

COVID-19 Mortality Rate Trends in Countries and US States

Joel Elvery

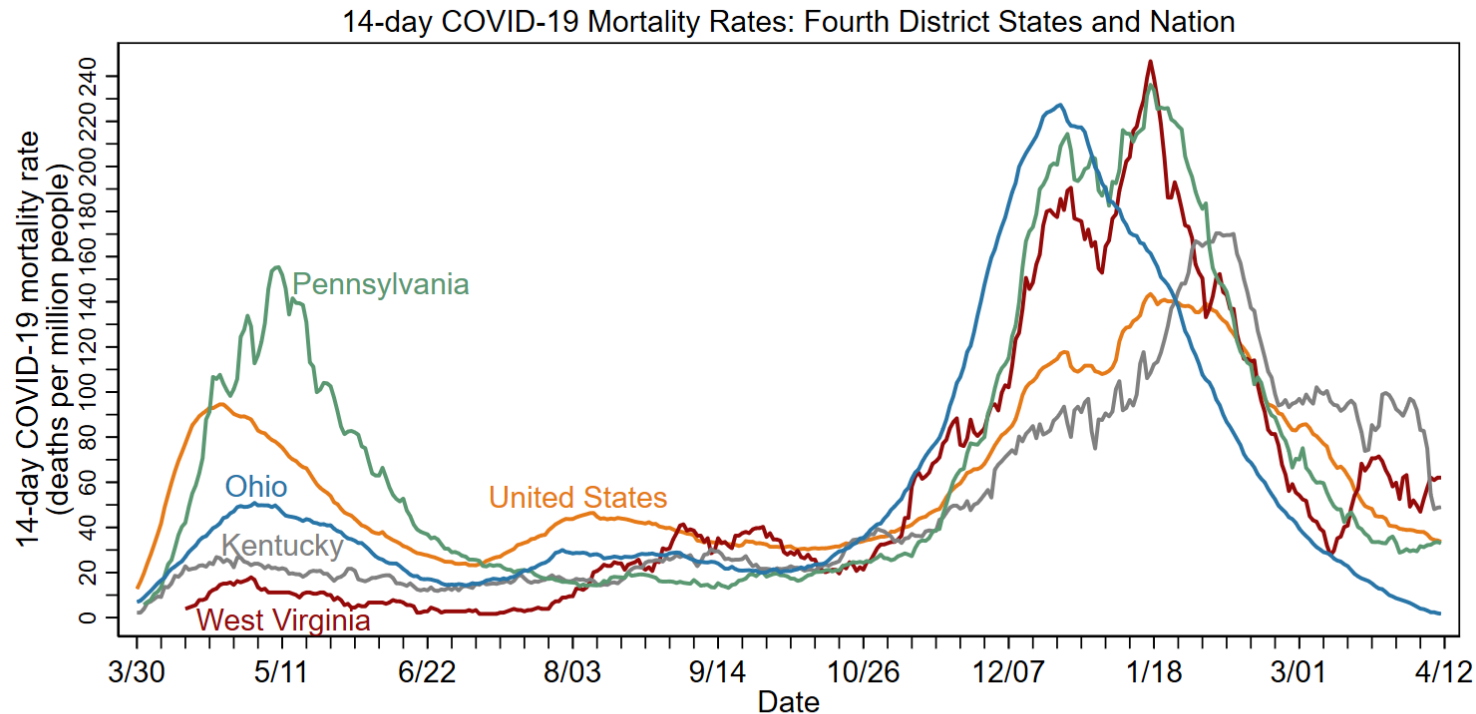
Mark Oleson

Updated April 12, 2021

FEDERAL RESERVE BANK *of* CLEVELAND
Cleveland | Pittsburgh | Cincinnati

- The charts in this presentation use the same data sources as the charts in two April 2020 District Data Briefs. Please see these reports for additional details.
 - [Getting to Accuracy: Measuring COVID-19 by Mortality Rates and Percentage Changes](#)
 - [A Speeding Rate Starts to Slow: COVID-19 Mortality Rates by State](#)
- Since those reports were completed, additional evidence shows that COVID-19 deaths have been underreported, both in other countries and in the United States. The following charts present the latest data from the Center for Systems Science and Engineering at Johns Hopkins University (CSSE) through April 11, with no attempt to further correct for underreporting.
 - Some large revisions in COVID-19 data have been smoothed. See the appendix for details.
- The design of some charts have been modified from those in the reports to better convey the current status of the COVID-19 epidemic in the United States.
- Hospitalization data come from the COVID Tracking Project at *The Atlantic* and the US Department of Health and Human Services (HHS). See the appendix for details.
- Data by race come from the COVID Tracking Project at *The Atlantic* and the Centers for Disease Control and Prevention. See the appendix for details.

As of April 11, the 14-day COVID-19 mortality rate rose modestly in West Virginia but fell in the other Fourth District states and in the United States as a whole.

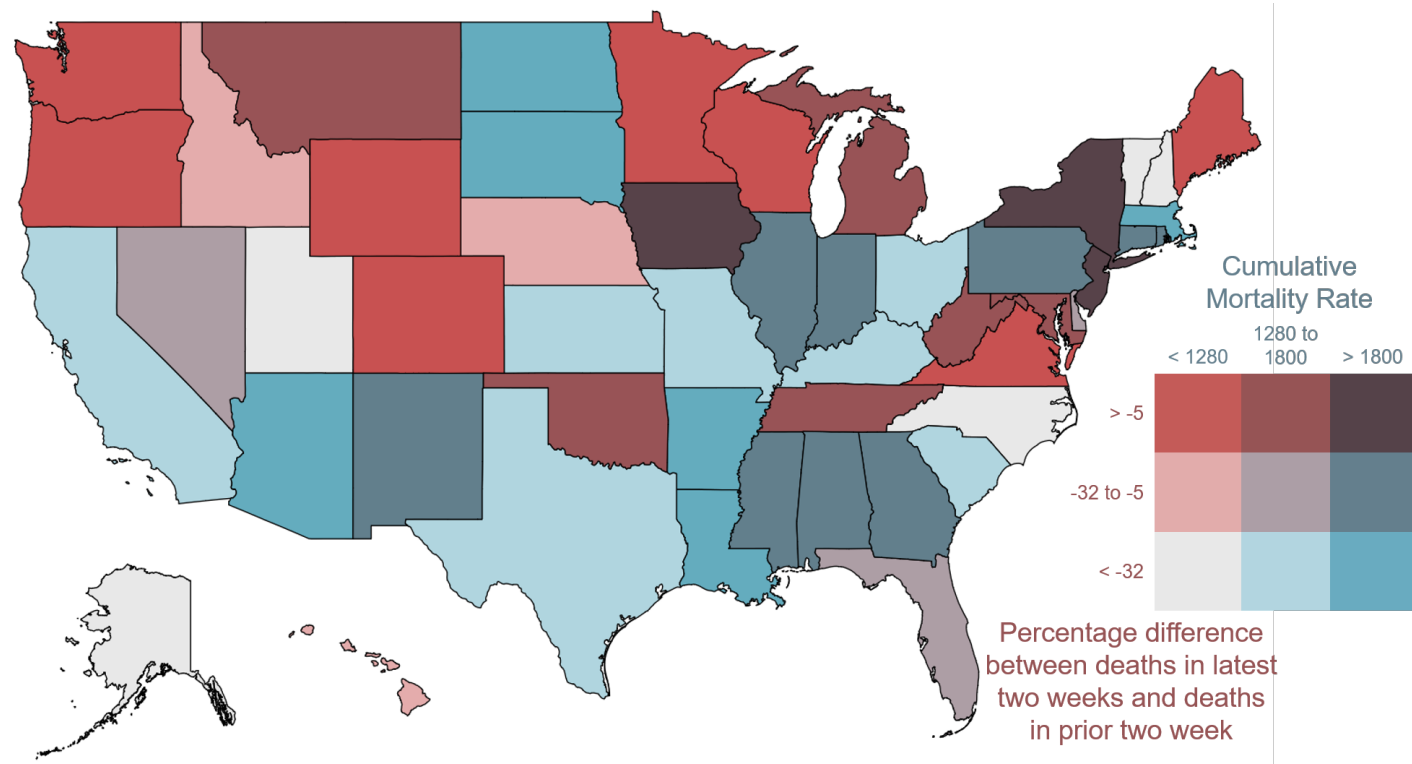


Note: Data through April 11, 2021.

Sources: FRBC calculations, the Center for Systems Science and Engineering at Johns Hopkins University, and Bureau of Economic Analysis.

Note: On March 3, 2021, Ohio began reporting COVID-19 deaths from death certificates only. While this makes the data less subject to revisions, it also means that it may take longer to count a death.

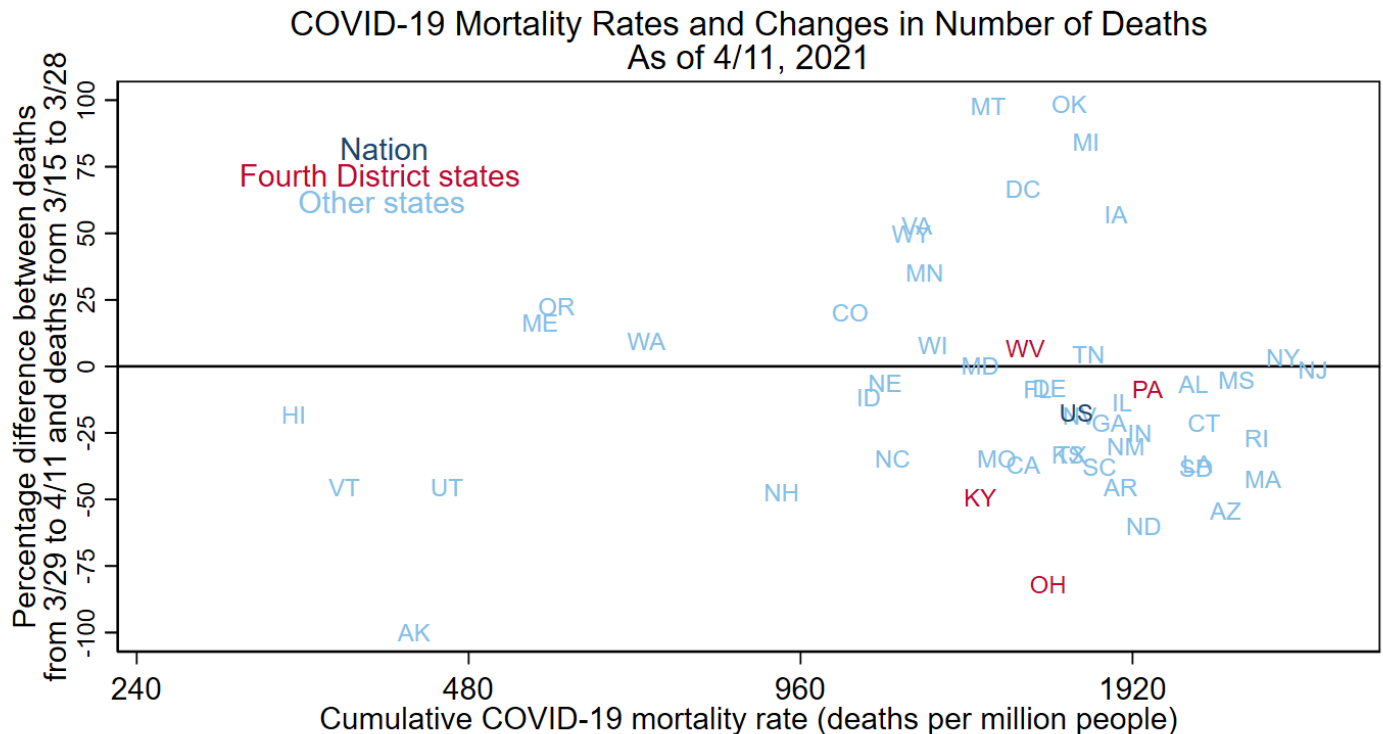
Between March 29 and April 11, the 14-day COVID-19 mortality rate fell in 34 states. This is the eleventh week in a row that 14-day mortality rates have fallen in more than half of all states.



Data for April 11, 2021, accessed on April 12, 2021.
“Latest two weeks” is 3/29/21 to 4/11/21; “prior two weeks” is 3/15/21 to 3/28/21.
Sources: FRBC calculations, CSSE, and BEA.

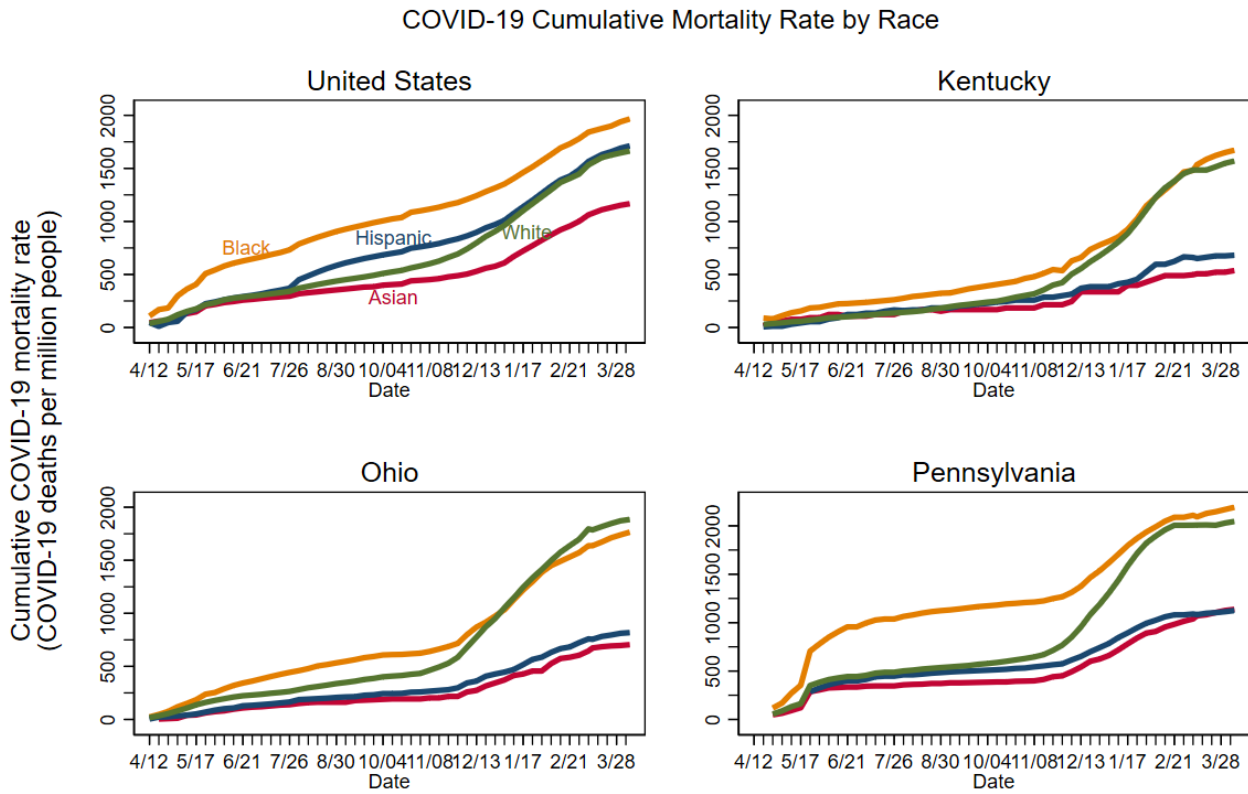
Note: The District of Columbia is in the bin with the mortality rate from 1280 to 1800 and percentage difference > -5. The color bins on this map are changed with each update to better represent the latest data.

This chart gives similar information to the map, but it is more precise and includes the nation as a whole.



Notes: Horizontal axis has log scale.
Sources: FRBC calculations, the Center for Systems Science and Engineering at Johns Hopkins University, and Bureau of Economic Analysis.

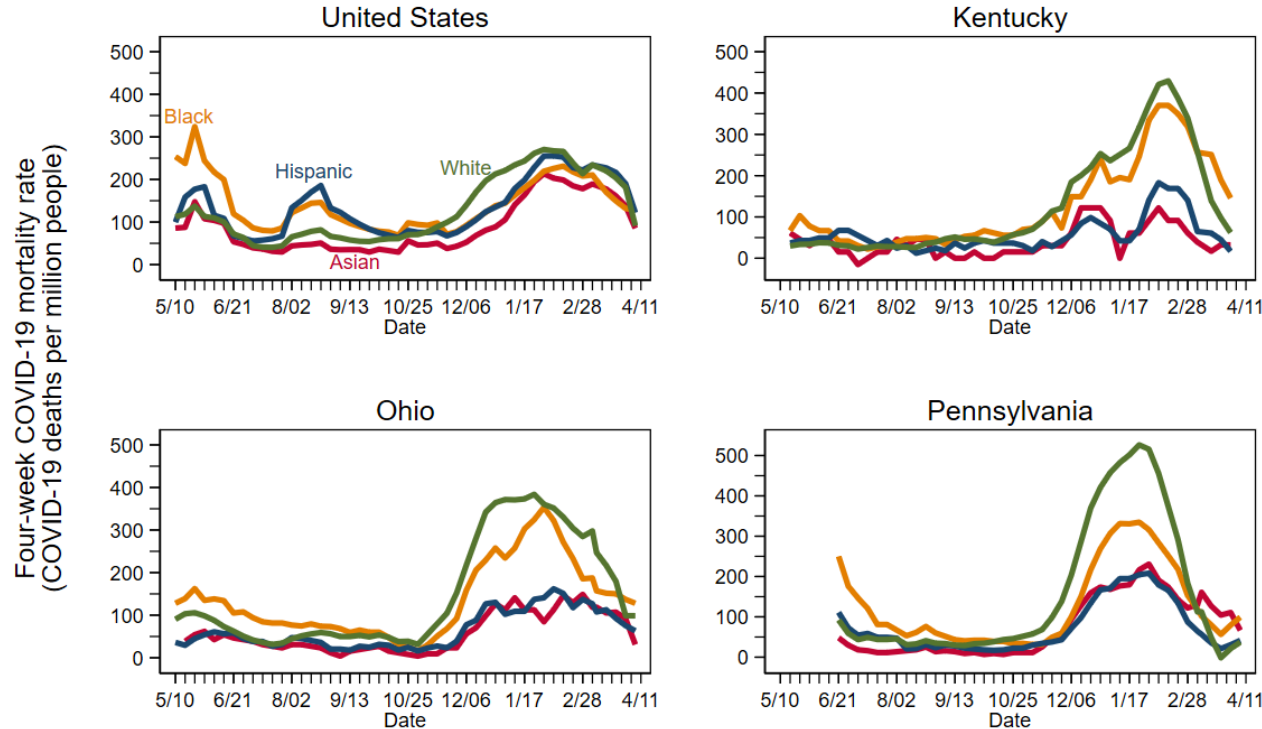
The cumulative COVID-19 mortality rates of Black residents and White residents are more similar in Kentucky, Ohio, and Pennsylvania than in the nation as a whole. In Ohio, this mortality rate is higher for White residents than for Black residents.



Notes: WV is excluded because race is missing in the data for a relatively high share of WV's COVID-19 deaths.
Data from 4/12/2020 to 4/11/2021.
Sources: FRBC calculations, Census Bureau's 2019 ACS 5-Year estimates, the COVID Tracking Project at *The Atlantic*, and the Centers for Disease Control and Prevention.

In the US, Black residents have the highest 4-week mortality rate. In Ohio and Pennsylvania in March 2021, the mortality rate of White residents fell faster than those of the other demographic groups.

Four-Week COVID-19 Mortality Rate by Race

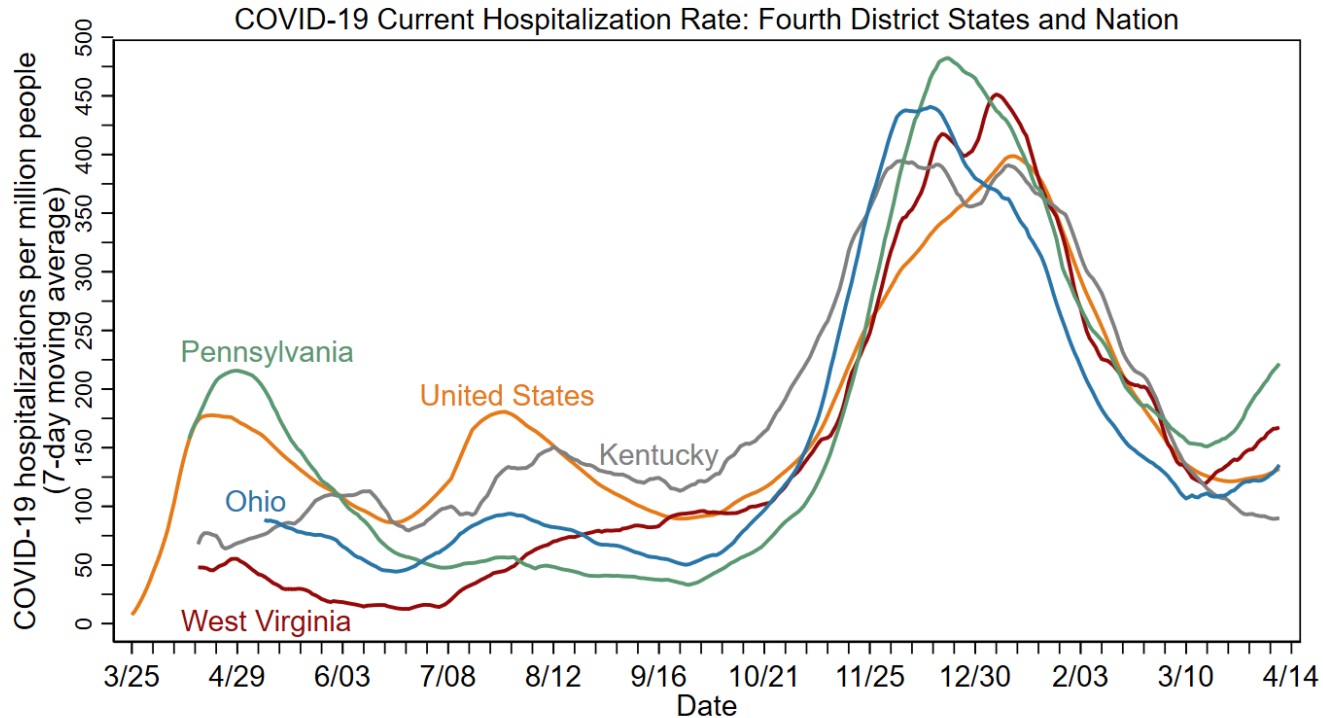


Notes: WV is excluded because race is missing in the data for a relatively high share of WV's COVID-19 deaths.

Data from 5/10/2020 to 4/11/2021.

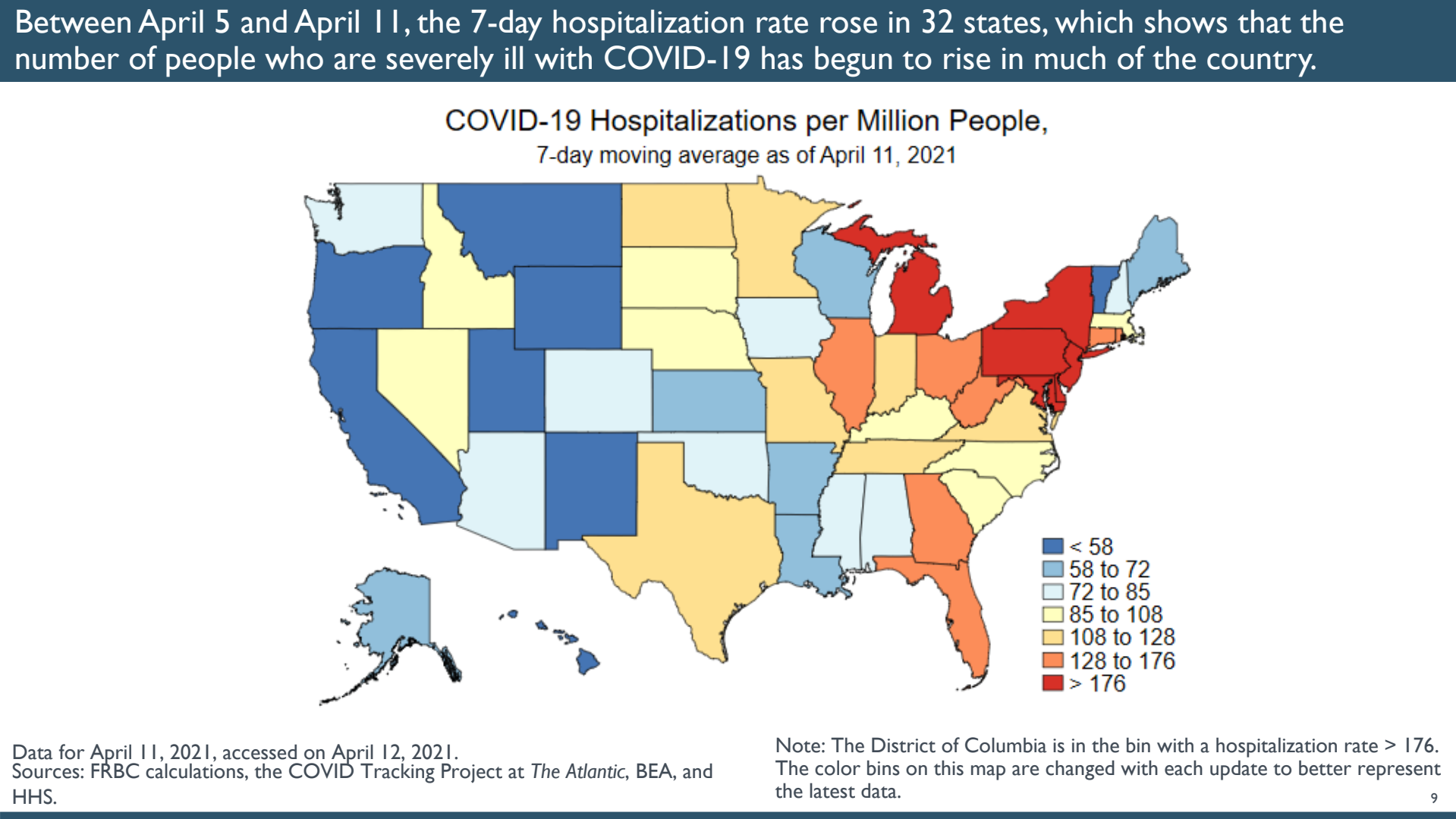
Sources: FRBC calculations, Census Bureau's 2019 ACS 5-Year estimates, and the COVID Tracking Project at *The Atlantic*, and the Centers for Disease Control and Prevention.

After falling sharply for at least two months, COVID-19 hospitalizations are rising in the United States as a whole and in most Fourth District states. The exception is in Kentucky, where hospitalizations continued to fall.



Note: Data through April 11, 2021.

Sources: FRBC calculations, the COVID Tracking Project at *The Atlantic*, BEA, and HHS.



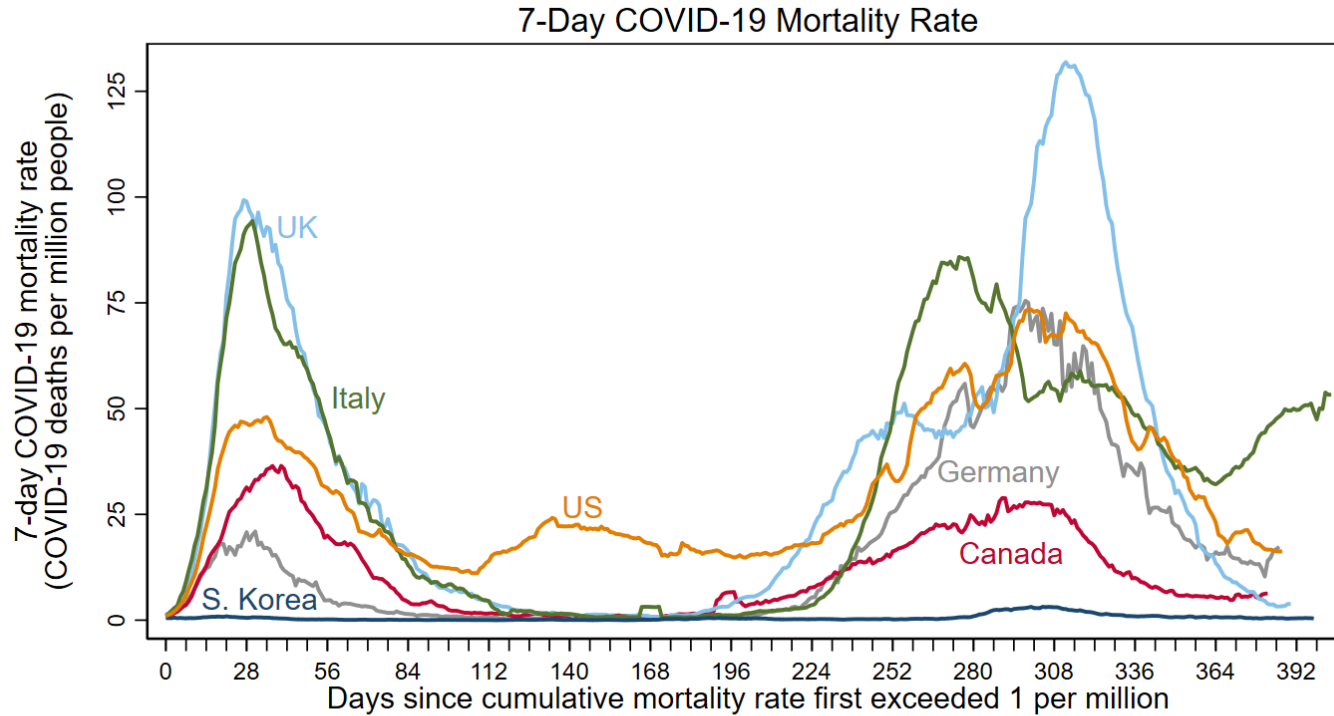
COVID-19 statistics for Fourth District states and the nation as of April 11, 2021.

COVID-19 Statistic	Kentucky	Ohio	Pennsylvania	West Virginia	United States
Levels					
Average daily deaths in past 2 weeks	16	2	31	8	805
Cumulative deaths	6,241	18,827	25,390	2,742	561,619
Average daily hospitalizations in the past week	403	1,582	2,841	299	43,433
Rates (per million residents)					
14-day mortality rate	49	2	34	62	34
Cumulative mortality rate	1,396	1,610	1,982	1,533	1,707
Average daily hospitalization rate in the past week	90	135	222	167	132
Four-week mortality rate by race					
Asian	31	31	66	--	85
Black	137	128	99	134	128
Hispanic	31	63	42	--	122
White	147	99	37	105	91
Cumulative mortality rate by race					
Asian	537	705	1,137	--	1,167
Black	1,672	1,765	2,192	1,194	1,966
Hispanic	681	819	1,125	--	1,712
White	1,569	1,885	2,046	1,454	1,664

Notes: West Virginia's data are missing race for a relatively high share of COVID-19 deaths, and the state reports COVID-19 deaths by race for only Black residents and White residents.

Sources: FRBC calculations, CSSE at Johns Hopkins University, the COVID Tracking Project at *The Atlantic*, BEA, and the HHS.

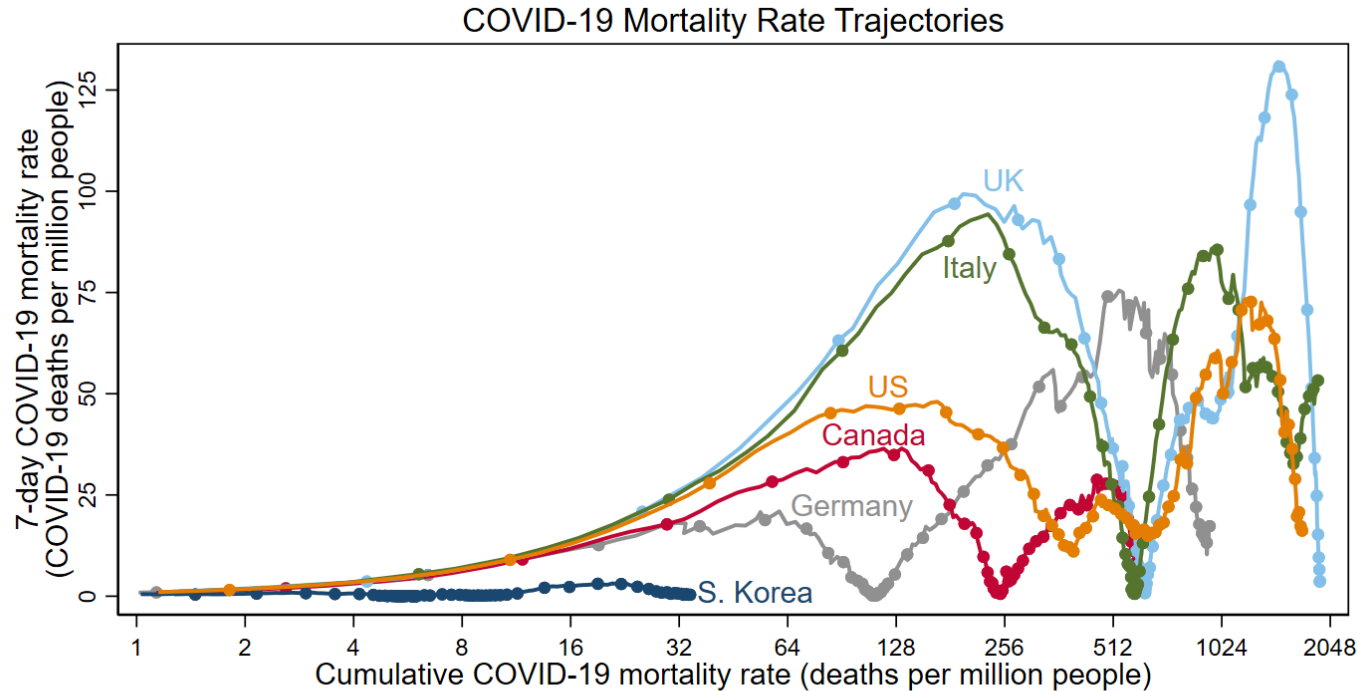
The 7-day COVID-19 mortality rate of the United States has resumed its downward trend after a small increase in late March 2021. The recent surge in Italy has been attributed to the B.1.1.7 COVID-19 variant.



Notes: 3/22/2020 was first day US rate > 1. Data through 4/11/2021.

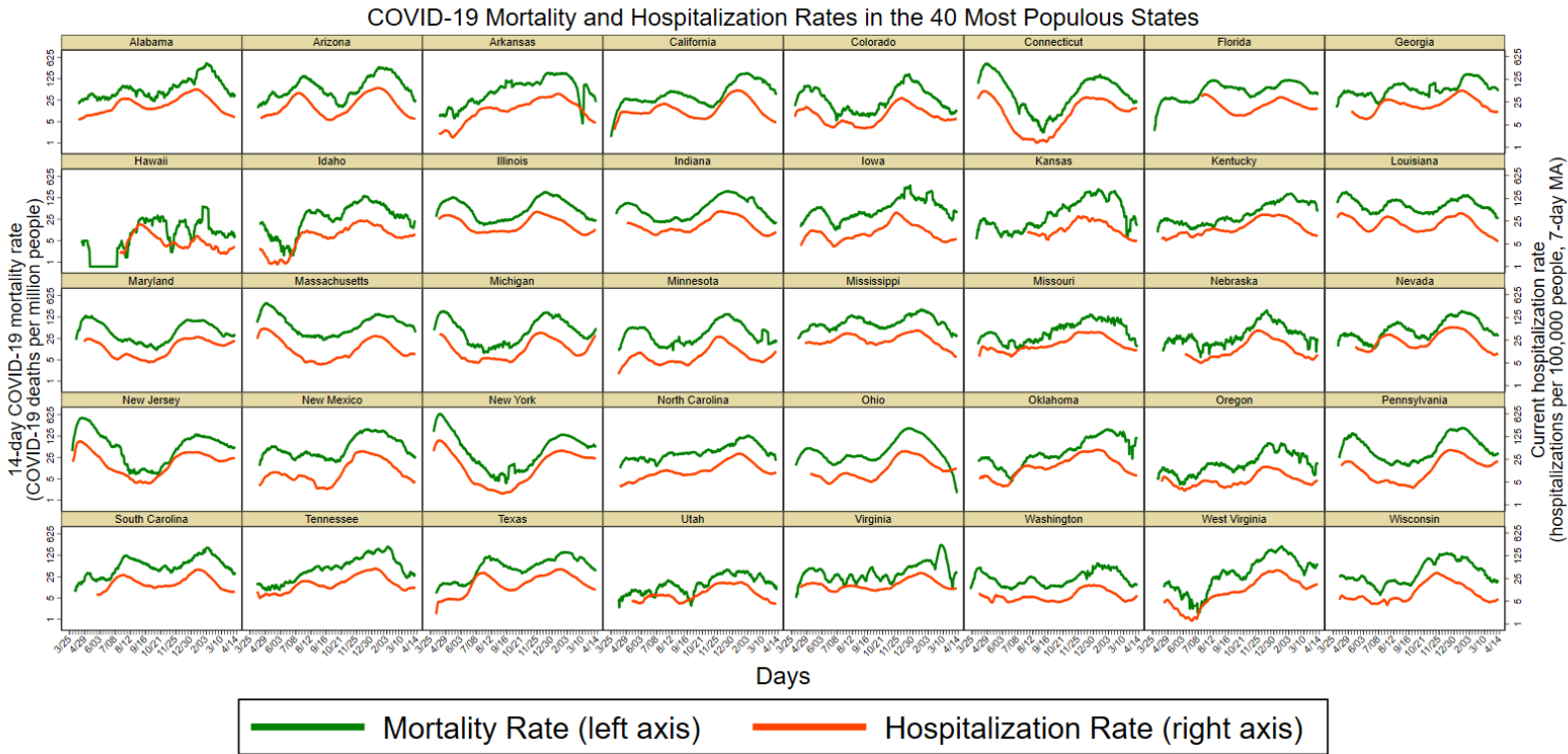
Sources: FRBC calculations, the Center for Systems Science and Engineering at Johns Hopkins University, and the World Bank.

As of April 11, the cumulative COVID-19 mortality rate of the United States is 1,707 deaths per million people. This is almost triple the mortality rate of Canada, but below that of Italy and the UK.



Notes: Horizontal axis has log scale. Excluding days when mortality rate < 1. Dots on Sundays to show time.
Data through April 11, 2021.
Sources: FRBC calculations, the Center for Systems Science and Engineering at Johns Hopkins University, and the World Bank.

This chart shows COVID-19 mortality and hospitalization rates for the 40 most populous US states.



Notes: Data from 4/13/2020-4/11/2021. Both vertical axes have log scales.
Sources: FRBC calculations, the Center for Systems Science and Engineering at Johns Hopkins University, BEA, HHS, and the COVID Tracking Project at *The Atlantic*.

- Series that use different sources at different times
 - Hospitalization data prior to February 1, 2021 are from the COVID Tracking Project at *The Atlantic*. To smooth transition to a new source, the February 2021 data uses a weighted average of the data from the COVID Tracking Project and data from HHS via HealthData.gov, with weight on the COVID Tracking Project falling over time. From March 1, 2021, onward, we use the HHS data.
 - Data by racial groups are from the COVID Tracking Project through March 7, 2021, and from the Centers for Disease Control and Prevention starting on March 8, 2021.
- Some significant revisions to the reported number of COVID-19 deaths cause large single-day jumps.
- We smooth some of these jumps by multiplying daily changes for a period of time by a scaling factor so that the adjusted series meets the post-revision series.

Appendix: Source details and adjustments for data revisions (continued)

- We have used this approach for the following revisions and periods in 2020:
 - Spain revised deaths downward on May 25; data are adjusted from 3/3 to 5/24.
 - New Jersey revised deaths downward on June 25; data are adjusted from 3/10 to 6/24.
 - Illinois revised deaths upward on July 7; Illinois and the United States are adjusted from 3/23 to 7/6.
 - New Jersey revised deaths downward on August 26; data are adjusted from 3/18 to 8/25.
 - US revised deaths up on October 21 for all race categories; data adjusted from 6/6 to 10/18.
- Other data cleaning in 2020
 - Ohio's reported cumulative deaths jumped up on August 29 and reversed on August 30. We set Ohio's cumulative deaths on August 29 to the midpoint of deaths on August 28 and 30 and incorporated this change into the US total for August 29.
 - Ohio's reported cumulative deaths for Hispanic residents jumped up on August 5 and reversed on August 9. We set Ohio's cumulative deaths on August 5 to the average between August 2 and August 9, given data are only available every Sunday and Wednesday.

- **Data cleaning in 2021**
 - West Virginia's reported cumulative deaths for Black residents fell on January 3 and January 6 and reversed on January 10. We set West Virginia's cumulative deaths on January 3 and January 6 to the average between December 30 and January 10, excluding January 3 and January 6.
 - On February 10, Ohio announced that it underreported COVID-19 deaths in November and December and adjusted the data. The CSSE data is adjusted for this change, but the race-level data from the COVID Tracking Project at *The Atlantic* is not. We smooth this jump in the race-level data by multiplying daily changes from November to February 14 by a scaling factor so that the adjusted series meets the post-revision series.
 - Ohio continued to review and revise its COVID-19 deaths after February 14. We smoothed the latest changes by assuming that deaths rose at a steady rate from February 17 to February 28. Virginia revised death counts in the week leading up to February 28, with the guidance that the additional deaths occurred in 2021. Lacking information on when the deaths occurred, we revised Virginia's data so the state's 14-day mortality rate has been constant since January 15.
 - West Virginia revised death counts upward between February 7 and February 14 to account for deaths between December 1, 2020 and January 30, 2021. We smoothed these changes using method described on slide 14.

- Data cleaning in 2021 (continued)
 - Death counts of Asian residents were revised on March 17 in Ohio, Pennsylvania, and the United States. Also on March 17, the death counts of all racial groups in Kentucky were revised. We adjusted these weekly series from November 11, 2020, through March 10, 2021, to account for these revisions, using the rescaling methodology described on slide 14.
 - Oklahoma revised death counts upward between April 6 and April 7 to account for deaths between December 1, 2020, and March 31, 2021. We smoothed these changes using the rescaling methodology described on slide 14.