

COVID-19 Mortality Rate Trends in Countries and US States

Joel Elvery

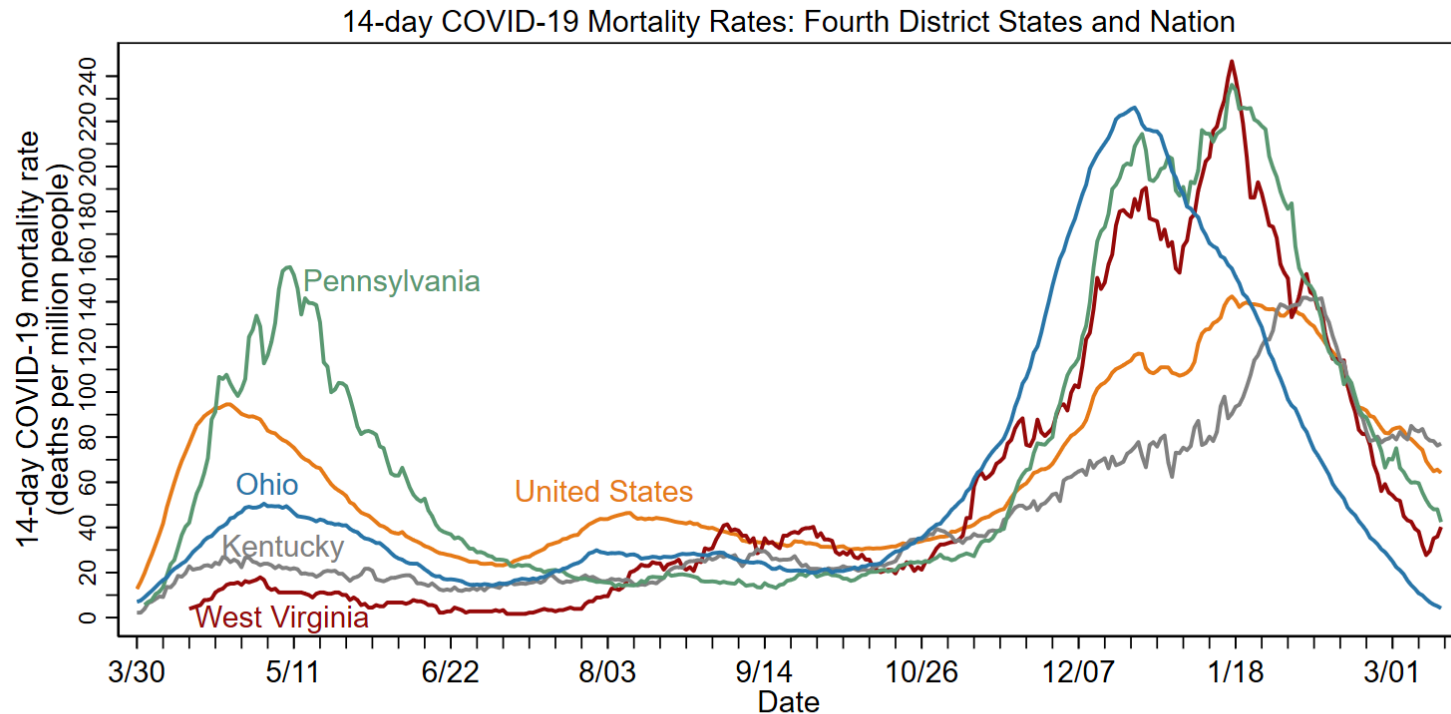
Mark Oleson

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- 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 March 14, 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 (DHHS). 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 March 14, West Virginia's 14-day COVID-19 mortality rate mortality rate rose due to revisions in the data. The mortality rates continued to fall in the other Fourth District states and in the United States overall.

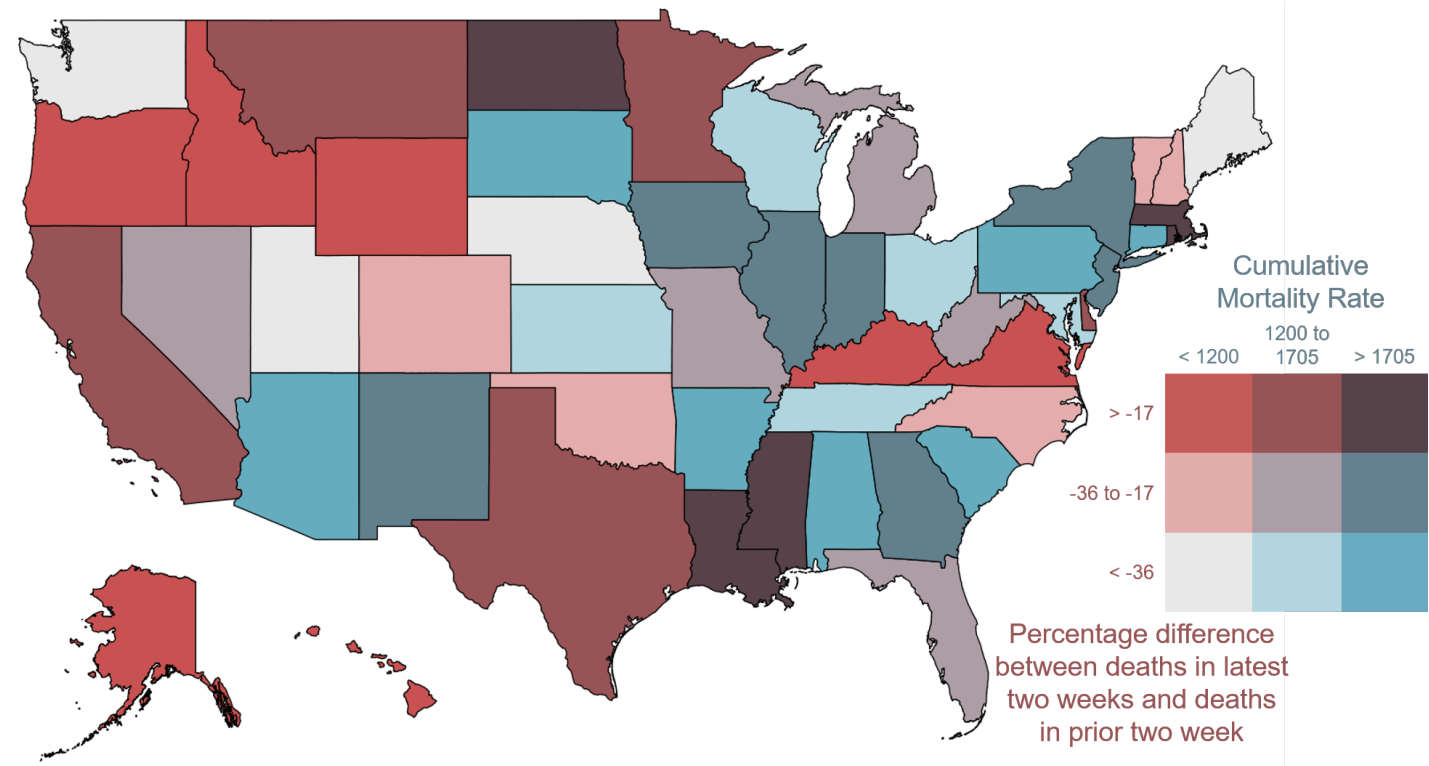


Note: Data through March 14, 2021.

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

Note: Ohio's reported COVID-19 deaths have been fluctuating recently due to an ongoing review of the data by Ohio's Bureau of Infectious Diseases and Bureau of Vital Statistics.

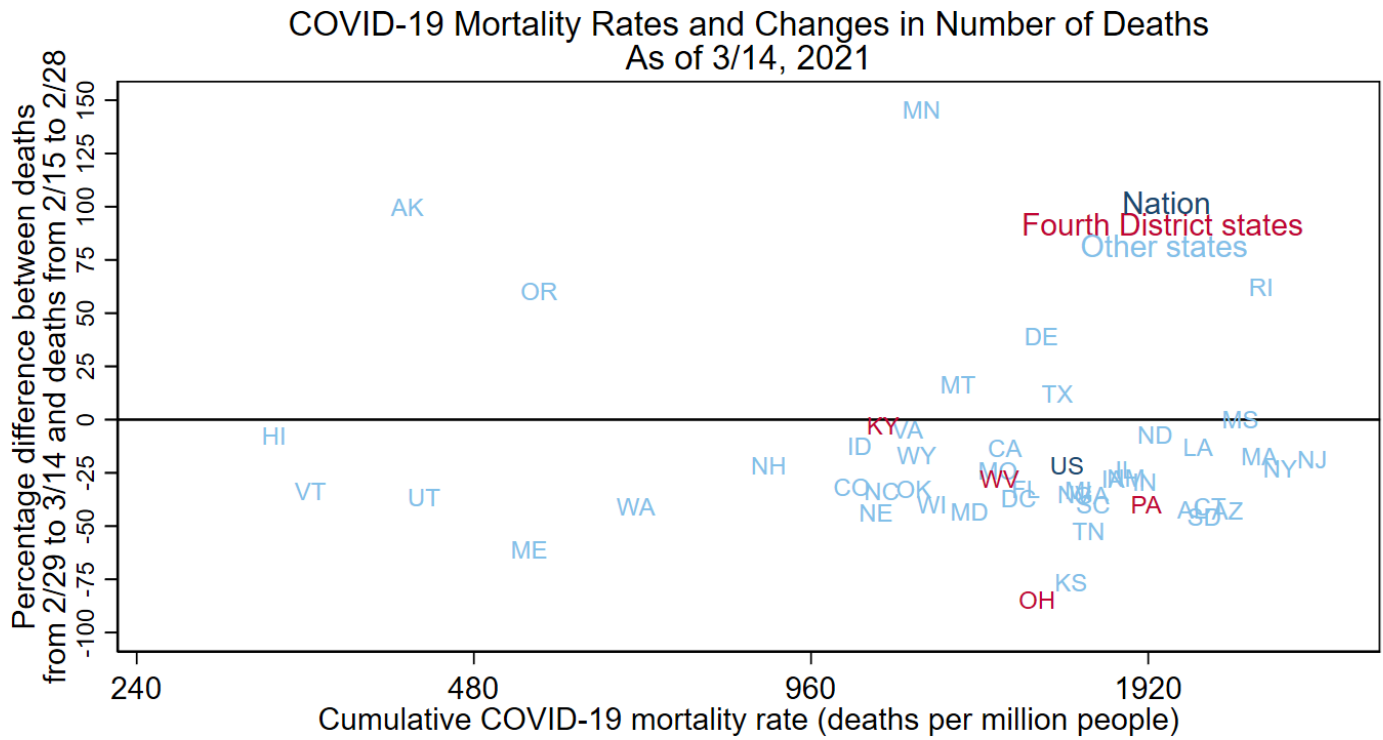
Between February 28 and March 14, the 14-day COVID-19 mortality rate rose in only eight states. This is the seventh week in a row that 14-day mortality rates have fallen in more than half of all states.



Data for March 14, 2021, accessed on March 15, 2021.
“Latest two weeks” is 3/1/21 to 3/14/21; “prior two weeks” is 2/14/21 to 2/28/21.
Sources: FRBC calculations, CSSE, and BEA.

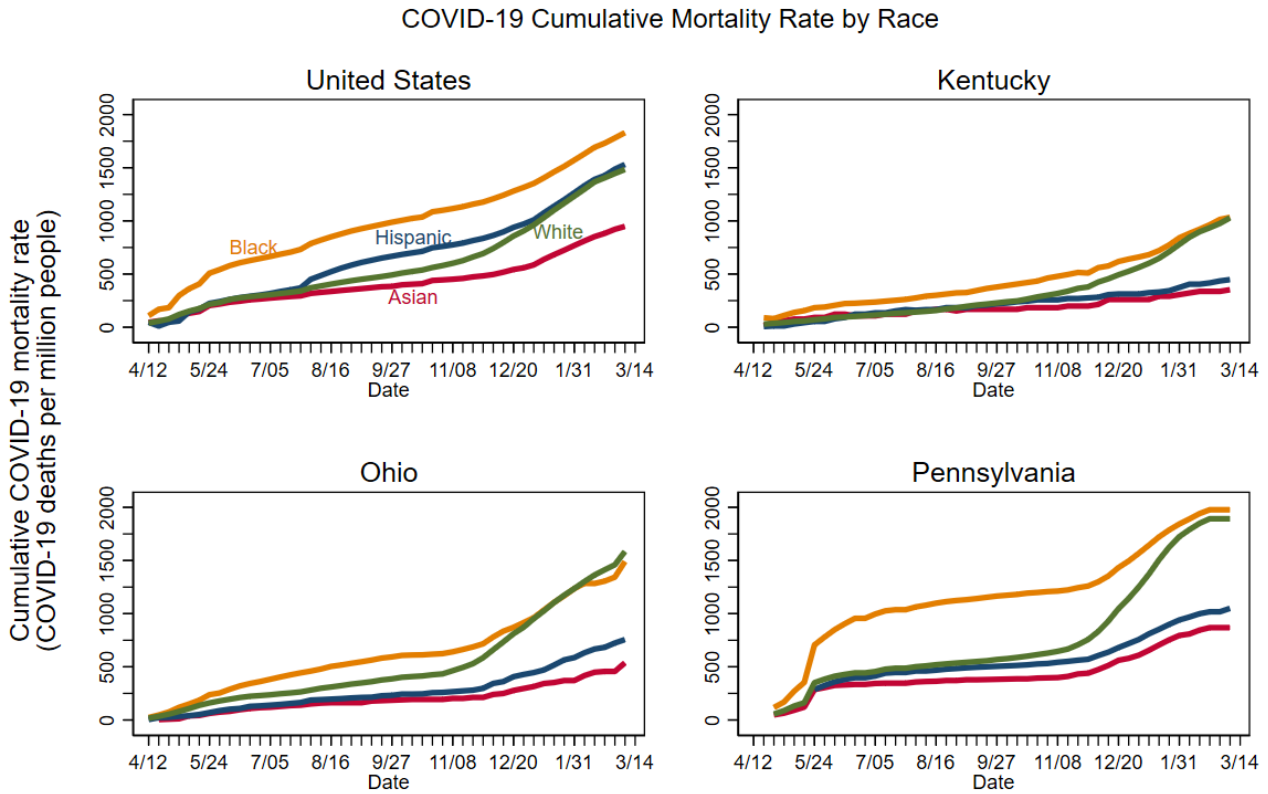
Note: The District of Columbia is in the bin with the mortality rate from 1200 to 1705 and percentage difference < -36. The color bins on this map are changed with each update to better represent the latest data.

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



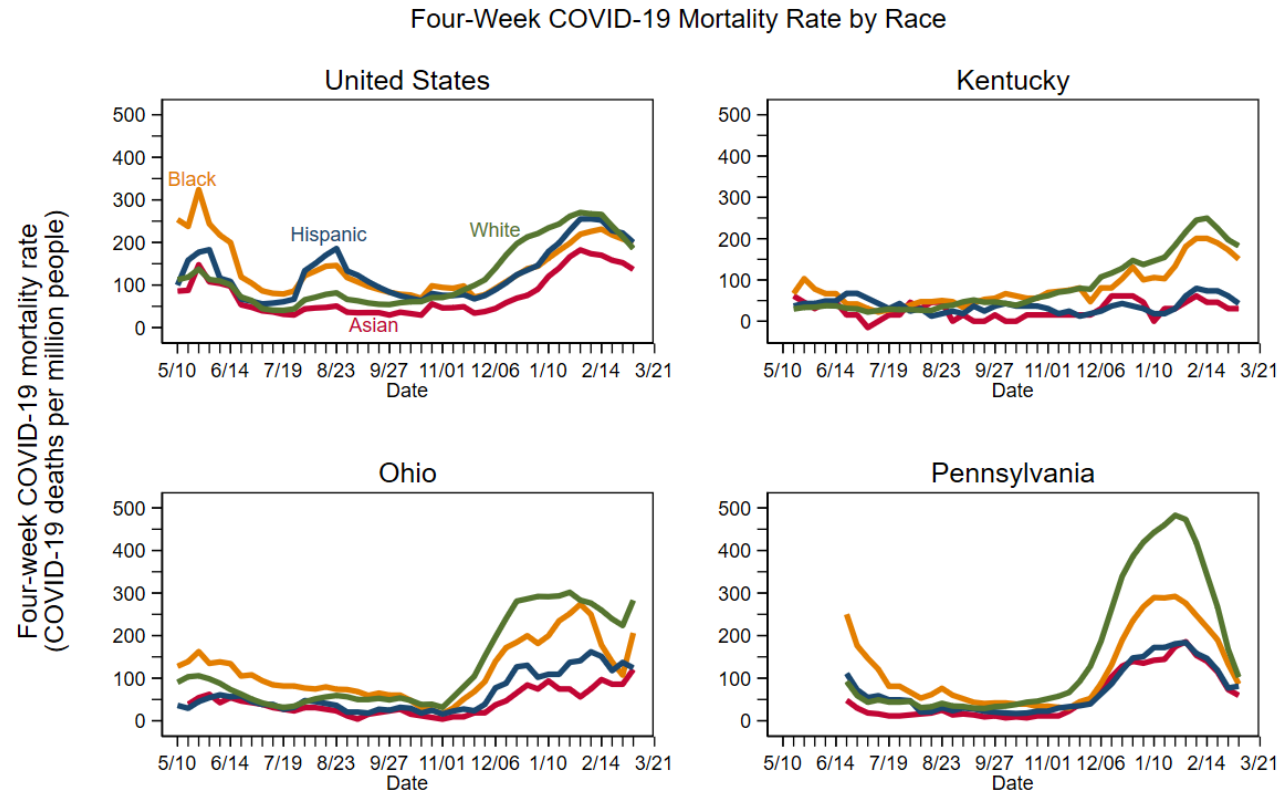
Notes: Horizontal axis has log scale.
Sources: FRBC calculations, the Center for Systems Science and Engineering at Johns Hopkins University, and Bureau of Economic Analysis.

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 now higher for White residents than for Black residents.



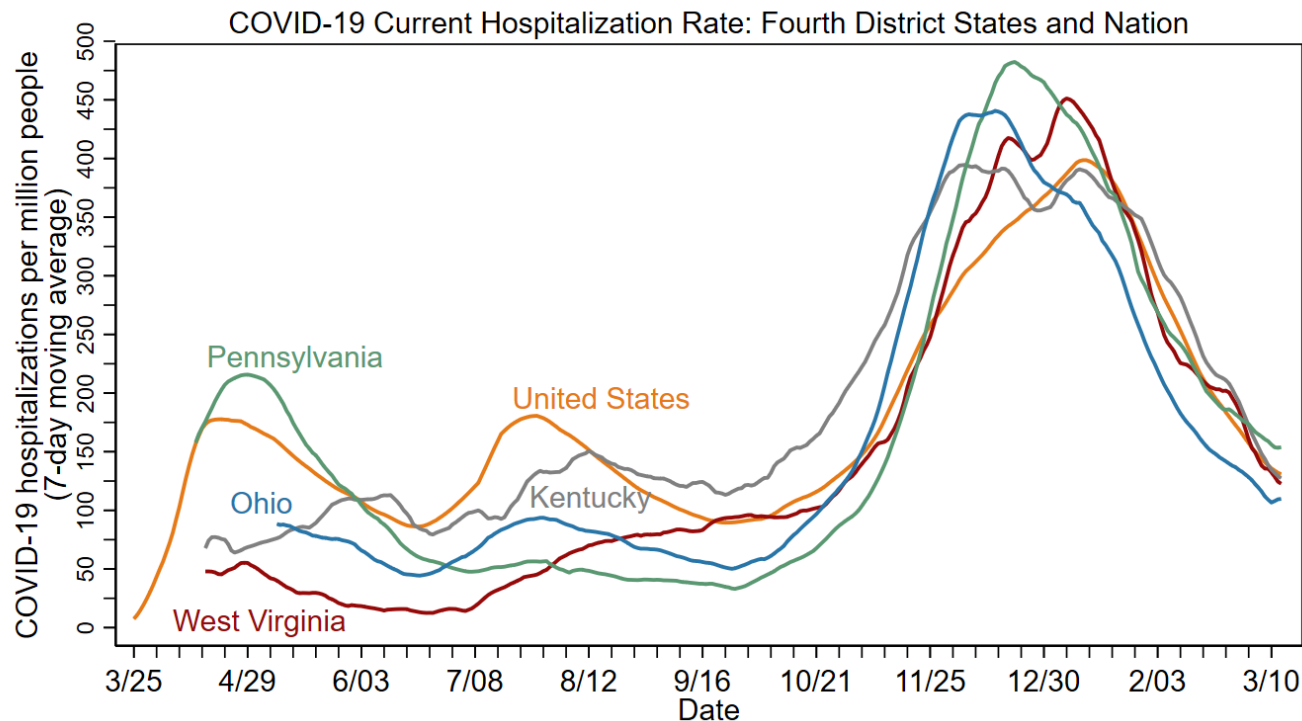
Notes: WV is excluded because race is missing in the data for a relatively high share of WV's COVID-19 deaths.
Data from 4/12/2020 to 3/14/2021.
Sources: FRBC calculations, Census Bureau's 2019 ACS 5-Year estimates, the COVID Tracking Project at *The Atlantic*, and the Centers for Disease Control and Prevention.

In the Fourth District states, White residents have had the highest 4-week mortality rates since November. In the United States, Hispanic residents currently have the highest rate, just above those of Black residents and White residents.



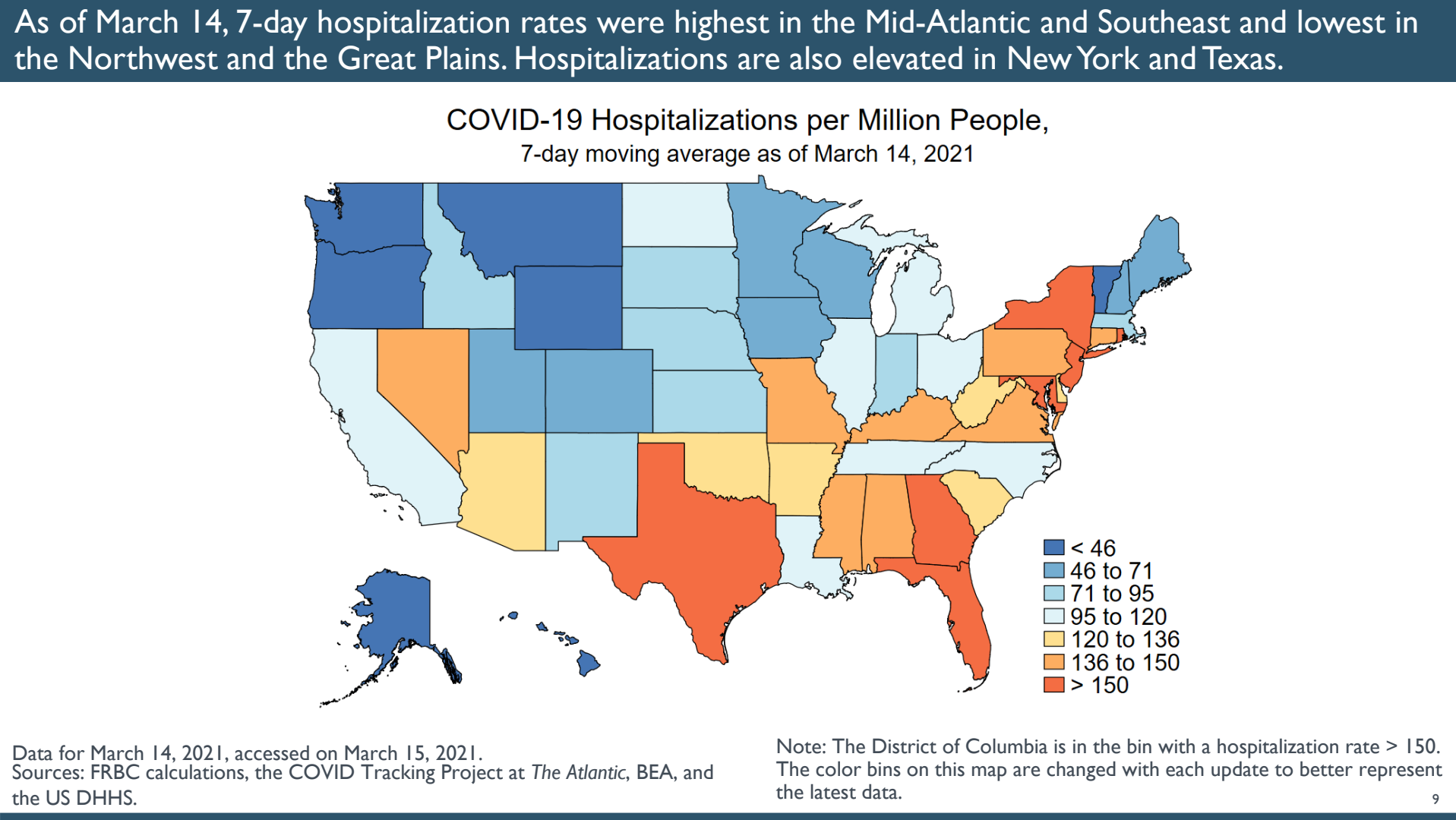
Notes: WV is excluded because race is missing in the data for a relatively high share of WV's COVID-19 deaths.
Data from 5/10/2020 to 3/14/2021.
Sources: FRBC calculations, Census Bureau's 2019 ACS 5-Year estimates, and the COVID Tracking Project at *The Atlantic*, and the Centers for Disease Control and Prevention.

COVID-19 hospitalizations have fallen sharply in recent weeks, which suggests that mortality rates will continue to fall in the weeks ahead in all Fourth District states and in the United States as a whole.



Note: Data through March 14, 2021.

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



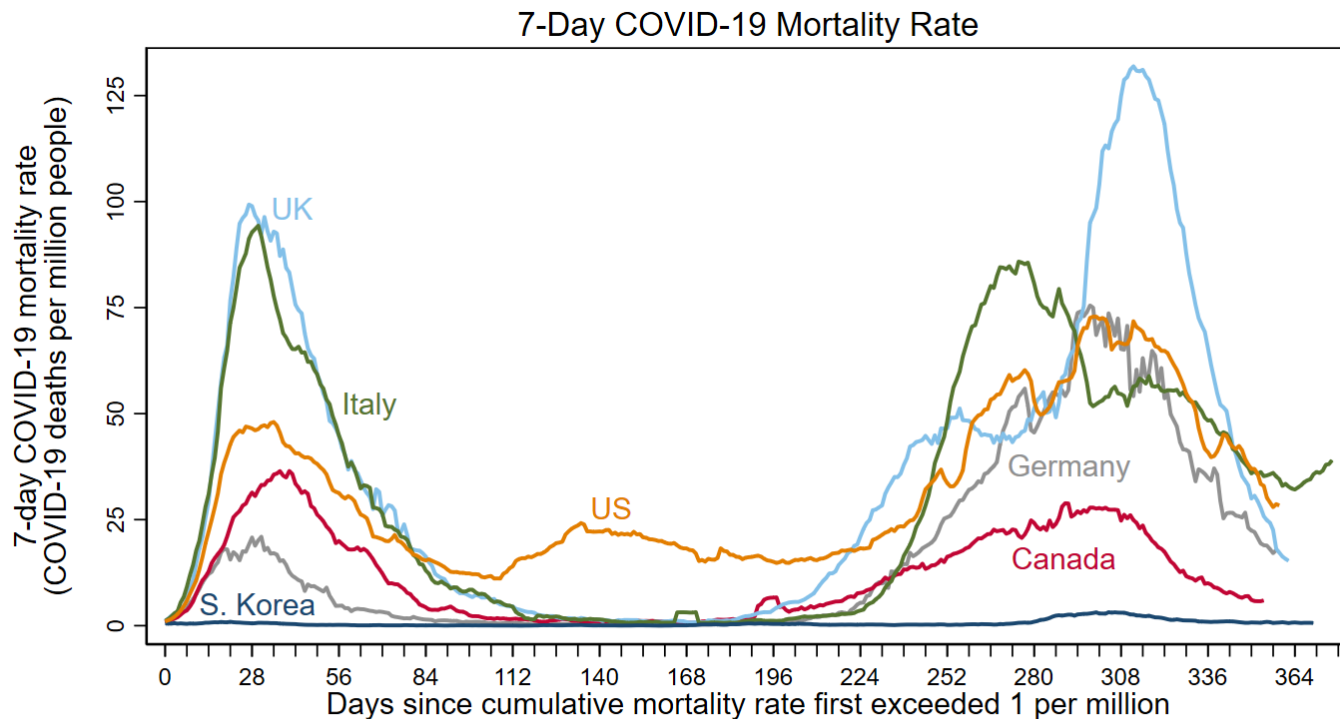
COVID-19 statistics for Fourth District states and the nation as of March 14, 2021.

COVID-19 Statistic	Kentucky	Ohio	Pennsylvania	West Virginia	United States
Levels					
Average daily deaths in past 2 weeks	24	4	44	5	1542
Cumulative deaths	4,966	17,871	24,510	2,519	534,156
Average daily hospitalizations in the past week	558	820	1,587	179	40,212
Rates (per million residents)					
14-day mortality rate	76	5	48	36	66
Cumulative mortality rate	1,111	1,528	1,914	1,409	1,624
Average daily hospitalization rate in the past week	127	110	154	123	131
Four-week mortality rate by race					
Asian	169	237	261	--	257
Black	635	330	201	522	186
Hispanic	245	108	114	--	241
White	566	454	166	439	253
Cumulative mortality rate by race					
Asian	506	674	1,070	--	1,082
Black	1,535	1,637	2,093	1,060	1,838
Hispanic	650	755	1,083	--	1,590
White	1,441	1,787	1,957	1,349	1,573

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 US DHHS.

The rapid increases in weekly mortality rates in Germany and the UK in November and December were largely due to new variants of the coronavirus. These variants have begun to spread in the United States.

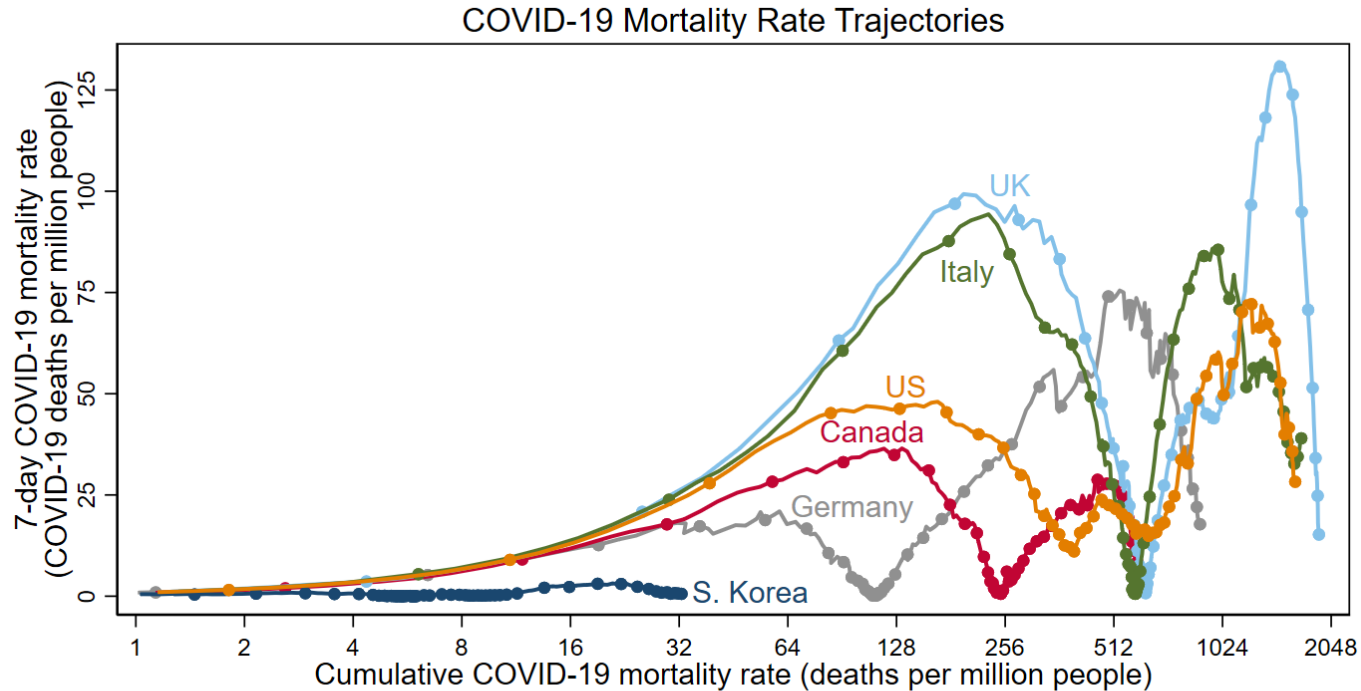


Notes: 3/22/2020 was first day US rate > 1. Data through 3/14/2021.

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

Note: For more information on the new coronavirus variants, please see [this report](#) from the Centers for Disease Control and Prevention.

As of March 14, the cumulative COVID-19 mortality rate of the United States is 1,624 deaths per million people. This is almost triple the mortality rate of Canada but below that of Italy and that of the UK.



Notes: Horizontal axis has log scale. Excluding days when mortality rate < 1. Dots on Sundays to show time.
Data through March 14, 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 4/13/2020-3/14/2021. Both vertical axes have log scales.

Sources: FRBC calculations, the Center for Systems Science and Engineering at Johns Hopkins University, BEA, the US DHHS, and the COVID Tracking Project at *The Atlantic*.

Appendix: Adjustments for data revisions

- 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.
- 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.

Appendix: Adjustments for data revisions (continued)

- Other data cleaning in 2020 (continued)
 - 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.

- Data cleaning in 2021 (continued)
 - 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.
- Series that use different sources at different times
 - Hospitalization data prior to February 1, 2021 is from the COVID Tracking Project at *The Atlantic* COVID Tracking Project. 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 the US Department of Health and Human Services via HealthData.gov, with weight on the COVID Tracking Project falling over time. From March 1, 2021 onward, we use the US DHHS data.
 - Data by racial groups is from COVID Tracking Project through March 7, 2021 and from the Centers for Disease Control and Prevention starting on March 8, 2021.