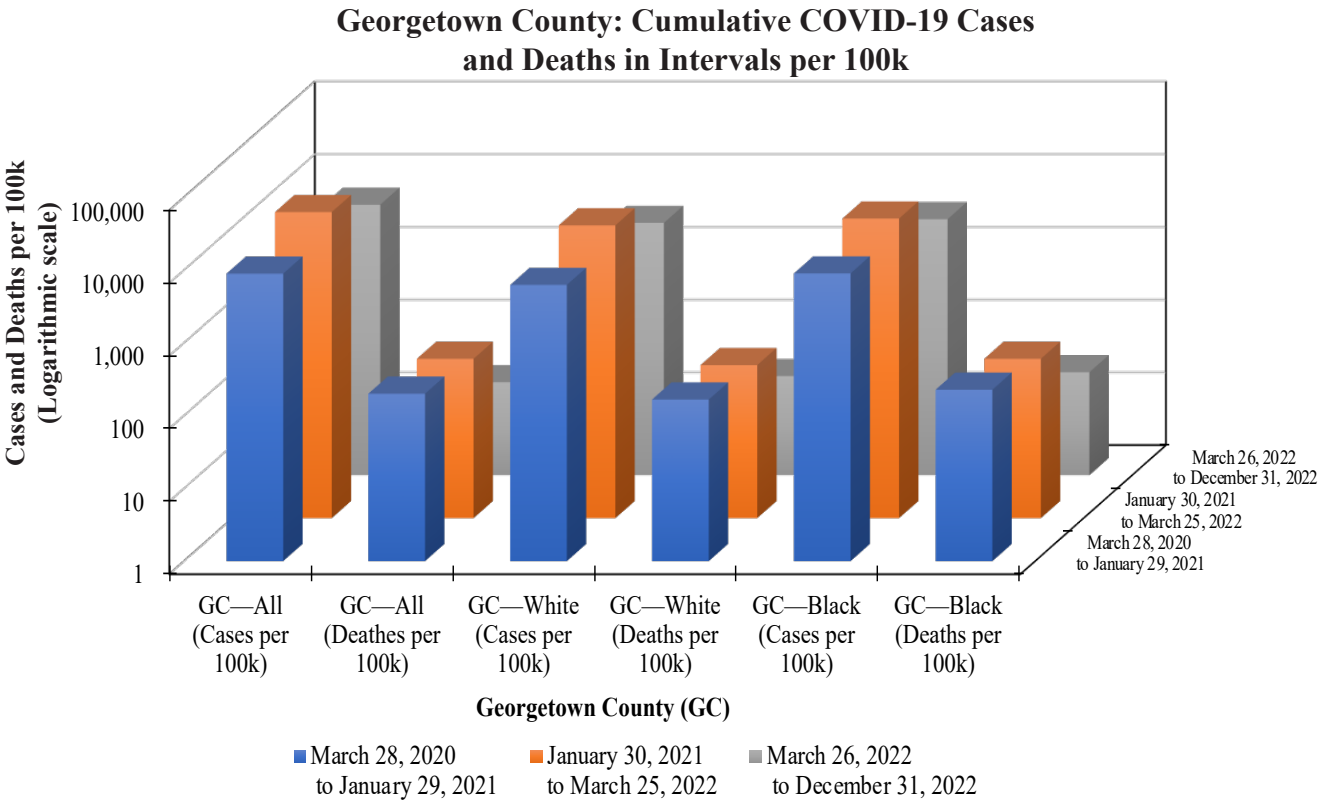

Figure 5.3 Georgetown County: Intervals of COVID-19 cases and deaths by race per 100k.*

•Source: Tables 6.15 and 6.16

V. COVID-19: Cumulative Cases and Deaths in Three Selected Intervals and Race

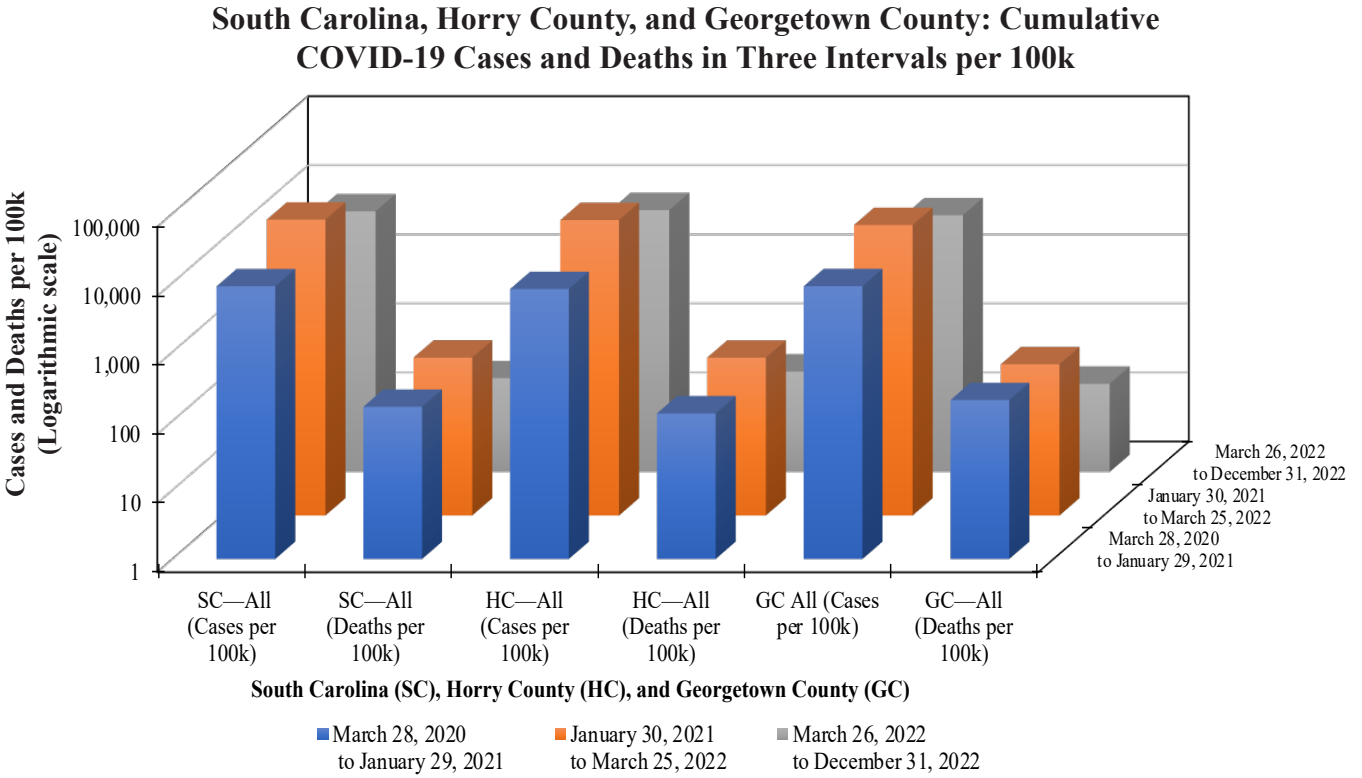

Figure 5.4 South Carolina, Horry County, and Georgetown County: Three intervals of COVID-19 cases and deaths by race per 100k.*

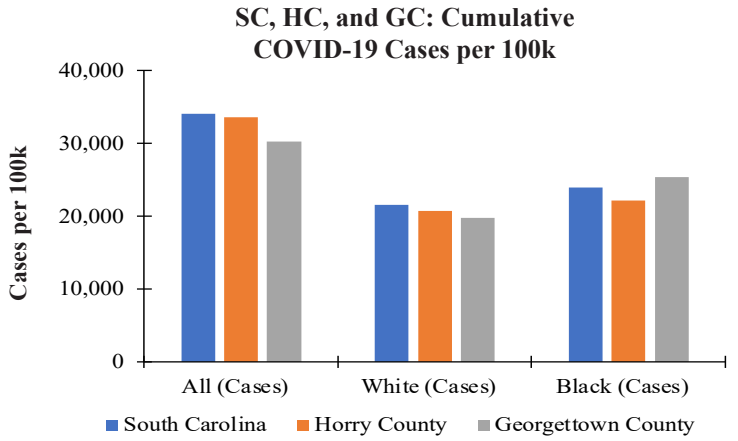

Figure 5.5: SC, HS, and GC: COVID-19 cases l per 100k (03/20/2020–12/31/2022).*

The graphs shown in Figures 5.5 and 5.6 depict the combined cumulative cases and deaths instead of the three intervals. The graph in Figure 5.5 depicts higher COVID-19 cases for Black residents in all three entities examined in this report. However, in Figure 5.6, the death rate for Black residents is statistically lower than White residents in Horry County.

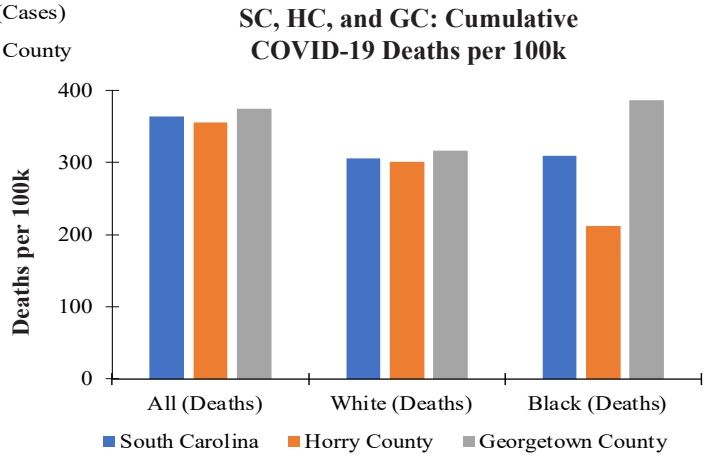

Figure 5.6: SC, HC, and GC: COVID-19 cases l per 100k (03/20/2020–12/31/2022).*

Source: Tables 6.14–6.16

VI. COVID-19: Tabular Analysis

Table 6.1: South Carolina—cumulative cases, deaths, and vaccinations (03/28/2023 to 12/31/2022).*

Name	Race	Parameters	Total		
			Cases	Deaths	Vaccinations Completion
South Carolina	White	Count	783,924	11,114	1,579,958
		Population Estimate	3,631,407	3,631,407	3,631,407
		Rate per 100k	21,587	306	43,508
	Black	Count	344,406	4,458	600,318
		Population Estimate	1,441,509	1,441,509	1,441,509
		Rate per 100k	23,892	309	41,645
	Other	Count	201,394	1,202	420,225
		Population Estimate	145,124	145,124	145,124
		Rate per 100k	138,774	828	289,563
	Unknown	Count	450,461	2,171	206,682
		Population Estimate	0	0	0
		Rate per 100k			
	Total	Count	1,780,185	18,945	2,807,183
		Population Estimate	5,218,040	5,218,040	5,218,040
		Rate per 100k	34,116	363	53,798

Table 6.2: Horry County—cumulative cases, deaths, and vaccinations (03/28/2020 to 12/31/2022).*

Name and Data Range Dates	Race	Parameters	Total		
			Cases	Deaths	Vaccinations Completion
Horry County	White	Count	63,552	924	145,092
		Population Estimate	307,341	307,341	307,341
		Rate per 100k	20,678	301	0
	Black	Count	10,884	104	17,340
		Population Estimate	49,102	49,102	49,102
		Rate per 100k	22,166	212	35,314
	Other	Count	7,485	53	26,410
		Population Estimate	9,006	9,006	9,006
		Rate per 100k	83,111	588	293,249
	Unknown	Count	36,083	167	13,673
		Population Estimate	0	0	0
		Rate per 100k			
	Total	Count	118,004	1,248	202,515
		Population Estimate	365,449	365,449	365,449
		Rate per 100k	32,290	341	55,415

*Source: SCDHEC

VI. COVID-19: Tabular Analysis, cont.

Table 6.3: Georgetown County—cumulative cases, deaths, and vaccinations completion (03/28/2020 to 12/31/2022).

Name and Data Range	Category	Parameters	Grand Total		
			Cases	Deaths	Vaccinations Completion
Georgetown County	White	Count	8,555	137	25,366
		Population Estimate	43,298	43,298	43,298
		Rate per 100k	19,758	316	58,585
	Black	Count	4,929	75	10,489
		Population Estimate	19,405	19,405	19,405
		Rate per 100k	25,401	386	54,053
	Other	Count	774	10	4,488
		Population Estimate	650	650	650
		Rate per 100k	119,077	1,538	690,462
	Unknown	Count	4,902	15	2,315
		Population Estimate	0	0	0
		Rate per 100k			
	Total	Count	19,160	237	42,658
		Population Estimate	63,353	63,353	63,353
		Rate per 100k	30,243	374	67,334

*Source: SCDHEC

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VI. COVID-19: Tabular Analysis, cont.

Table 6.4: South Carolina—cases of COVID-19 by race and age category (03/28/2020–12/31/2022).*

Category	Parameter	0–4	5–11	12–17	18–34	35–49	50–64	65–84	85+	Unknown	Total
White	Count	25,000	46,008	53,670	204,253	157,539	156,900	122,870	17,259	425	783,924
	Population Estimate	186,214	282,274	253,623	760,071	653,987	736,029	684,161	75,048	0	3,631,407
	Cases per 100k	13,425	16,299	21,161	26,873	24,089	21,317	17,959	22,997		21,587
Black	Count	15,185	25,344	27,932	97,159	77,138	61,516	36,046	3,926	160	344,406
	Population Estimate	95,115	143,072	126,254	355,995	257,293	261,959	183,803	18,018	0	1,441,509
	Cases per 100k	15,965	17,714	22,124	27,292	29,981	23,483	19,611	21,789		23,892
Other	Count	8,903	17,130	18,641	57,535	46,388	33,051	17,388	2,319	39	201,394
	Population Estimate	9,967	14,409	11,681	37,647	32,822	23,253	14,117	1,228	0	145,124
	Cases per 100k	89,325	118,884	159,584	152,828	141,332	142,136	123,171	188,844		138,774
Unknown	Count	17,709	29,918	35,355	136,638	92,476	79,733	50,418	6,335	1,879	450,461
	Population Estimate	0	0	0	0	0	0	0	0	0	0
	Cases per 100k										
Total	Count	66,797	118,400	135,598	495,585	373,541	331,200	226,722	29,839	2,503	1,780,185
	Population Estimate	291,296	439,755	391,558	1,153,713	944,102	1,021,241	882,081	94,294	0	5,218,040
	Cases per 100k	22,931	26,924	34,630	42,956	39,566	32,431	25,703	31,645		34,116

Table 6.5: Horry County— cases of COVID-19 by race and age category (03/28/2020–12/31/2022).*

Category	Parameter	0–4	5–11	12–17	18–34	35–49	50–64	65–84	85+	Unknown	Total
White	Count	1,446	2,722	3,474	13,399	11,619	14,587	14,660	1,623	22	63,552
	Population Estimate	12,049	19,152	17,388	51,633	49,033	70,766	81,171	6,149	0	307,341
	Cases per 100k	12,001	14,213	19,979	25,950	23,696	20,613	18,061	26,395		20,678
Black	Count	487	681	869	3,393	2,489	1,870	985	108	<5	10,884
	Population Estimate	3,351	5,058	4,537	12,188	9,108	8,623	5,816	421	0	49,102
	Cases per 100k	14,533	13,464	19,154	27,839	27,328	21,686	16,936	25,653		22,166
Other	Count	376	631	720	2,078	1,822	1,106	674	76	<5	7,485
	Population Estimate	531	773	656	1,888	2,149	1,691	1,245	73	0	9,006
	Cases per 100k	70,810	81,630	109,756	110,064	84,784	65,405	54,137	104,110		83,111
Unknown	Count	1,184	2,282	2,686	8,916	6,763	7,401	6,370	415	66	36,083
	Population Estimate	0	0	0	0	0	0	0	0	0	0
	Cases per 100k										
Total	Count	3,493	6,316	7,749	27,786	22,693	24,964	22,689	2,222	88	118,004
	Population Estimate	15,931	24,983	22,581	65,709	60,290	81,080	88,232	6,643	0	365,449
	Cases per 100k	21,926	25,281	34,316	42,286	37,640	30,789	25,715	33,449		32,290

*Source: SCDHEC

VI. COVID-19: Tabular Analysis, cont

Table 6.6: Georgetown County—cases of COVID-19 by race and age (03/28/2020–12/31/2022).*

Category	Parameter	0–4	5–11	12–17	18–34	35–49	50–64	65–84	85+	Unknown	Total
White	Count	226	358	456	1,579	1,343	1,926	2,325	340	<5	8,555
	Population Estimate	1,550	2,409	2,252	6,048	6,002	9,977	13,824	1,236	0	43,298
	Cases per 100k	14,581	14,861	20,249	26,108	22,376	19,304	16,819	27,508	0	19,758
Black	Count	221	358	358	1,203	967	990	753	79		4,929
	Population Estimate	1,082	1,806	1,619	4,179	3,046	3,939	3,408	326		19,405
	Cases per 100k	20,425	19,823	22,112	28,787	31,747	25,133	22,095	24,233		25,401
Other	Count	35	59	80	192	182	121	94	11		774
	Population Estimate	41	51	48	145	132	126	96	11		650
	Cases per 100k	85,366	115,686	166,667	132,414	137,879	96,032	97,917	100,000		119,077
Unknown	Count	259	432	422	1,046	857	906	849	108	23	4,902
	Population Estimate	0	0	0	0	0	0	0	0	0	0
	Cases per 100k										
Total	Count	741	1,207	1,316	4,020	3,349	3,943	4,021	538	25	19,160
	Population Estimate	2,673	4,266	3,919	10,372	9,180	14,042	17,328	1,573	0	63,353
	Cases per 100k	27,722	28,293	33,580	38,758	36,481	28,080	23,205	34,202		30,243

Table 6.7: South Carolina—deaths from COVID-19 by race and age (03/28/2020–12/31/2022).*

Category	Parameter	0–4	5–11	12–17	18–34	35–49	50–64	65–84	85+	Unknown	Total
White	Count	3	3	5	104	466	1,901	6,031	2,593	8	11,114
	Population Estimate	186,214	282,274	253,623	760,071	653,987	736,029	684,161	75,048	0	3,631,407
	Deaths per 100k	2	1	2	14	71	258	882	3,455		306
Black	Count	5	4	5	79	344	1,041	2,296	684	<5	4,458
	Population Estimate	95,115	143,072	126,254	355,995	257,293	261,959	183,803	18,018	0	1,441,509
	Deaths per 100k	5	3	5	22	134	397	1,249	3,796		309
Other	Count	1	<5	4	31	114	253	557	239	<5	1,202
	Population Estimate	9,967	14,409	11,681	37,647	32,822	23,253	14,117	1,228	0	145,124
	Deaths per 100k	10		34	82	347	1,088	3,946	19,463		828
Unknown	Count		1		31	119	358	957	488	216	2,171
	Population Estimate		0		0	0	0	0	0	0	0
	Deaths per 100k										
Total	Count	9	8	14	245	1,043	3,553	9,841	4,004	224	18,945
	Population Estimate	291,296	439,755	391,558	1,153,713	944,102	1,021,241	882,081	94,294	0	5,218,040
	Deaths per 100k	3	2	4	21	110	348	1,116	4,246		363

*Source: SCDHEC

VI. COVID-19: Tabular Analysis, cont

Table 6.8: Horry County—deaths from COVID-19 by race and age (03/28/2020–12/31/2022).*

Category	Parameter	0–4	5–11	12–17	18–34	35–49	50–64	65–84	85+	Unknown	Total
White	Count	0	0	0	4	42	150	551	178	<5	924
	Population Estimate	12,049	19,152	17,388	51,633	49,033	70,766	81,171	6,149	0	307,341
	Deaths per 100k	0	0	0	8	86	212	679	2,895		301
Black	Count	0	0	0	4	11	24	54	12		104
	Population Estimate	3,351	5,058	4,537	12,188	9,108	8,623	5,816	421		49,102
	Deaths per 100k	0	0	0	33	121	278	928	2,850		212
Other	Count	0	0	0	2	7	21	13	10		53
	Population Estimate	531	773	656	1,888	2,149	1,691	1,245	73		9,006
	Deaths per 100k	0	0	0	106	326	1,242	1,044	13,699		588
Unknown	Count				1	9	27	87	28	12	167
	Population Estimate				0	0	0	0	0	0	0
	Deaths per 100k										
Total	Count	0	0	0	11	69	222	705	228	12	1,248
	Population Estimate	15,931	24,983	22,581	65,709	60,290	81,080	88,232	6,643	0	365,449
	Deaths per 100k	0	0	0	17	114	274	799	3,432		341

Table 6.9: Georgetown County—deaths from COVID-19 by race and age (03/28/2020–12/31/2022).*

Category	Parameter	0–4	5–11	12–17	18–34	35–49	50–64	65–84	85+	Unknown	Total
White	Count	0	0	0	2	4	12	91	29		137
	Population Estimate	1,550	2,409	2,252	6,048	6,002	9,977	13,824	1,236		43,298
	Deaths per 100k	0	0	0	33	67	120	658	2,346		316
Black	Count	0	0	0	2	6	17	40	11		75
	Population Estimate	1,082	1,806	1,619	4,179	3,046	3,939	3,408	326		19,405
	Deaths per 100k	0	0	0	48	196	432	1,174	3,374		386
Other	Count	0	0	0	0	1	2	4	3		10
	Population Estimate	41	51	48	145	132	126	96	11		650
	Deaths per 100k	0	0	0	0	758	1,587	4,167	27,273		1,538
Unknown	Count					1	1	10	3		15
	Population Estimate					0	0	0	0		0
	Deaths per 100k										
Total	Count	0	0	0	4	12	32	145	46	0	237
	Population Estimate	2,673	4,266	3,919	10,372	9,180	14,042	17,328	1,573	0	63,353
	Deaths per 100k	0	0	0	39	131	228	837	2,924		374

*Source: SCDHEC

VI. COVID-19: Tabular Analysis, cont

Table 6.10: South Carolina: vaccinations completed for COVID-19 by race and age (03/28/2020–12/31/2022).*

Category	Parameter	0–4	5–11	12–17	18–34	35–49	50–64	65–84	85+	Unknown	Total
White	Count	3,597	40,949	82,320	272,431	281,433	396,234	462,343	41,393	<5	1,580,703
	Population Estimate	186,214	282,274	253,623	760,071	653,987	736,029	684,161	75,048	0	3,631,407
	Vaccinations per 100k	1,932	14,507	32,458	35,843	43,033	53,834	67,578	55,155	0	43,529
Black	Count	665	22,683	47,467	112,224	125,222	158,773	123,651	9,925	5	600,615
	Population Estimate	95,115	143,072	126,254	355,995	257,293	261,959	183,803	18,018	0	1,441,509
	Vaccinations per 100k	699	15,854	37,596	31,524	48,669	60,610	67,274	55,084	0	41,666
Other	Count	978	16,227	33,387	84,264	83,758	93,358	94,038	14,453	<5	420,466
	Population Estimate	9,967	14,409	11,681	37,647	32,822	23,253	14,117	1,228	0	145,124
	Vaccinations per 100k	9,812	112,617	285,823	223,827	255,189	401,488	666,133	1,176,954	0	289,729
Unknown	Count	510	5,461	6,351	36,297	43,606	57,781	51,405	5,406	6	206,823
	Population Estimate	0	0	0	0	0	0	0	0	0	0
	Vaccinations per 100k										
Total	Count	5,750	85,320	169,525	505,216	534,019	706,146	731,437	71,177	17	2,808,607
	Population Estimate	291,296	439,755	391,558	1,153,713	944,102	1,021,241	882,081	94,294	0	5,218,040
	Vaccinations per 100k	1,974	19,402	43,295	43,790	56,564	69,146	82,922	75,484	0	53,825

Table 6.11: Horry County—vaccinations completed for COVID-19 by race and age (03/28/2020–12/31/2022).*

Category	Parameter	0–4	5–11	12–17	18–34	35–49	50–64	65–84	85+	Unknown	Total
White	Count	134	2,328	5,371	17,604	20,054	38,253	57,404	4,011		145,159
	Population Estimate	12,049	19,152	17,388	51,633	49,033	70,766	81,171	6,149		307,341
	Vaccinations per 100k	1,112	12,155	30,889	34,094	40,899	54,056	70,720	65,230	0	47,231
Black	Count	22	527	1,284	3,409	3,707	4,646	3,499	257	<5	17,355
	Population Estimate	3,351	5,058	4,537	12,188	9,108	8,623	5,816	421	0	49,102
	Vaccinations per 100k	657	10,419	28,301	27,970	40,700	53,879	60,162	61,045	0	35,345
Other	Count	18	587	1,815	4,466	4,313	5,839	8,413	969		26,420
	Population Estimate	531	773	656	1,888	2,149	1,691	1,245	73		9,006
	Vaccinations per 100k	3,390	75,938	276,677	236,547	200,698	345,299	675,743	1,327,397	0	293,360
Unknown	Count	15	277	406	2,181	2,679	4,022	3,822	280		13,682
	Population Estimate	0	0	0	0	0	0	0	0		0
	Vaccinations per 100k										
Total	Count	189	3,719	8,876	27,660	30,753	52,760	73,138	5,517	<5	202,616
	Population Estimate	15,931	24,983	22,581	65,709	60,290	81,080	88,232	6,643	0	365,449
	Vaccinations per 100k	1,186	14,886	39,307	42,095	51,008	65,072	82,893	83,050	0	55,443

*Source: SCDHEC

VI. COVID-19: Tabular Analysis, cont

Table 6.12: Georgetown County—vaccinations completion for COVID-19 by race and age (03/28/2020–12/31/2022).*

Category	Parameter	0–4	5–11	12–17	18–34	35–49	50–64	65–84	85+	Unknown	Total
White	Count	7	378	1,023	2,560	3,171	6,684	10,733	812		25,368
	Population Estimate	1,550	2,409	2,252	6,048	6,002	9,977	13,824	1,236		43,298
	Vaccinations per 100k	452	15,691	45,426	42,328	52,832	66,994	77,640	65,696	0	58,589
Black	Count	0	309	726	1,722	1,824	2,902	2,769	227		10,479
	Population Estimate	1,082	1,806	1,619	4,179	3,046	3,939	3,408	326		19,405
	Vaccinations per 100k	0	17,110	44,842	41,206	59,882	73,674	81,250	69,632	0	54,002
Other	Count	<5	71	272	636	647	1,035	1,595	230		4,487
	Population Estimate	41	51	48	145	132	126	96	11		650
	Vaccinations per 100k										
Unknown	Count		22	59	276	383	752	772	53		2,317
	Population Estimate		0	0	0	0	0	0	0		0
	Vaccinations per 100k										
Total	Count	8	780	2,080	5,194	6,025	11,373	15,869	1,322		42,651
	Population Estimate	2,673	4,266	3,919	10,372	9,180	14,042	17,328	1,573		63,353
	Vaccinations per 100k	299	18,284	53,075	50,077	65,632	80,993	91,580	84,043	0	67,323

Table 6.13 Cumulative vaccination completion rate.*

		Vaccinations Completion								
		South Carolina			Horry County			Georgetown County		
Race	Parameter	All	Female	Male	All	Female	Male	All	Female	Male
White	Count	1,579,958	861,148	718,110	145,092	80,142	64,924	25,366	13,862	11,499
	Population Estimate	3,631,407	1,851,057	1,780,350	307,341	159,182	148,159	43,298	22,509	20,789
	Vaccinations per 100k	43,508	46,522	40,335	47,209	50,346	43,820	58,585	61,584	55,313
Black	Count	600,318	353,744	246,362	17,340	10,168	7,169	10,489	6,248	4,238
	Population Estimate	1,441,509	768,768	672,741	49,102	25,756	23,346	19,405	10,596	8,809
	Vaccinations per 100k	41,645	46,014	36,621	35,314	39,478	30,708	54,053	58,966	48,110

*Source: SCDHEC

VI. COVID-19: Tabular Analysis, cont

Tables 6.14–6.16 contain COVID-19 data for three selected intervals between (3/28/2020–01/29/2021); (01/30/2021–03/25/2022); and (03/26/2022–12/31/2022)

Table 6.14: South Carolina: Cases, Deaths, and Vaccinations Completed (Three intervals)

Name and Intervals	Race	Population Characteristics	Total		
			Cases	Deaths	Vaccinations Completion
South Carolina Interval #1 March 28, 2020 to January 29, 2021	White	Count	211,891	4,213	55,696
		Population Estimate	3,631,407	3,631,407	3,631,407
		Rate per 100k	5,835	116	1,534
	Black	Count	95,656	2,140	7,262
		Population Estimate	1,441,509	1,441,509	1,441,509
		Rate per 100k	6,636	148	504
	Other	Count	54,674	359	10,367
		Population Estimate	145,124	145,124	145,124
		Rate per 100k	37,674	247	7,144
	Unknown	Count	102,003	944	3,692
		Population Estimate	0	0	0
		Rate per 100k			
	Total	Count	464,224	7,656	77,017
		Population Estimate	5,218,040	5,218,040	5,218,040
		Rate per 100k	8,897	147	1,476
South Carolina Interval #2 January 30, 2021 to March 25, 2022	White	Count	451,427	6,110	1,471,859
		Population Estimate	3,631,407	3,631,407	3,631,407
		Rate per 100k	12,431	168	40,531
	Black	Count	187,478	2,113	567,422
		Population Estimate	1,441,509	1,441,509	1,441,509
		Rate per 100k	13,006	147	39,363
	Other	Count	130,746	776	390,635
		Population Estimate	145,124	145,124	145,124
		Rate per 100k	90,093	535	269,173
	Unknown	Count	236,114	1,100	193,440
		Population Estimate	0	0	0
		Rate per 100k			
	Total	Count	1,005,765	10,099	2,623,356
		Population Estimate	5,218,040	5,218,040	5,218,040
		Rate per 100k	19,275	194	50,275

Source; South Carolina Department of Health and Environmental (SCDHEC)

VI. COVID-19: Tabular Analysis, cont.

Table 6.14: South Carolina: Cases, Deaths, and Vaccinations Completed (Three intervals)—cont.*

Name and Interval	Race	Population Characteristics	Total		
			Cases	Deaths	Vaccinations Completion
South Carolina Interval #3 March 26, 2022 to December 31, 2022	White	Count	120,606	791	52,403
		Population Estimate	3,631,407	3,631,407	3,631,407
		Rate per 100k	3,321	22	1,443
	Black	Count	61,272	205	25,634
		Population Estimate	1,441,509	1,441,509	1,441,509
		Rate per 100k	4,251	14	1,778
	Other	Count	15,974	67	19,223
		Population Estimate	145,124	145,124	145,124
		Rate per 100k	11,007	46	13,246
	Unknown	Count	112,344	127	9,550
		Population Estimate	0	0	0
		Rate per 100k			
	Total	Count	310,196	1,190	106,810
		Population Estimate	5,218,040	5,218,040	5,218,040
		Rate per 100k	5,945	23	2,047

Table 6.15: Horry County: Cases, Deaths, and Vaccinations Completed (Three intervals).*

Name and Intervals	Race	Parameters	Total		
			Cases	Deaths	Vaccinations Completion
Horry County Interval #1 March 28, 2020 to January 29, 2021	White	Count	17,382	335	4,678
		Population Estimate	307,341	307,341	307,341
		Rate per 100k	5,656	109	1,522
	Black	Count	2945	46	317
		Population Estimate	49102	49102	49102
		Rate per 100k	5,998	94	646
	Other	Count	1,728	12	748
		Population Estimate	9,006	9,006	9,006
		Rate per 100k	19,187	133	8,306
	Unknown	Count	7,635	77	257
		Population Estimate	0	0	0
		Rate per 100k			
	Total	Count	29,690	470	6,000
		Population Estimate	365,449	365,449	365,449
		Rate per 100k	8,124	129	1,642

*Source: SCDHEC

VI. COVID-19: Tabular Analysis, cont.

Table 6.15: Horry County: Cases, Deaths, and Vaccinations Completed (Three intervals)—cont.

Name and Intervals	Race	Parameters	Total		
			Cases	Deaths	Vaccinations Completion
Horry County Interval #2 January 30, 2021 to March 25, 2022	White	Count	37,224	506	135,993
		Population Estimate	307,341	307,341	307,341
		Rate per 100k	12,112	165	44,248
	Black	Count	6,316	53	16,296
		Population Estimate	49,102	49,102	49,102
		Rate per 100k	12,863	108	33,188
	Other	Count	5,192	37	24,442
		Population Estimate	9,006	9,006	9,006
		Rate per 100k	57,650	411	271,397
	Unknown	Count	17,840	82	12,732
		Population Estimate	0	0	0
		Rate per 100k			
	Total	Count	66,572	678	189,463
		Population Estimate	365,449	365,449	365,449
		Rate per 100k	18,216	186	51,844
Horry County Interval #3 March 26, 2022 to December 31, 2022	White	Count	8,946	83	4,421
		Population Estimate	307,341	307,341	307,341
		Rate per 100k	2,911	27	1,438
	Black	Count	1,623	5	727
		Population Estimate	49,102	49,102	49,102
		Rate per 100k	3,305	10	1,481
	Other	Count	565	<5	1,220
		Population Estimate	9,006	9,006	9,006
		Rate per 100k	6,274	0	
	Unknown	Count	10,608	8	684
		Population Estimate	0	0	0
		Rate per 100k			
	Total	Count	21,742	100	7,052
		Population Estimate	365,449	365,449	365,449
		Rate per 100k	5,949	27	1,930

*Source: SCDHEC

VI. COVID-19: Tabular Analysis, cont.

Table 6.16: Georgetown County: Cases, Deaths, and Vaccinations Completed (Three intervals)

Name and Interval	Race	Parameters	Grand Total		
			Cases	Deaths	Vaccinations Completion
Georgetown County Interval #1 March 28, 2020 to January 29, 2021	White	Count	2,707	72	887
		Population Estimate	43,298	43,298	43,298
		Rate per 100k	6,252	166	2,049
	Black	Count	1,745	44	151
		Population Estimate	19,405	19,405	19,405
		Rate per 100k	8,993	227	778
	Other	Count	271	6	165
		Population Estimate	650	650	650
		Rate per 100k	41,692	923	25,385
	Unknown	Count	942	5	14
		Population Estimate	0	0	0
		Rate per 100k			
	Total	Count	5,665	127	1,217
		Population Estimate	63,353	63,353	63,353
		Rate per 100k	8,942	200	1,921
Georgetown County Interval #2 January 30, 2021 to March 25, 2022	White	Count	4,578	55	23,849
		Population Estimate	43,298	43,298	43,298
		Rate per 100k	10,573	127	55,081
	Black	Count	2,544	30	9,991
		Population Estimate	19,405	19,405	19,405
		Rate per 100k	13,110	155	51,487
	Other	Count	462	4	4,184
		Population Estimate	650	650	650
		Rate per 100k	71,077	615	643,692
	Unknown	Count	2,606	9	2,181
		Population Estimate	0	0	0
		Rate per 100k			
	Total	Count	10,190	98	40,205
		Population Estimate	63,353	63,353	63,353
		Rate per 100k	16,084	155	63,462

*Source: SCDHEC

VI. COVID-19: Tabular Analysis, cont.

Table 6.16: Georgetown County: Cases, Deaths, and Vaccinations Completed (Three intervals)—cont.*

Name and Intervals	Race	Parameters	Total		
			Cases	Deaths	Vaccinations Completion
Georgetown County Interval #3 March 26, 2022 to December 31, 2022	White	Count	1,270	10	630
		Population Estimate	43,298	43,298	43,298
		Rate per 100k	2,933	23	0
	Black	Count	640	5	347
		Population Estimate	19,405	19,405	19,405
		Rate per 100k	3,298	26	1,788
	Other	Count	41	0	139
		Population Estimate	650	650	650
		Rate per 100k	6,308	0	21,385
	Unknown	Count	1,354	<5	120
		Population Estimate	0	0	0
		Rate per 100k			
	Total	Count	3,305	12	1,236
		Population Estimate	63,353	63,353	63,353
		Rate per 100k	5,217	19	1,951

*Source: SCDHEC

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VII. Summary

The executive summary on page 4 of this report bulletized the takeaways from the report. Consequently, the longer summary shown here provides a significantly more detailed discussion of the results and findings of the analyses performed for COVID-19 that have been depicted throughout the report. To emphasize, the entities examined are South Carolina as a whole, Horry County, and Georgetown County.

Weekly Cases and Deaths from COVID-19

The weekly cases are not statistically different from before and after the implementation of vaccines. This is evidence that the vaccines do not stop the spread of the COVID-19 virus. Additionally, there is strong statistical inference that wearing masks on or off or using social distancing do not slow the spread of the COVID-19 virus; as evidenced in weekly cases, a stochastic path of the COVID-19 virus persists.

Although Phase I of the COVID-19 vaccine started on March 8, 2021, the random pattern of COVID-19 weekly cases and deaths continued with a stochastic path, or random pattern, until March 26, 2022, in South Carolina as a whole, Horry County, and Georgetown County. The stochastic path of cases with large variations continued after the vaccine was implemented, along with the wearing of masks, social distancing, and shutdowns, in addition to other Centers for Disease Control and Prevention (CDC) guidelines. Even after there were significantly fewer deaths, the randomness of a stochastic pattern continued with a significantly smaller variation. See Figures 2.1, 2.2, and 2.3. It is difficult to tell whether the smaller number of deaths from March 26, 2022, through December 31, 2022, was because of vaccinations completion, herd immunity, or both. Nevertheless, the fewer deaths per 100,000 continued to follow a stochastic process.

The difference between the South Carolina as a whole and Horry County weekly deaths per 100,000 is statistically insignificant. However, the difference between the South Carolina as a whole and Georgetown County weekly deaths per 100,000 is statistically significant with Georgetown County experiencing a higher rate.

COVID-19: Vaccinations Completion versus Cases and Deaths

The graphs in Figures 3.1–3.6 depict classical stochastic paths—including vaccinations—shown for weekly measurements of cases and deaths. There is no statistical correlation between vaccinations completion and cases. Examples of no statistical correlation between COVID-19 cases and deaths relative to vaccinations completion are shown in Figures 3.7, 3.9, and 3.11. However, the decreased death rate is statistically significant from March 2022 to the present. The graphs in Figures 3.8, 3.10, and 3.12 show strong statistical evidence that COVID-19 deaths among the 85 and older group are substantially higher than those under the age of 85. However, the graphs show that the age category with the most infection was 65–84 and the category with the most deaths was 85 and older. Since the beginning of COVID-19, older adults have been seriously affected in terms of hospitalization and/or death.

The CDC is on record stating that vaccines are an effective way to protect yourself against severe COVID-19. The notion of the vaccine protecting a person from severe COVID-19 is consistent with the findings in this report. Hence, this report depicted the reduction in deaths after completed vaccinations. It is important that people who are moderately to severely immunocompromised exercise caution and recognize the need for additional preventative measures as well as other treatment options.

COVID-19: Cases and Deaths by Race and Age

The graphs shown in Figures 4.1–4.8 exhibit little difference in cases due to age differences for all age categories and are statistically insignificant. In South Carolina as a whole, for example, age categories 35–49

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VII. Summary, cont.

cases and deaths by race and age, cont.

and 65–84 have a ratio of 1.5 to 1, which means that the 35–49 age category's number of cases is about 1.5 times greater than that of 65–84, whereas the ratio of deaths for the same age categories was 10 to 1, which means the COVID–19 death rate is 10 times greater for the 65–84 category than for 35–49. This ratio jumps to 39 to 1 for those 85 and older. For the same categories, (1) in Horry County, the categories 35–49 and 65–84 have ratio of 1.5 to 1, meaning that the younger age group is 1.5 times more cases than the older age category; and (2) in Georgetown County, the categories 35–49 and 65–84 have ratio of 1.6 to 1, meaning that the younger age group is 1.6 times more cases than the older age category (65–84). However, the death rate in Georgetown County for the same age categories reverses and jumps to a ratio of 6.4 to 1, meaning that the older category (65–84) is about 6.4 times likely to die from COVID-19 than the age category (35–49). For COVID-19 deaths for the 85 and older category, the Horry and Georgetown Counties' ratios jump to 30 to 1 and 22 to 1, respectively. This means that the 85 or older death rate was 30 times and 22 times greater than that of the 35–49 category.

For Black residents, shown in Figures 4.1–4.8, there is a significant difference in the ratio of cases and deaths from COVID-19 for South Carolina as a whole, Horry County, and Georgetown County. The average ratio for cases for Black residents in the age categories 35–49 and 65–84 is 1.5 to 1; this ratio means that the younger age group has 1.5 times more cases than the older category. The death ratio in these categories is 7.9; therefore, the older category experienced a death rate of 7.9 times that of the younger category.

For White residents in the same categories there is a significant difference in the ratios of cases and deaths from COVID-19 for South Carolina as a whole, Horry County, and Georgetown County. The average case ratio for White residents aged 35–49 and 65–84 is 1.3 to 1; this ratio means that the younger age group has 1.3 times more cases than the older category. For deaths the ratio for these age categories is 8.1; however, in this ratio, the older category experienced a death rate 8.1 times that of the younger category.

Cumulative Cases and Deaths in Three Selective Intervals

The graphs depicted in Figures 5.1–5.2 examine cumulative cases and deaths for three periods of time. The intervals are as follows: (1) March 28, 2020, to January 29, 2021; (2) January 30, 2021, to March 25, 2022, and (3) March 26, 2022, to December 31, 2022. The graphs and tables reconfirm evidence that the difference in COVID-19 cases relative to vaccinations completion is statistically insignificant. Figures 2.1–2.3 depict that the spread of cases is still present but show significantly fewer deaths from COVID-19.

Comment: In my view, it is not practical to keep changing lifestyles by opening or shutting down schools, businesses, churches, and economies to chase a stochastic path or randomness. ■

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About WCS

Wilson Consulting Services, LLC is a limited liability company that provides consulting in measurement processes, statistical analyses, mathematics education, and family history research.

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Wilson has worked in the engineering areas of product development, quality, and reliability for more than 35 years with multinational corporations such as, General Electric, Honeywell, and IBM. He used his expertise in engineering and statistics to improve product performance and drive down cost. He is an IBM retiree. After retiring, Dave found and lead Wilson Consulting Services, LLC.


Dave Wilson

During his 25+ years as an adjunct professor while working in his engineering job, he taught engineering technology, mathematics, and statistics at Dutchess Community College (New York), Quinnipiac University (Connecticut), and Horry Georgetown Technical College (South Carolina). Additionally, he served one year with the prestigious IBM Faculty Loan Program.

A former reader for the College Board/AP Statistics Program and program evaluator for the Accreditation Board for Engineering and Technology/Technology Accreditation Commission, Wilson is currently a senior member of the American Statistical Association, the American Society for Quality, and the Institute of Electrical and Electronics Engineers. He has earned numerous professional and community service awards and citations for his work and volunteer activities.

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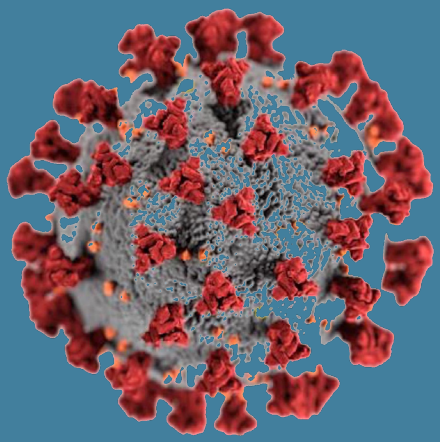

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