

# COVID-19 Mortality Rate Trends in Countries and US States

Joel Elvery

Mark Oleson

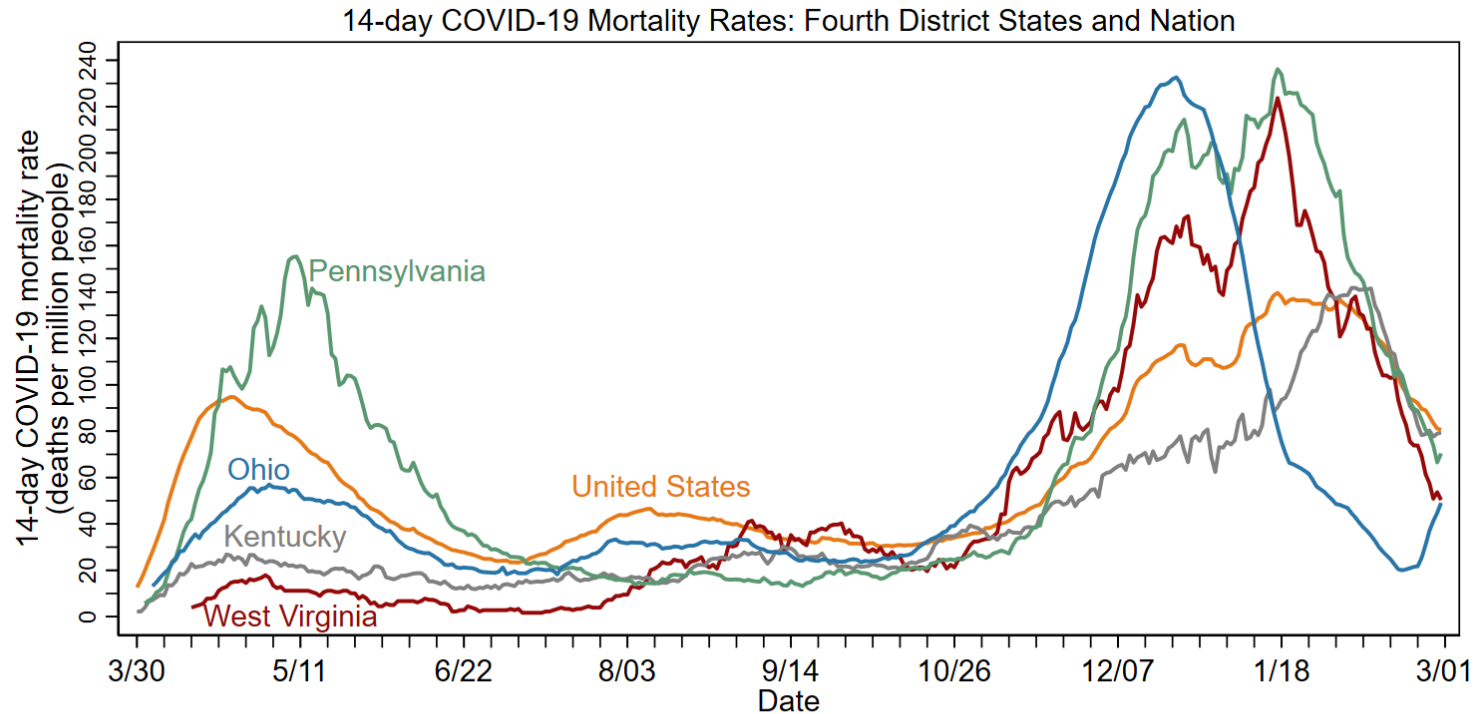
Updated March 1, 2021

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

# Introduction

- 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 February 28, 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 rate data come from the COVID Tracking Project at *The Atlantic*.

As of February 28, the 14-day COVID-19 mortality rate continued to fall in Kentucky, Pennsylvania, West Virginia, and the United States. Ohio's mortality rate rose due to revisions in the data.

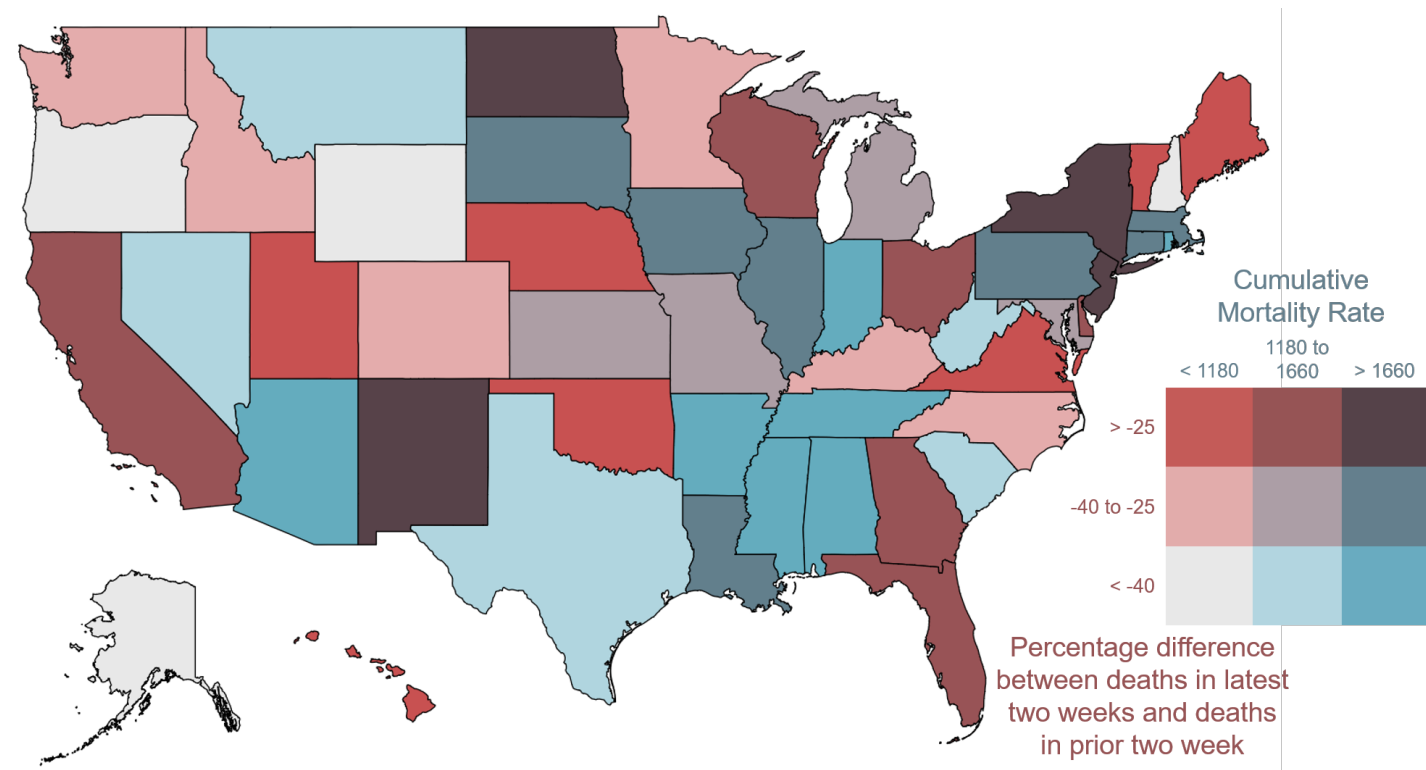


Note: Data through February 28, 2021.

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.

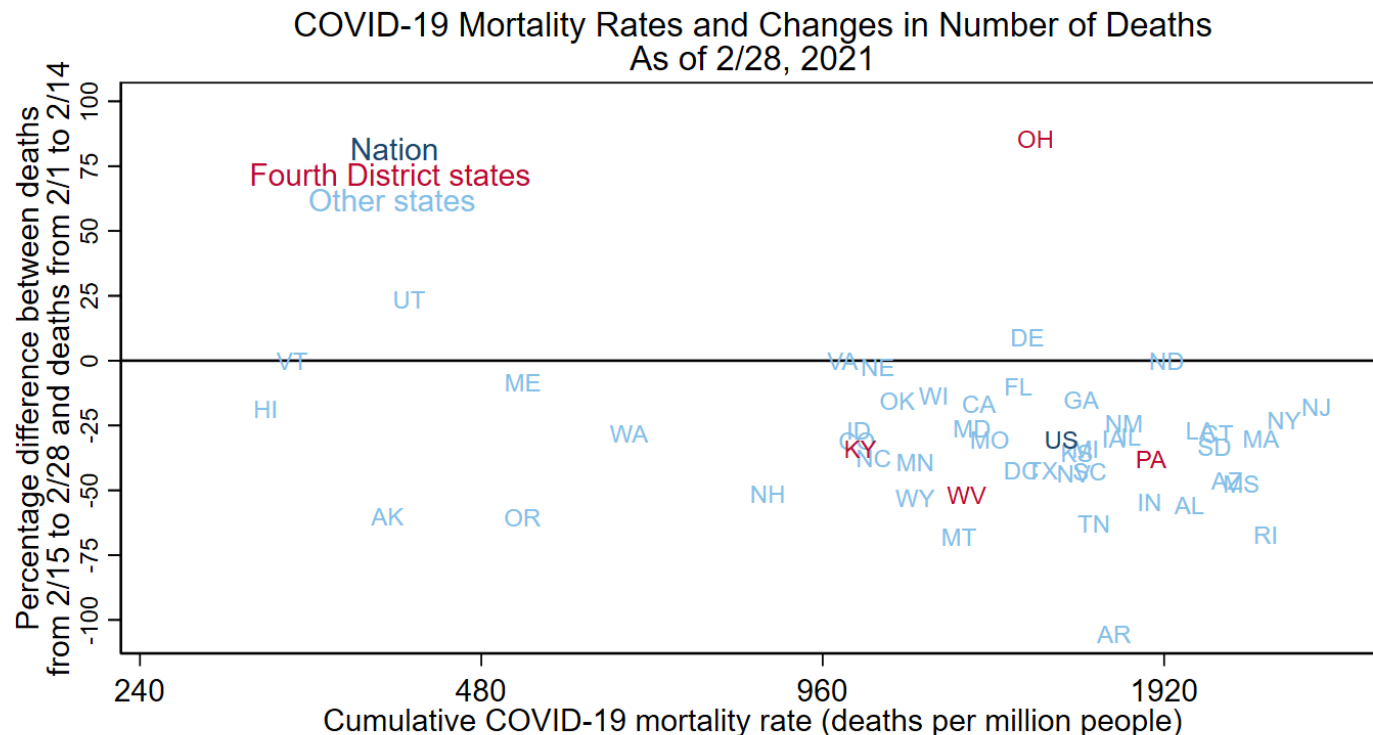
Between February 14 and February 28, the 14-day COVID-19 mortality rate rose in only three states. This is the fifth week in a row that 14-day mortality rates have fallen in more than half of all states.



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

Note: The District of Columbia is in the bin with the mortality rate from 1180 to 1660 and percentage difference < -40. The color bins on this map are changed with each update to better represent the latest data.

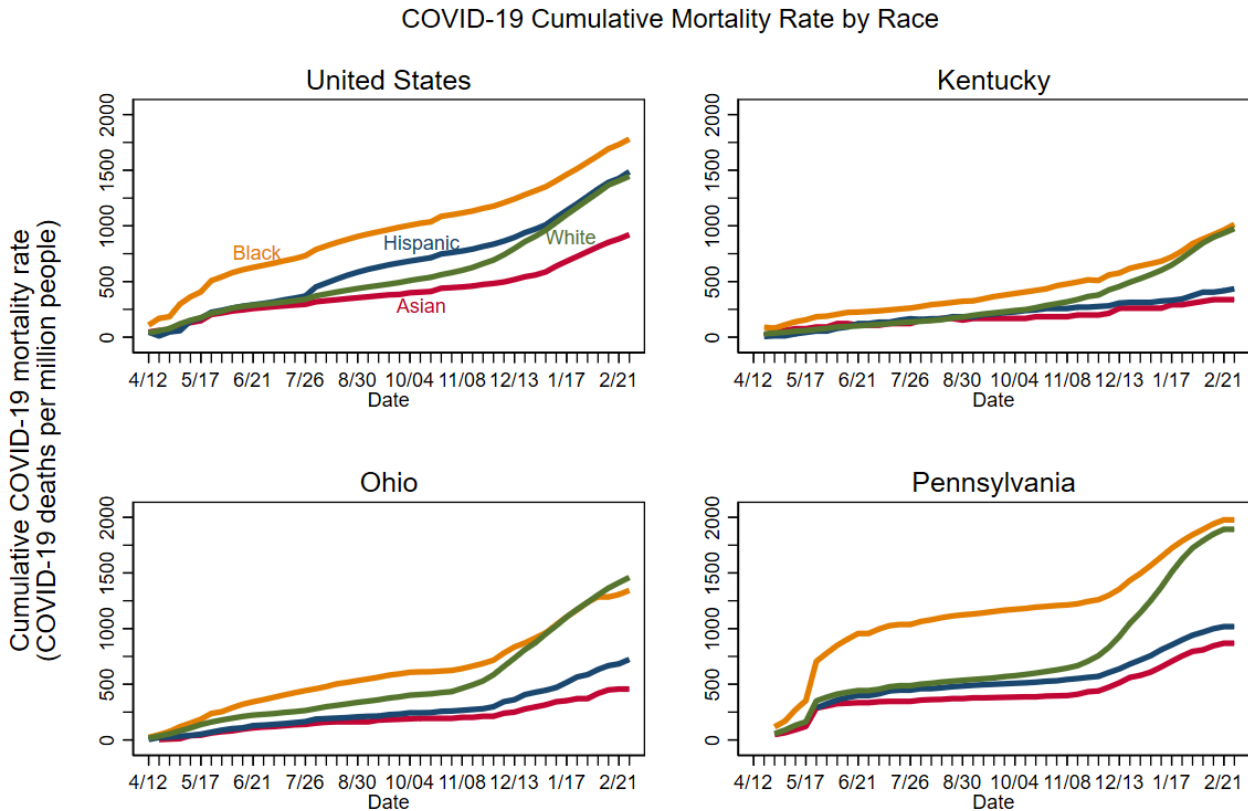
This chart gives similar information to the map, but it is more precise and includes the nation as a whole.



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.

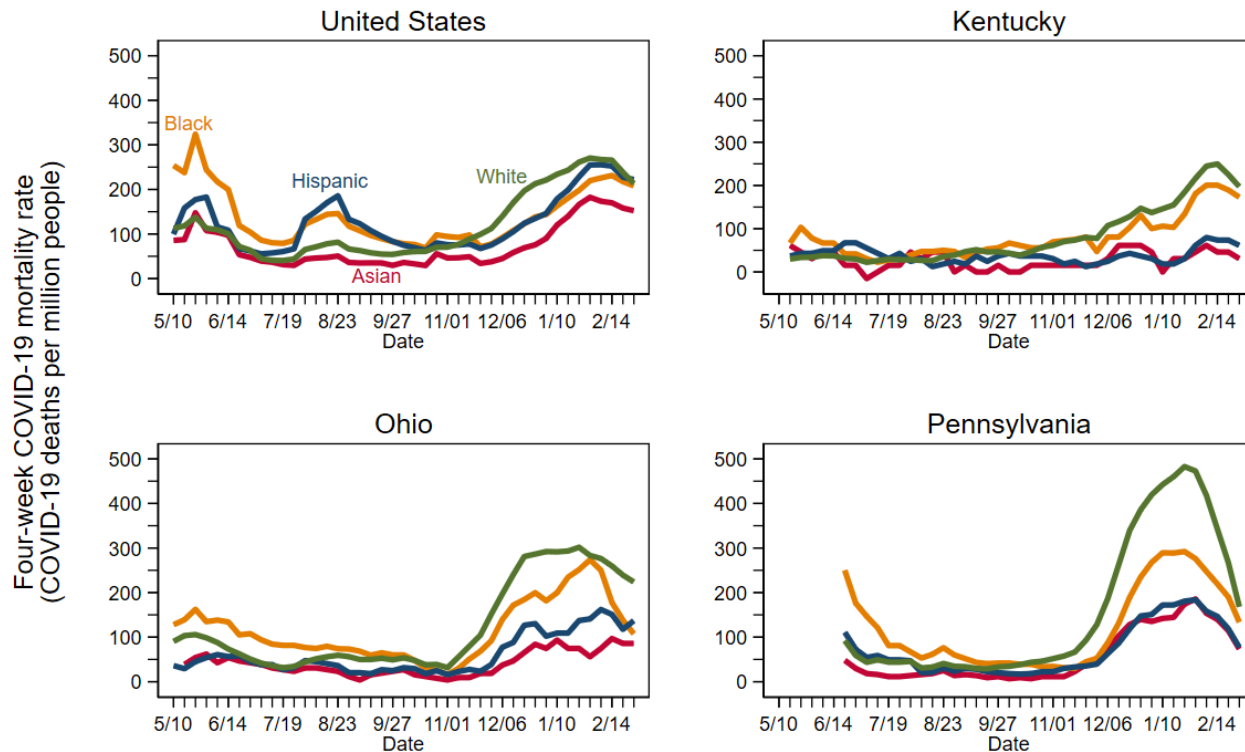
The cumulative COVID-19 mortality rates of Black residents and White residents are more similar in Kentucky, Ohio, and Pennsylvania than they are in the nation as a whole. In Ohio, this mortality rate is now higher for White residents than for Black residents.



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 2/28/2021.  
Sources: FRBC calculations, Census Bureau's 2019 ACS 5-Year estimates, and the COVID Tracking Project at *The Atlantic*.

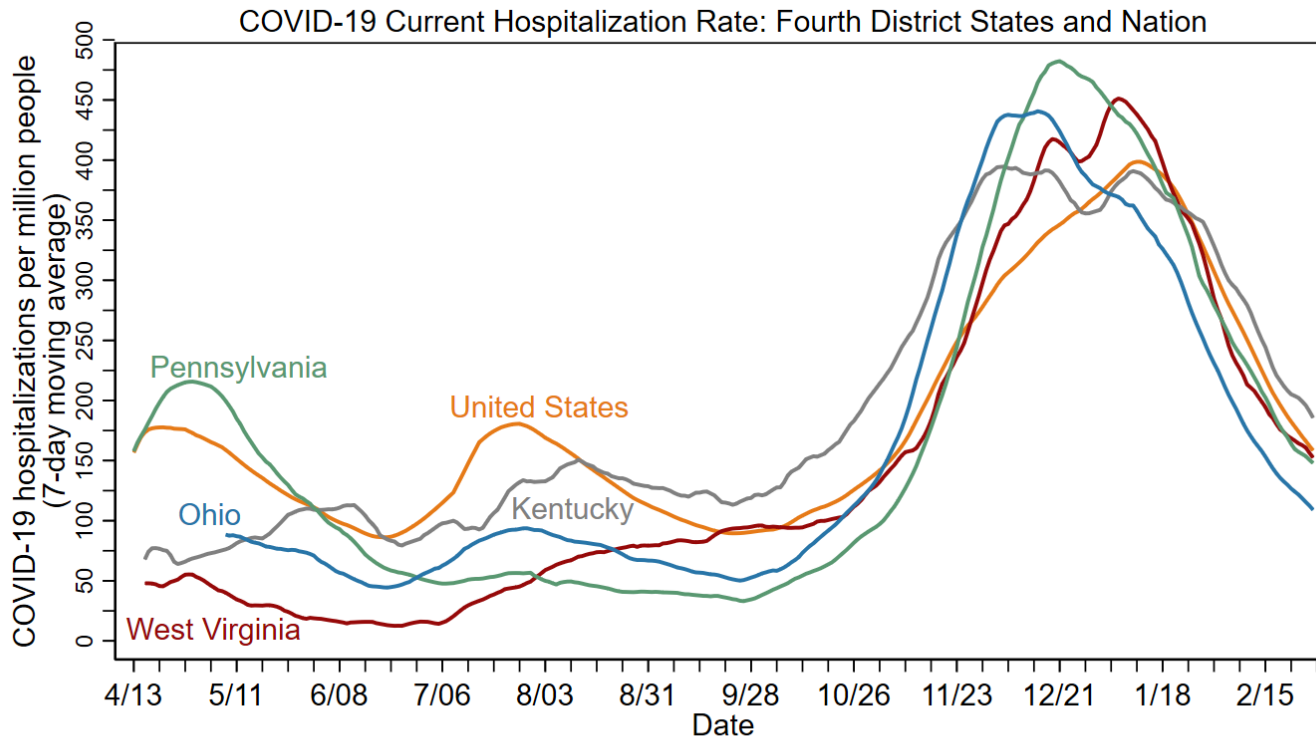
In the Fourth District states, White residents have had the highest 4-week mortality rates since November. In the United States, Hispanic residents currently have the highest rate, just above those of Black residents and White residents.

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 2/28/2021.  
Sources: FRBC calculations, Census Bureau's 2019 ACS 5-Year estimates, and the COVID Tracking Project at *The Atlantic*.

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.

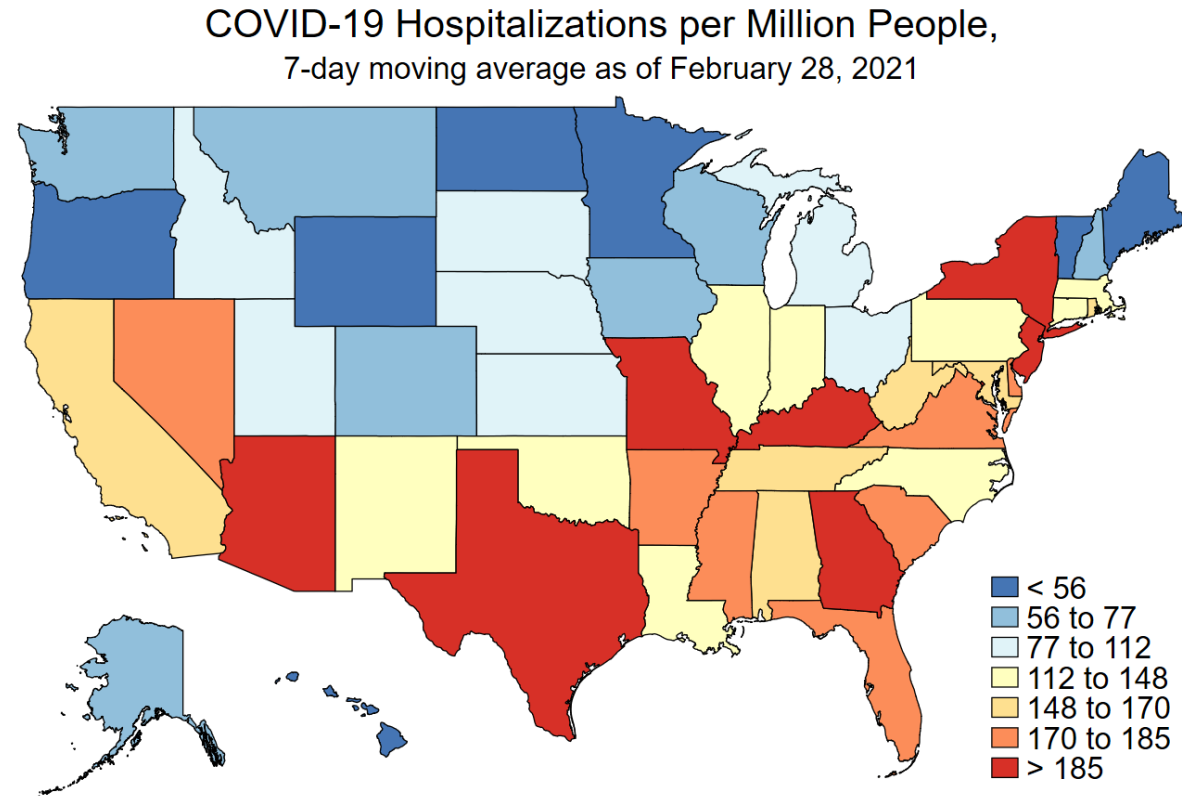


Note: Data through February 28, 2021.

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



As of February 28, 7-day hospitalization rates were highest in the Mid-Atlantic and Southeast and lowest in the Northwest and the Great Plains. Hospitalizations are also elevated in New York and Texas.



Data for February 28, 2021, accessed on March 1, 2021.

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

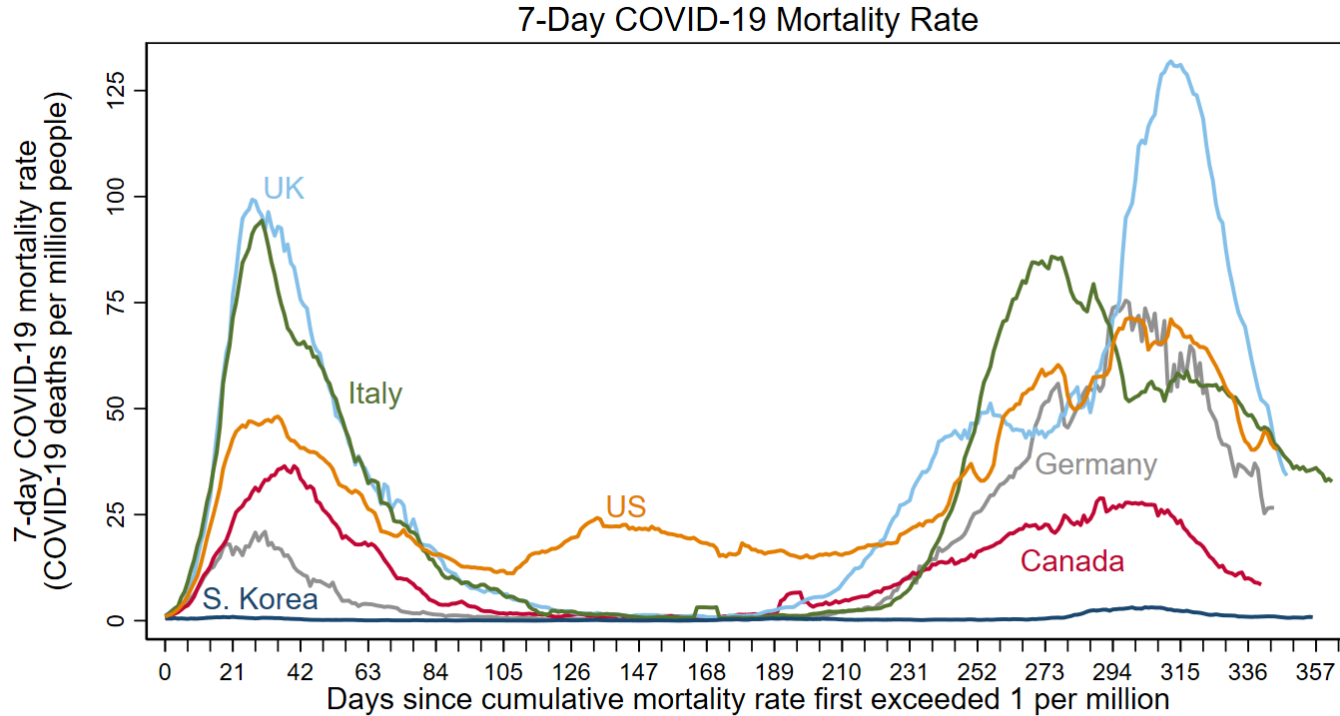
Note: The District of Columbia is in the bin with a hospitalization rate > 185. The color bins on this map are changed with each update to better represent the latest data.

# COVID-19 statistics for Fourth District states and the nation as of February 28, 2021.

COVID-19 Statistic	Kentucky	Ohio	Pennsylvania	West Virginia	United States
<b>Levels</b>					
Average daily deaths in past 2 weeks	25	41	64	6	1,895
Cumulative deaths	4,637	17,297	23,967	2,300	512,934
Average daily hospitalizations in the past week	829	1,274	1,895	272	52,083
<b>Rates (per million residents)</b>					
14-day mortality rate	79	49	70	50	81
Cumulative mortality rate	1,037	1,479	1,871	1,286	1,559
Average daily hospitalization rate in the past week	185	109	148	152	158
<b>Four-week mortality rate by race</b>					
Asian	31	86	73	--	152
Black	173	107	134	104	208
Hispanic	61	137	77	--	222
White	197	224	168	149	213
<b>Cumulative mortality rate by race</b>					
Asian	337	457	869	--	921
Black	1,014	1,344	1,977	567	1,780
Hispanic	436	724	1,018	--	1,487
White	976	1,460	1,893	977	1,446

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

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

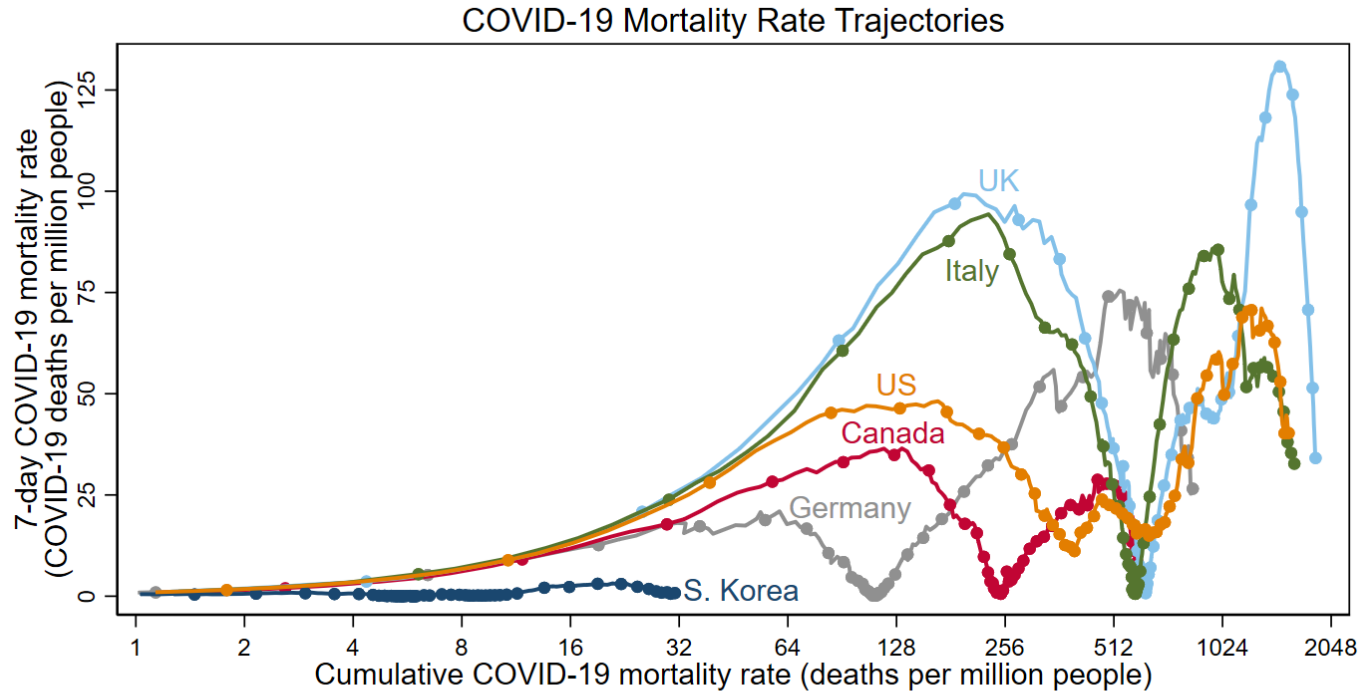


Notes: 3/22/2020 was first day US rate > 1. Data through 2/28/2021.

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

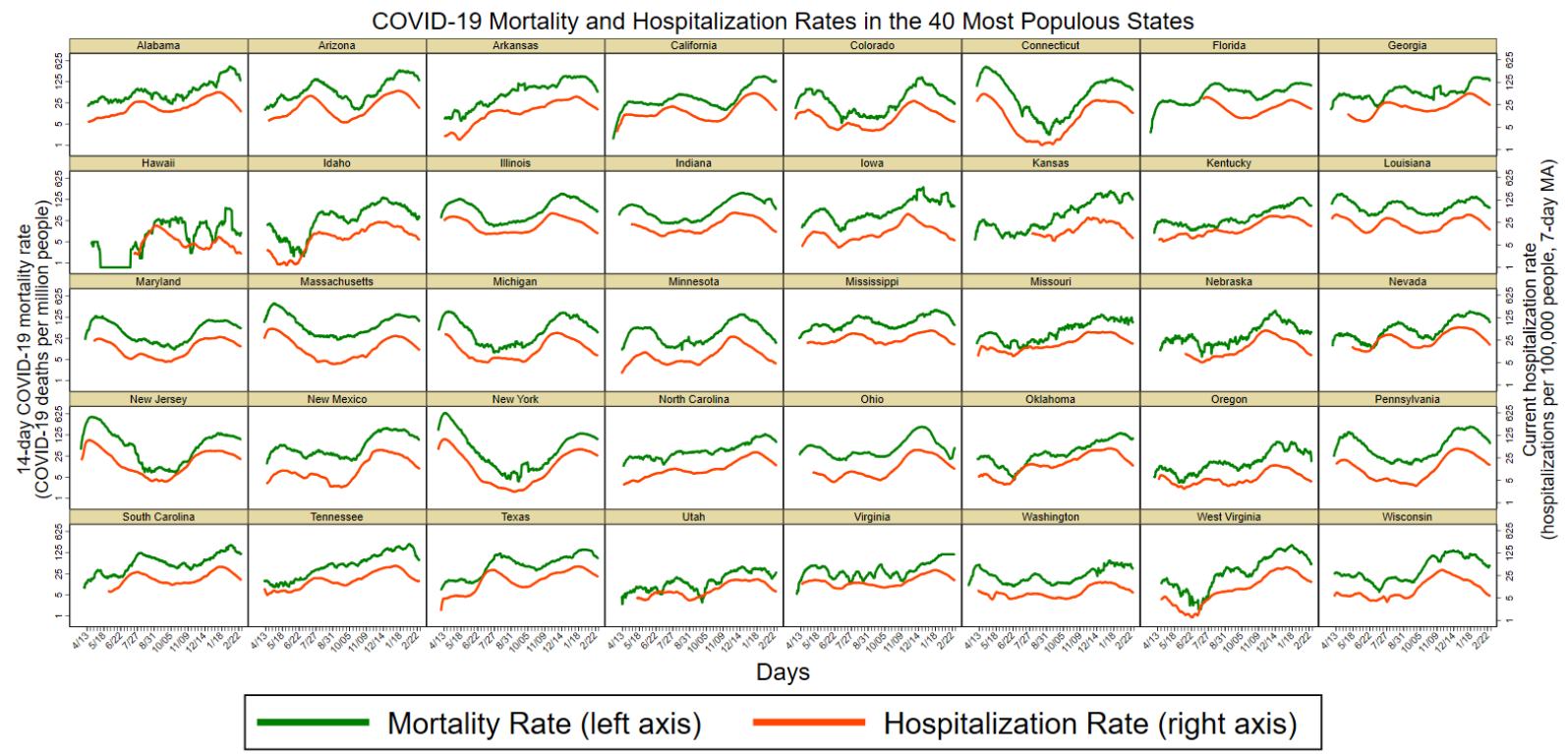
Note: For more information on the new coronavirus variants, please see [this report](#) from the Centers for Disease Control and Prevention.

As of February 28, the cumulative COVID-19 mortality rate of the United States is 1,559 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 February 28, 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 4/13/2020-2/28/2021. Both vertical axes have log scales.  
Sources: FRBC calculations, the Center for Systems Science and Engineering at Johns Hopkins University, BEA, 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.