The fall/winter surge has more clearly begun in the US with an accelerating increase in daily cases. We remain 3-4 weeks behind the surge in Europe. Daily deaths have risen for the second week in a row, but at a slow rate. We expect the weekly increases in cases and deaths to accelerate in the next 2–3 weeks. The fall/winter surge should lead to a daily death toll that is approximately three times higher than now by mid-January. Hospital systems, particularly ICUs, are expected to be under extreme stress in December and January in 18 states. Scaling up mask wearing can delay the need for further social distancing mandates and save 62,000 lives by February 1.

Current situation

- Daily cases in the last week increased to 60,000 a day, up from 50,000 a day the week prior, suggesting an accelerating week-on-week increase (Figure 1).
- Daily deaths are up to 770 in the last week, a 9% increase from the week prior (Figure 2). Even at this early point in the fall/winter surge, COVID-19 is the second-leading cause of death in the US (Table 1).
- Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 27 states (Figure 3).
- The daily death rate is over 4 per million in Montana, North Dakota, South Dakota, Kansas, Iowa, Wisconsin, and Indiana (Figure 6).

Trends in key drivers of transmission (mobility, mask use, testing, and seasonality)

- Social distancing mandates stayed the same, with the exception of Iowa lifting any business restrictions (Figure 7). Only one mandate, school restrictions, remains in place in Florida, Idaho, Iowa, Missouri, Oklahoma, and South Dakota.
- Mobility remained flat at 20% below pre-COVID-19 baseline in the last week. Mobility is lowest in Hawaii, California, and Massachusetts (Figure 8).
- Mask use is holding steady at 65%. The highest levels of mask use are on the West Coast and in the Southwest and Northeast. Mask use is lowest in Idaho, Wyoming, North Dakota, and South Dakota (Figure 9).
- Testing rates have risen to close to 300 per 100,000 (Figure 10).

Projections

- In the reference scenario, the scenario we believe is most likely to occur, daily deaths will reach 2,250 in mid-January, three times higher than current daily deaths (Figure 13).
- Cumulative deaths by February 1 in the reference scenario reach 399,000. If states do not react to rising numbers by re-imposing mandates, cumulative deaths could reach 514,000 by the same date (Figure 13).
- Increasing mask use to the level seen in Singapore will delay the re-imposition of social distancing mandates in many states and prevent 62,000 deaths by February 1 (Figure 12).
- Comparing our forecasts to other publicly archived models shows extremely different forecasts. The Imperial forecasts suggest a constant number of deaths over the period to January. The MIT (Delphi) model shows a slight increase to 800 deaths a day in December. The USC model shows a peak in mid-November, and the Los Alamos National Labs model shows a steady decline. The point of most extreme divergence in the models is the second week of December, with forecasts of daily deaths ranging from 200 to 1,750 (Figure 18).
- We have added to this brief Figures 19 and 20, which show forecasts of hospital and ICU stress. We expect extreme health system stress to occur for general hospital beds in 13 states in December and January and in 18 states for ICUs in the same period.

IHME wishes to warmly acknowledge the support of these and others who have made our COVID-19 estimation efforts possible. Thank you.

For all COVID-19 resources at IHME, visit http://www.healthdata.org/covid.

Questions? Requests? Feedback? Please contact us at https://www.healthdata.org/covid/contact-us.

COVID-19 Results Briefing: the United States of America

Institute for Health Metrics and Evaluation (IHME)

October 29, 2020

This briefing contains summary information on the latest projections from the IHME model on COVID-19 in the United States of America. The model was run on October 28, 2020.

For more information on the model, including interactive visualizations, downloadable results, and model details, please visit our site covid19.healthdata.org.

Model Overview

Updates to the model this week include additional data on deaths, cases, and updates on covariates.

Current situation

Figure 1. Reported daily COVID-19 cases

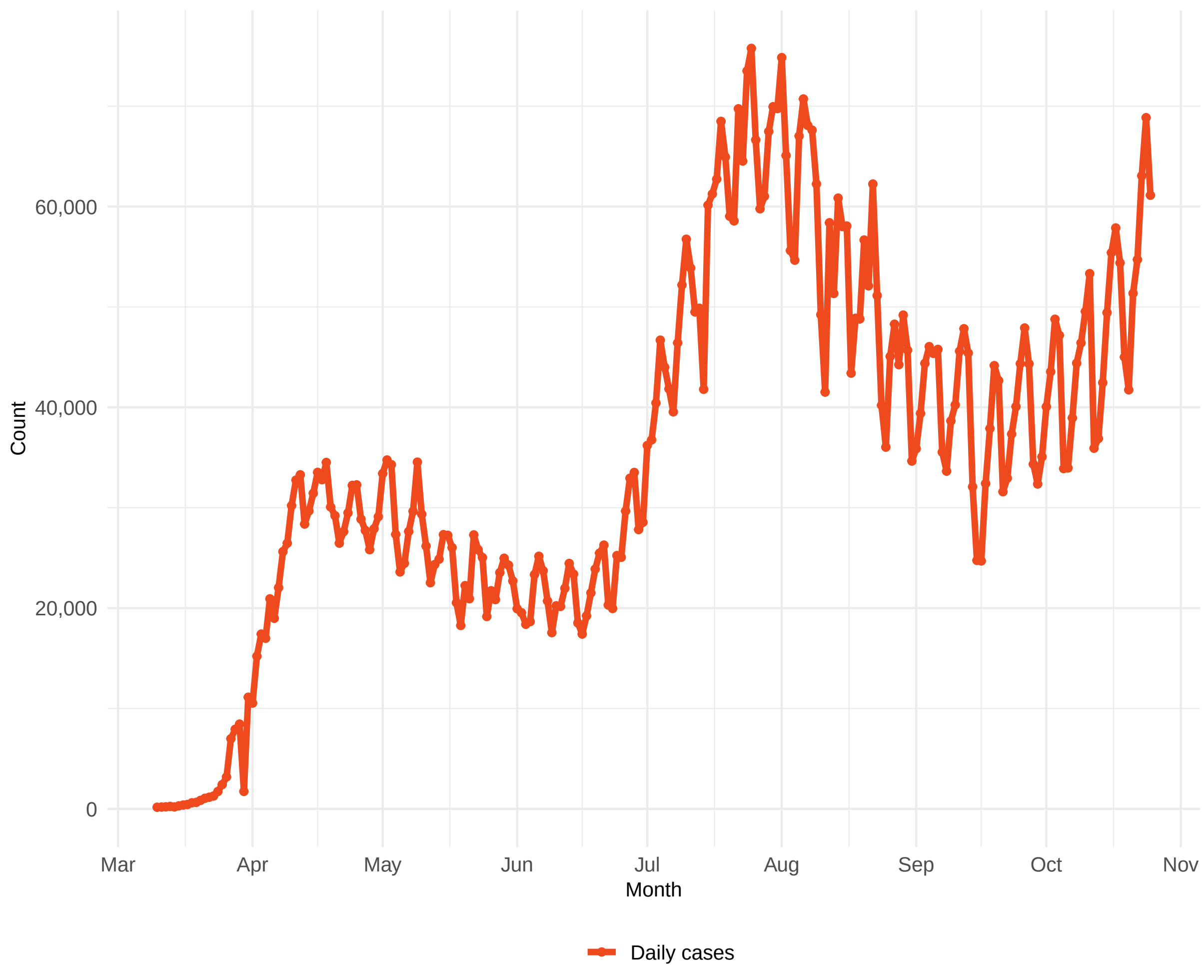


Table 1. Ranking of COVID-19 among the leading causes of mortality this week, assuming uniform deaths of non-COVID causes throughout the year

Cause name	Weekly deaths	Ranking
Ischemic heart disease	10,724	1
COVID-19	5,384	2
Tracheal, bronchus, and lung cancer	3,965	3
Chronic obstructive pulmonary disease	3,766	4
Stroke	3,643	5
Alzheimer's disease and other dementias	2,768	6
Chronic kidney disease	2,057	7
Colon and rectum cancer	1,616	8
Lower respiratory infections	1,575	9
Diabetes mellitus	1,495	10

Figure 2a. Reported daily COVID-19 deaths.

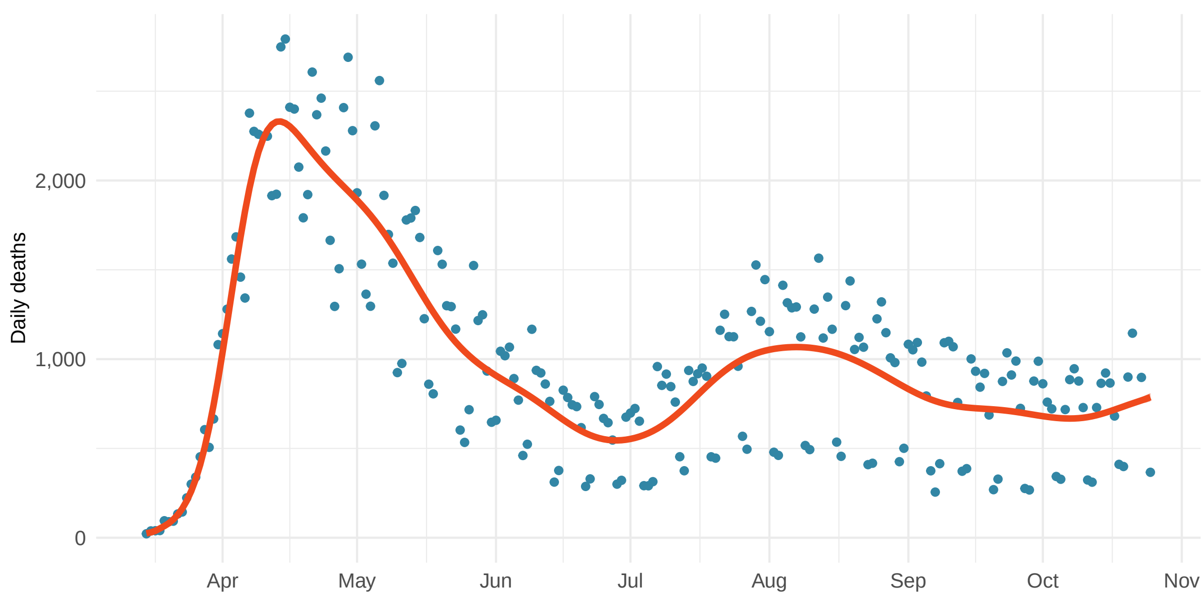


Figure 2b. Estimated cumulative deaths by age group

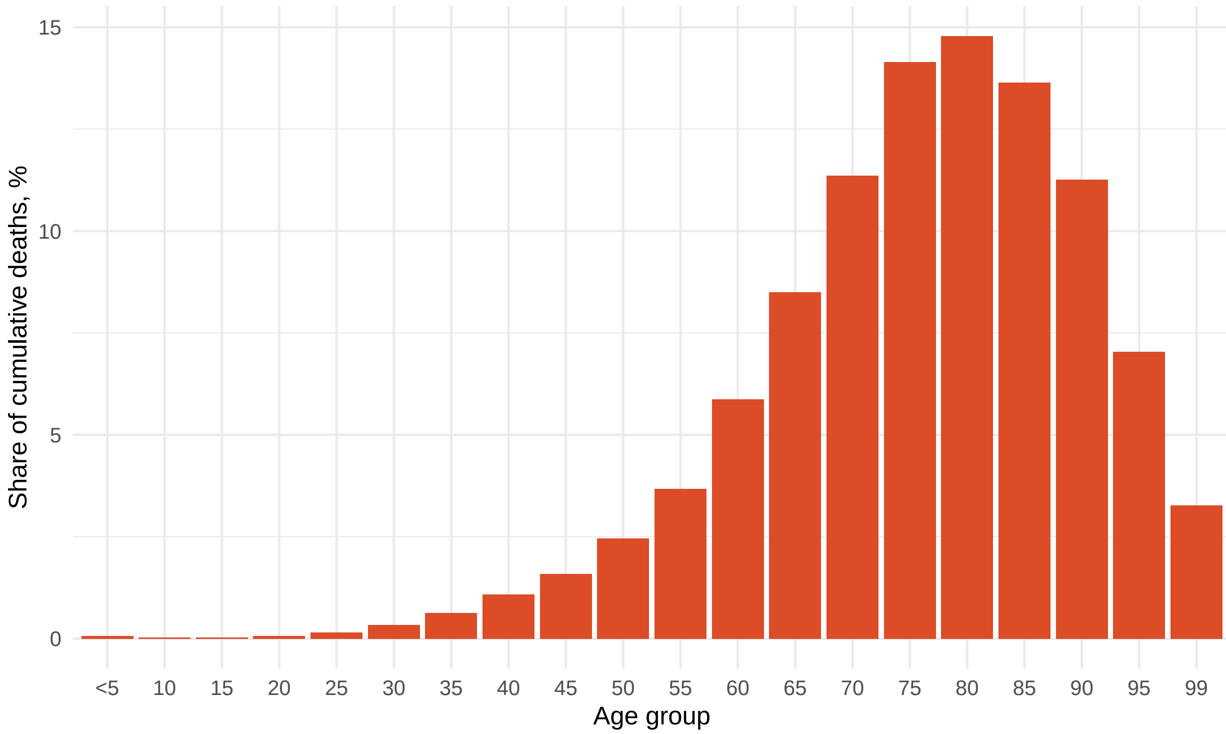


Figure 3. Mean effective R on October 15, 2020. The estimate of effective R is based on the combined analysis of deaths, case reporting and hospitalizations where available. Current reported cases reflect infections 11-13 days prior so estimates of effective R can only be made for the recent past. Effective R less than 1 means that transmission should decline all other things being held the same.

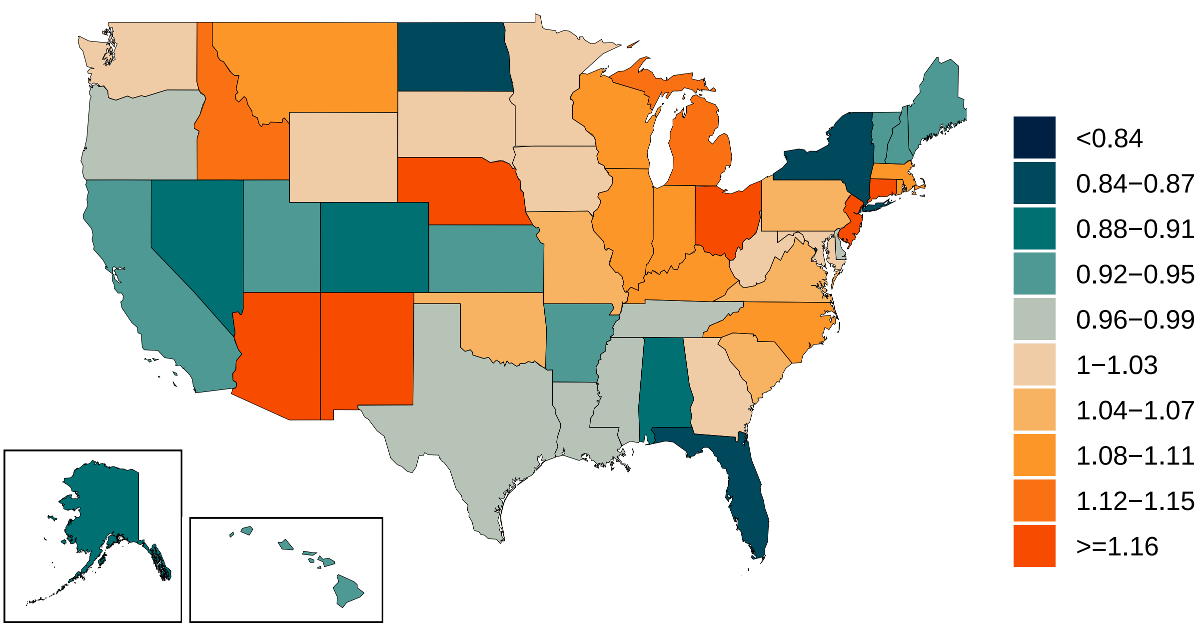


Figure 4. Estimated percent of the population infected with COVID-19 on October 26, 2020

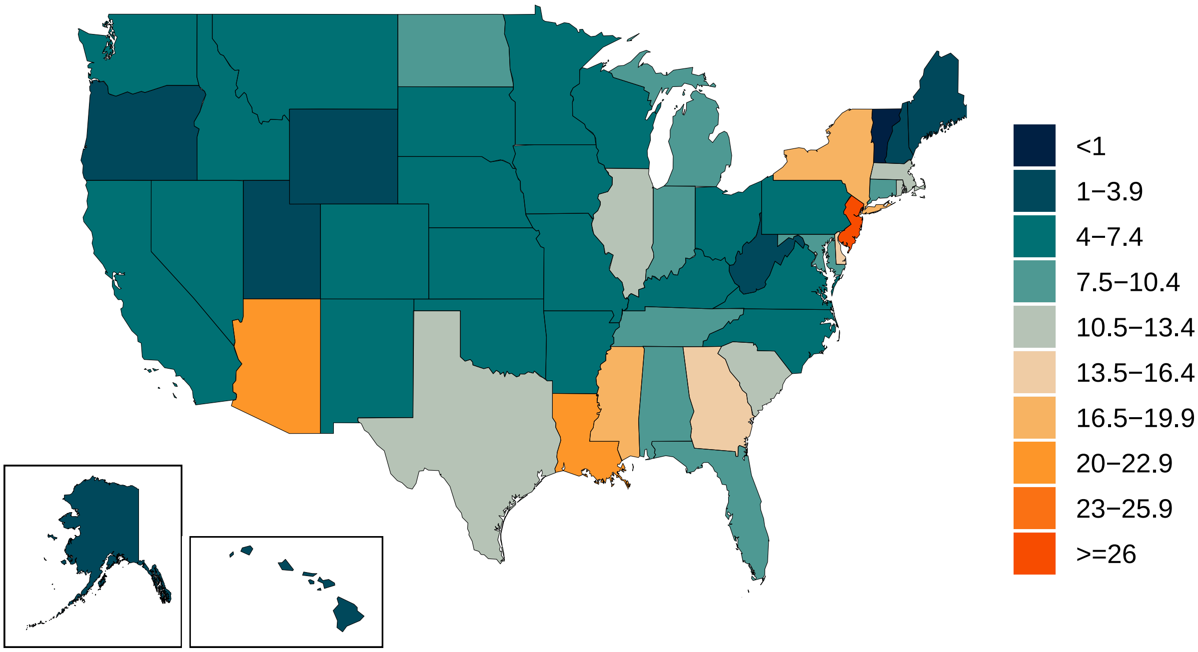


Figure 5. Percent of COVID-19 infections detected. This is estimated as the ratio of reported COVID-19 cases to estimated COVID-19 infections based on the SEIR disease transmission model.

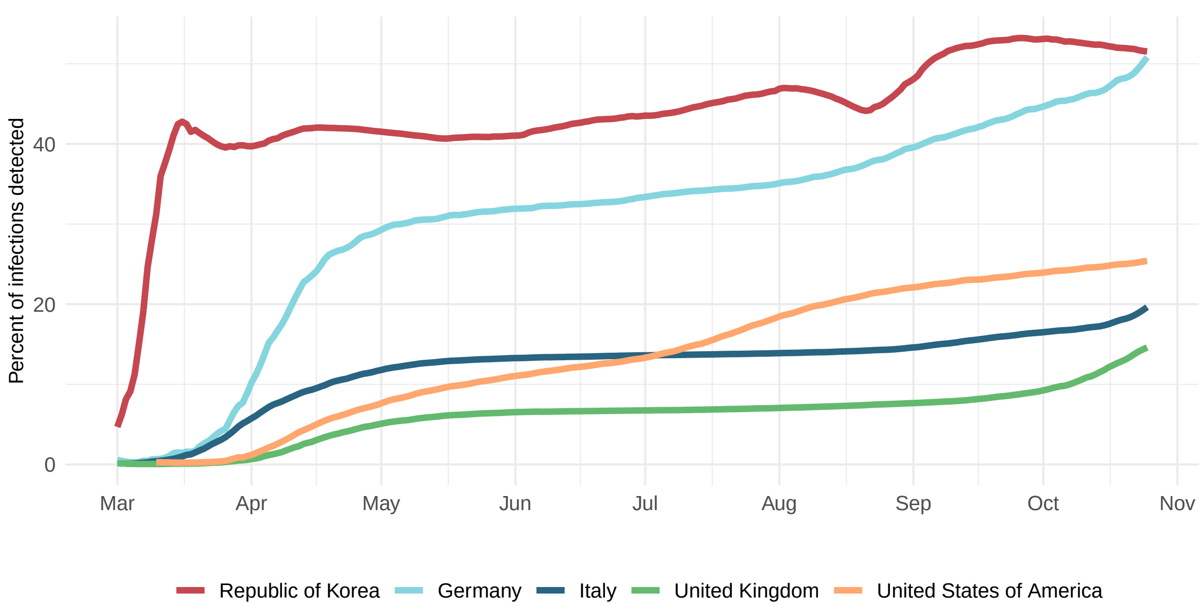
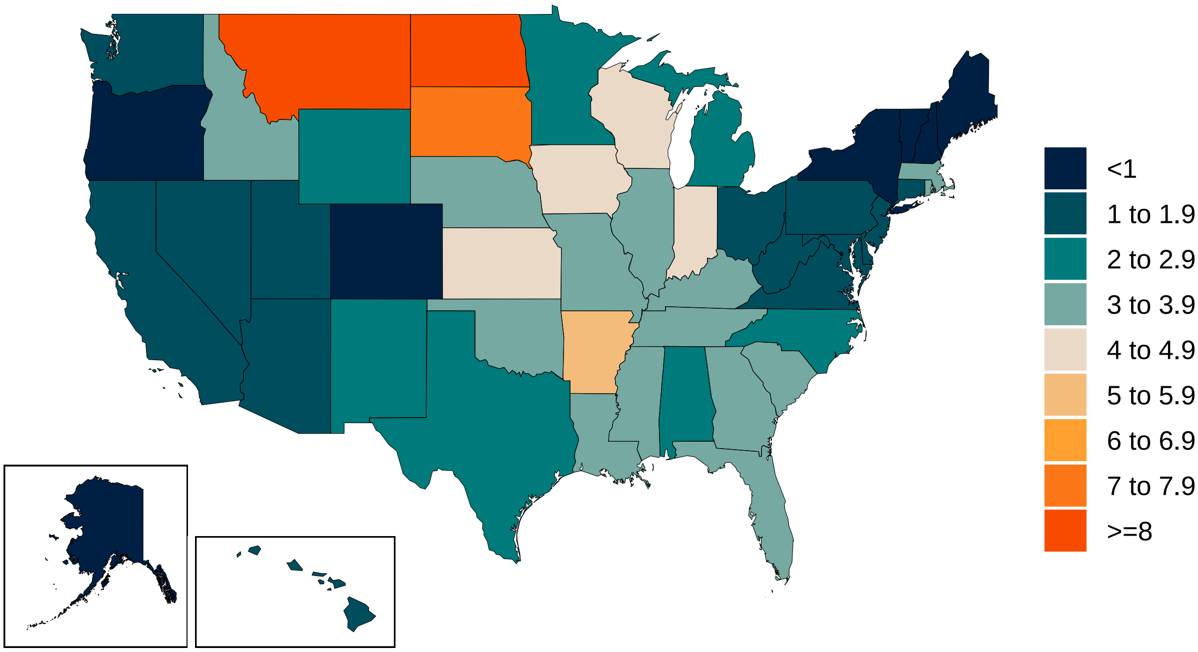


Figure 6. Daily COVID-19 death rate per 1 million on October 26, 2020



Critical drivers

Table 2. Current mandate implementation

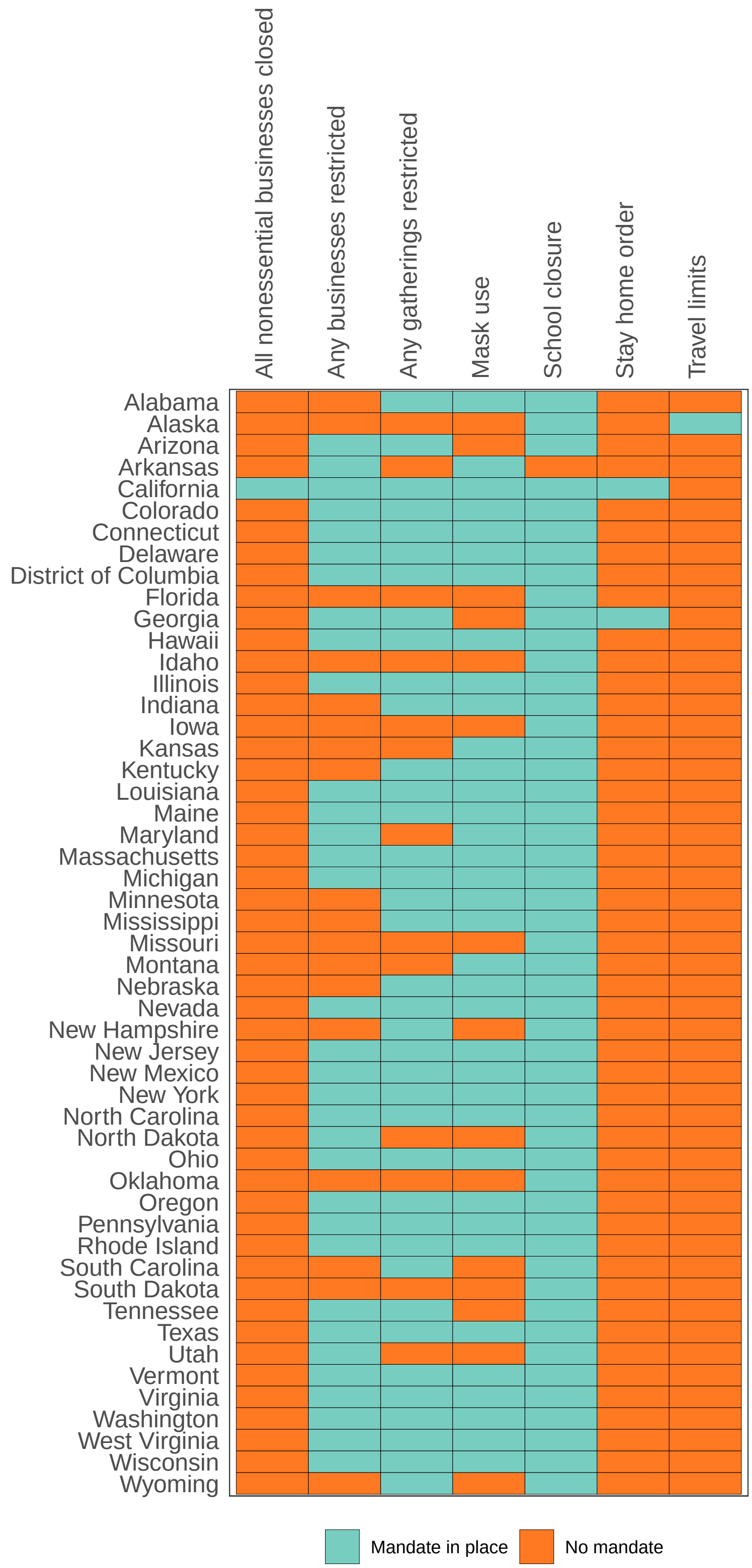


Figure 7. Total number of social distancing mandates (including mask use)

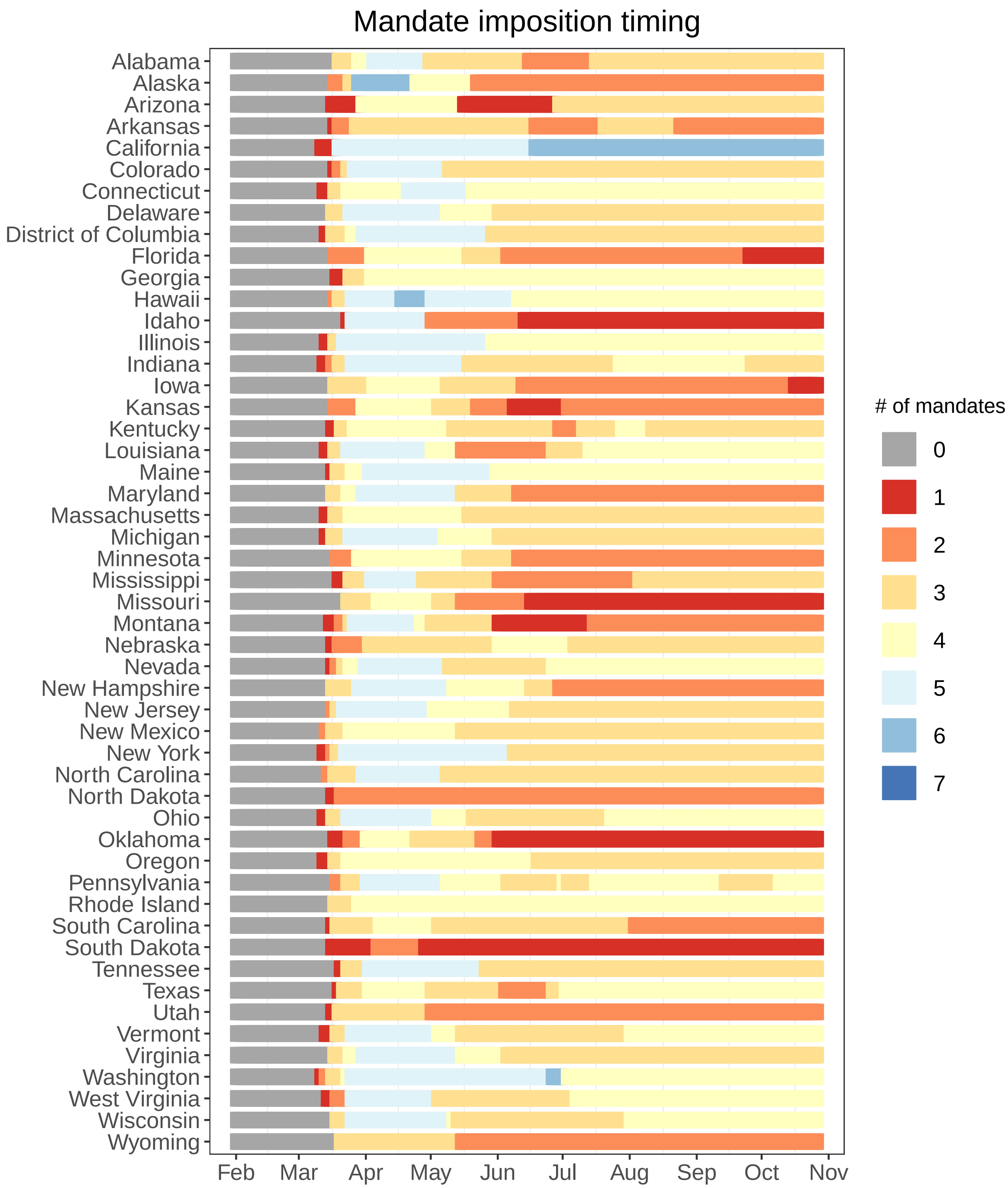


Figure 8a. Trend in mobility as measured through smartphone app use compared to January 2020 baseline

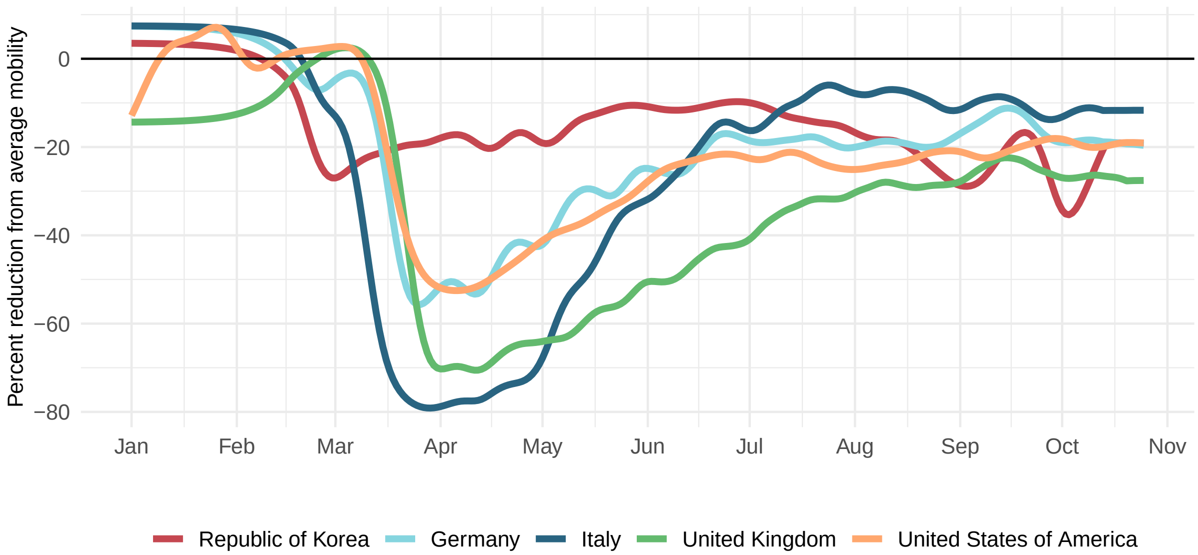


Figure 8b. Mobility level as measured through smartphone app use compared to January 2020 baseline (percent) on October 26, 2020

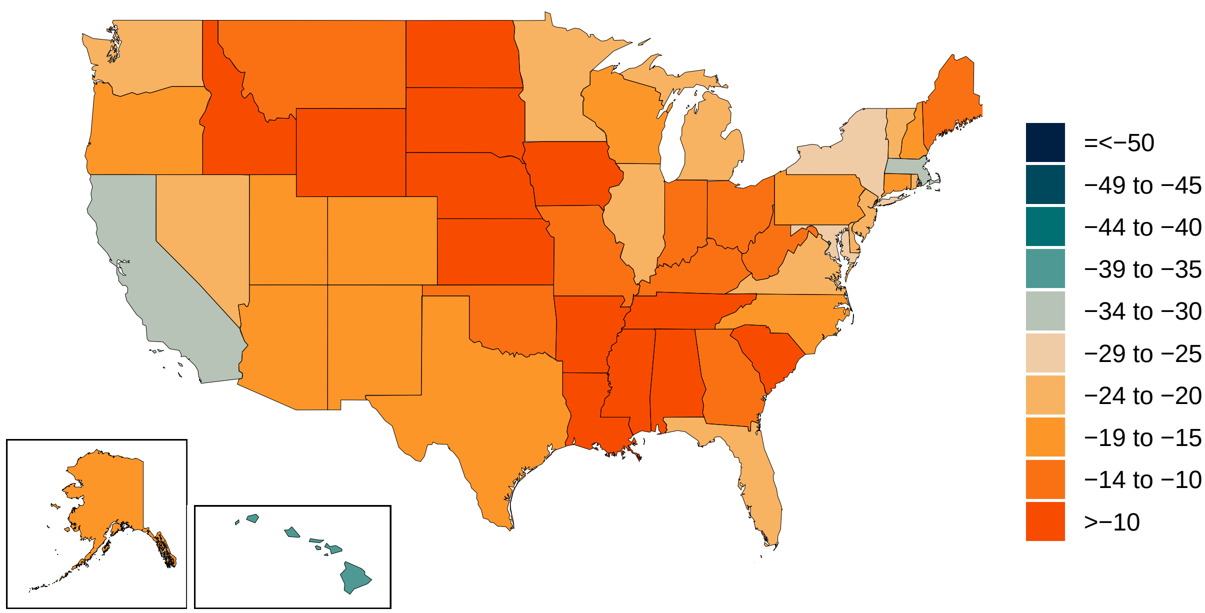


Figure 9a. Trend in the proportion of the population reporting always wearing a mask when leaving home

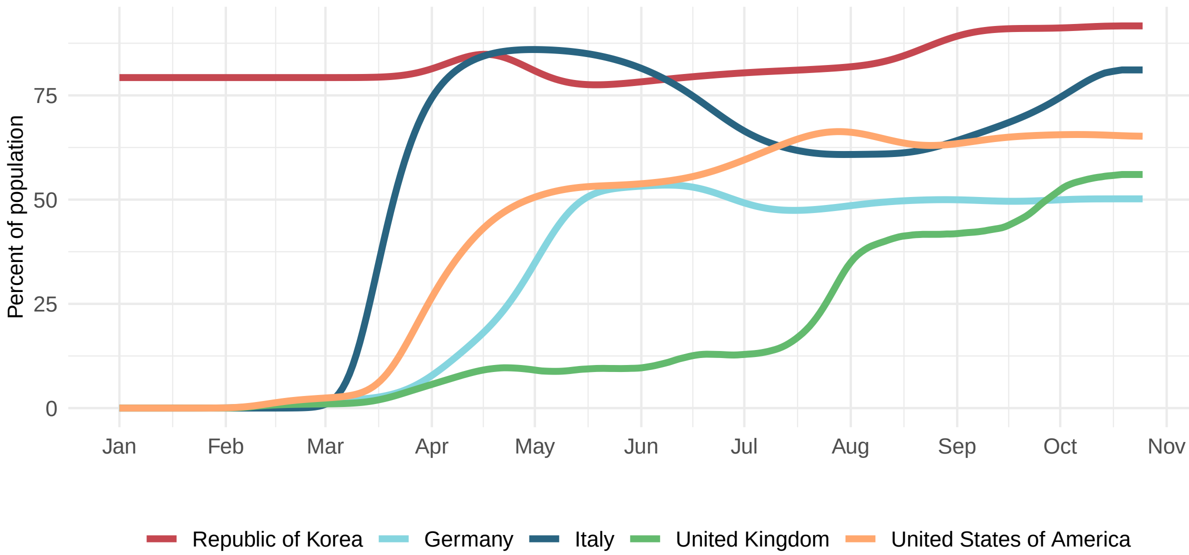


Figure 9b. Proportion of the population reporting always wearing a mask when leaving home on October 26, 2020

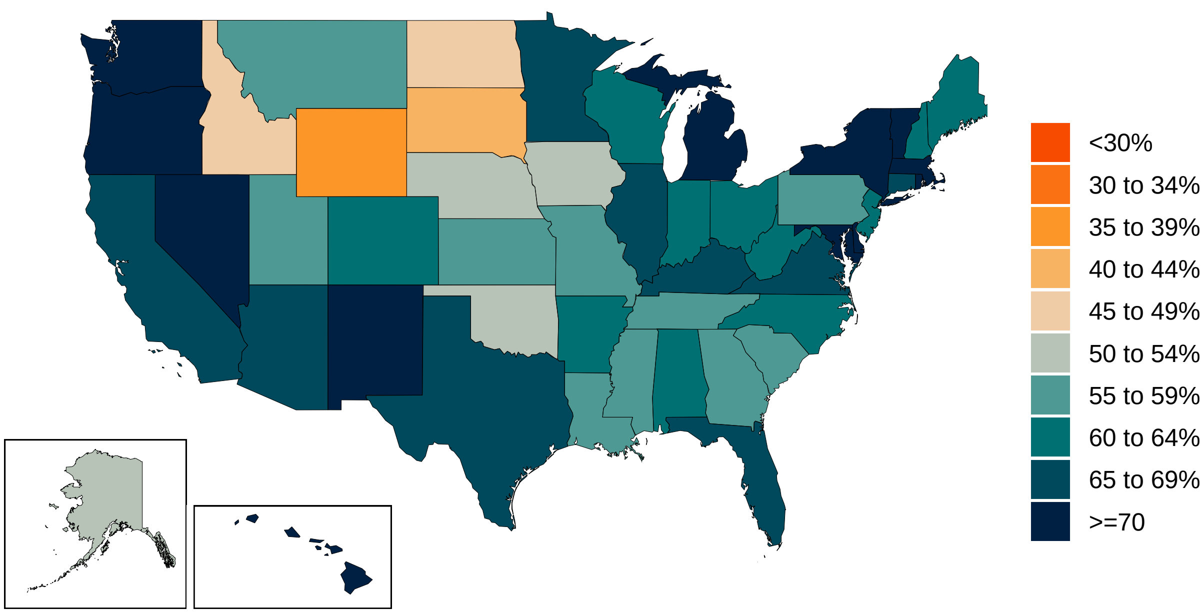


Figure 10a. Trend in COVID-19 diagnostic tests per 100,000 people

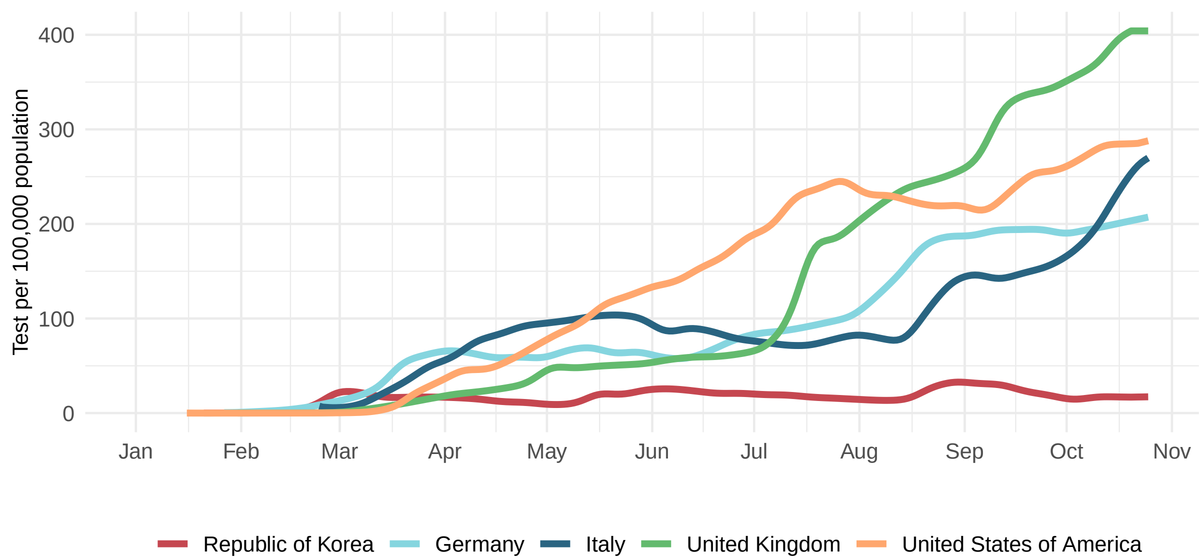


Figure 10b. COVID-19 diagnostic tests per 100,000 people on October 22, 2020

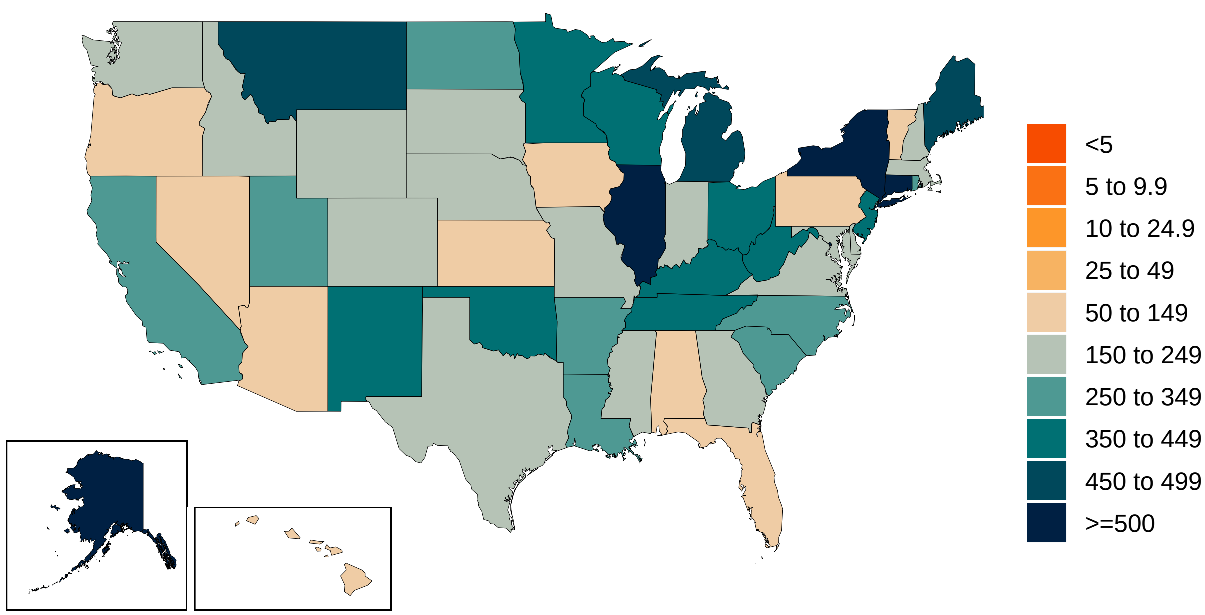
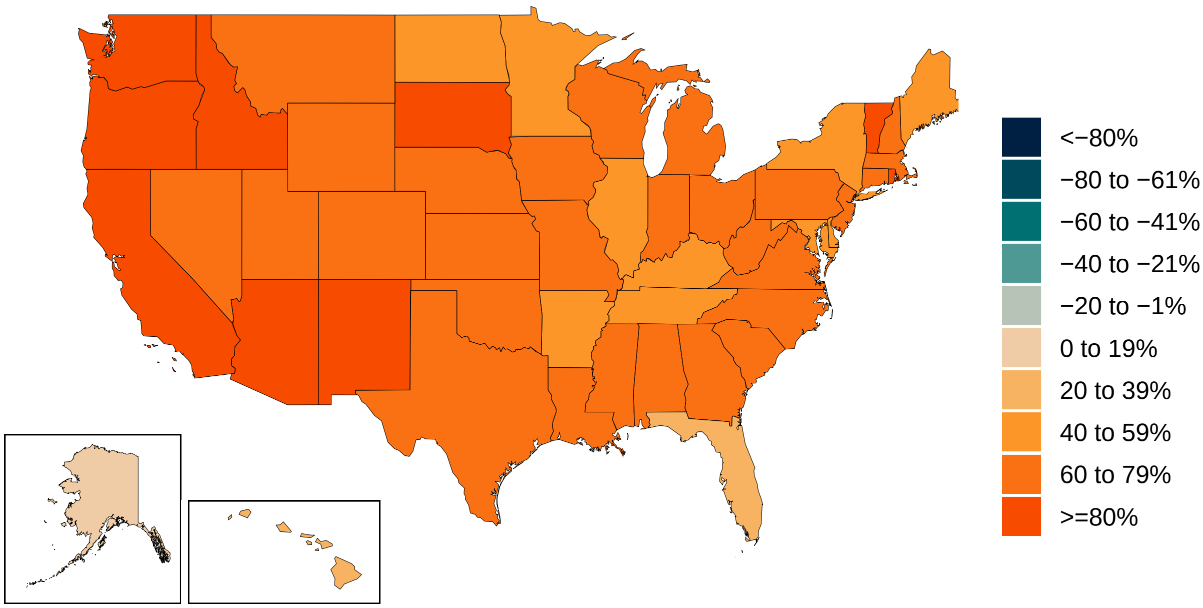


Figure 11. Increase in the risk of death due to pneumonia on February 1 compared to August 1



Projections and scenarios

We produce three scenarios when projecting COVID-19. The reference scenario is our forecast of what we think is most likely to happen. We assume that if the daily mortality rate from COVID-19 reaches 8 per million, social distancing (SD) mandates will be re-imposed. The mandate easing scenario is what would happen if governments continue to ease social distancing mandates with no re-imposition. The universal mask mandate scenario is what would happen if mask use increased immediately to 95% and social distancing mandates were re-imposed at 8 deaths per million.

Figure 12. Cumulative COVID-19 deaths until February 01, 2021 for three scenarios.

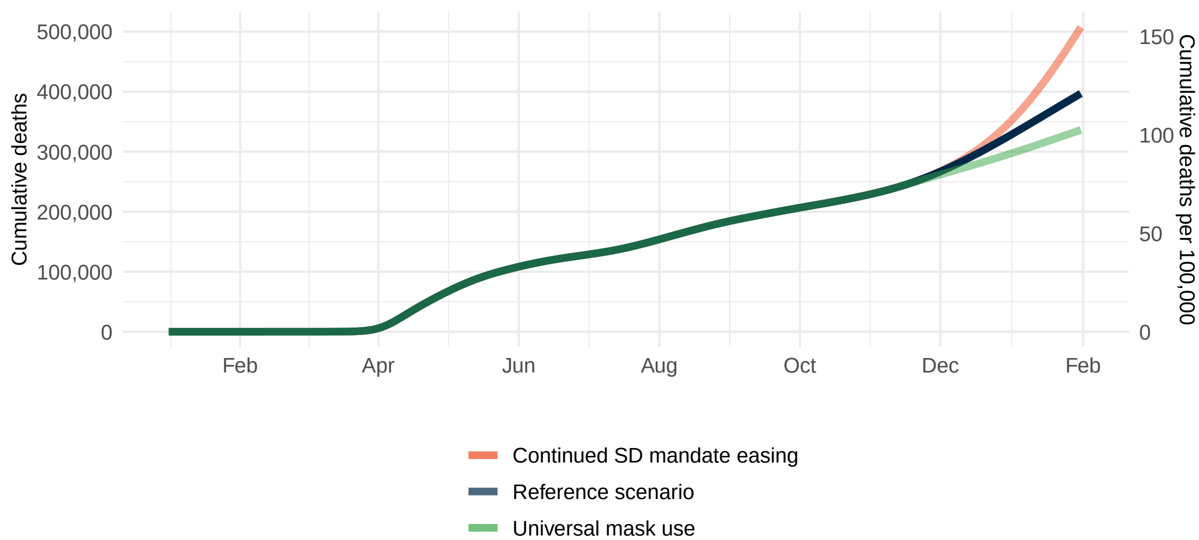


Fig 13. Daily COVID-19 deaths until February 01, 2021 for three scenarios.

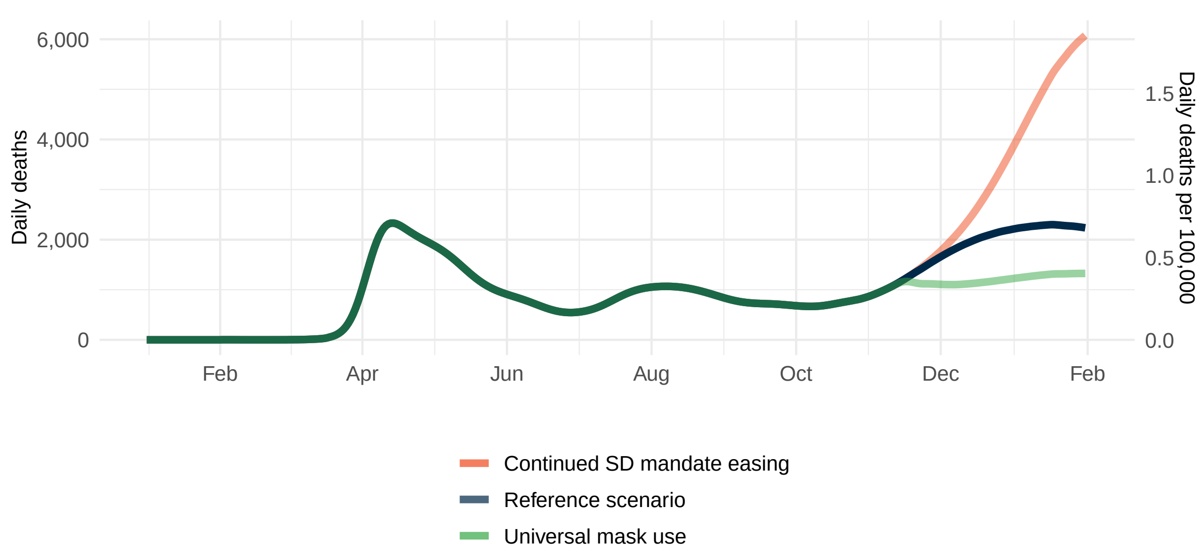


Fig 14. Daily COVID-19 infections until February 01, 2021 for three scenarios.

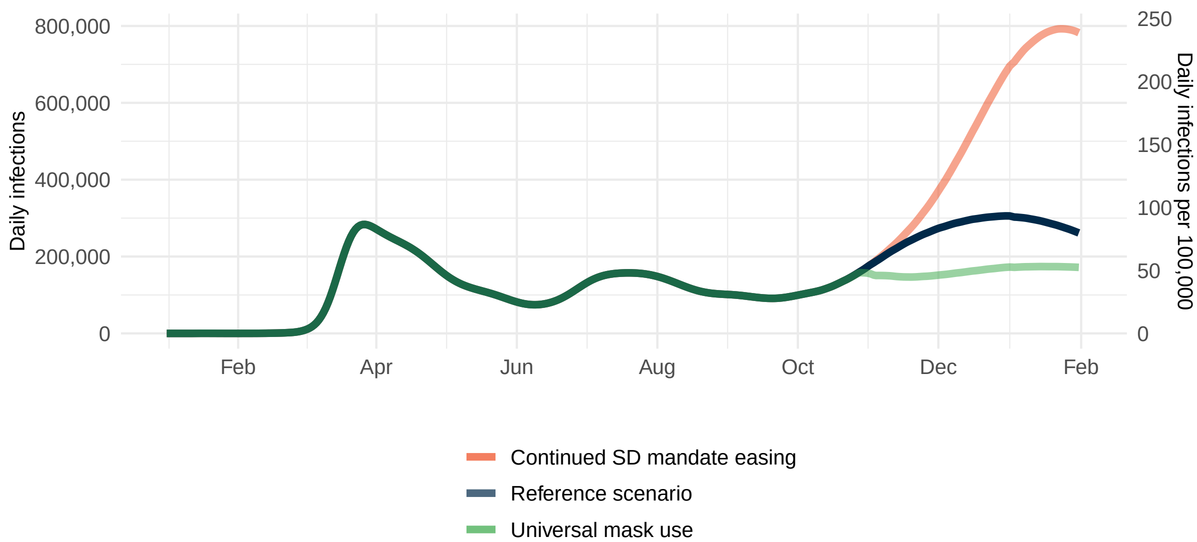


Fig 15. Month of assumed mandate re-implementation. (Month when daily death rate passes 8 per million, when reference scenario model assumes mandates will be re-imposed.)

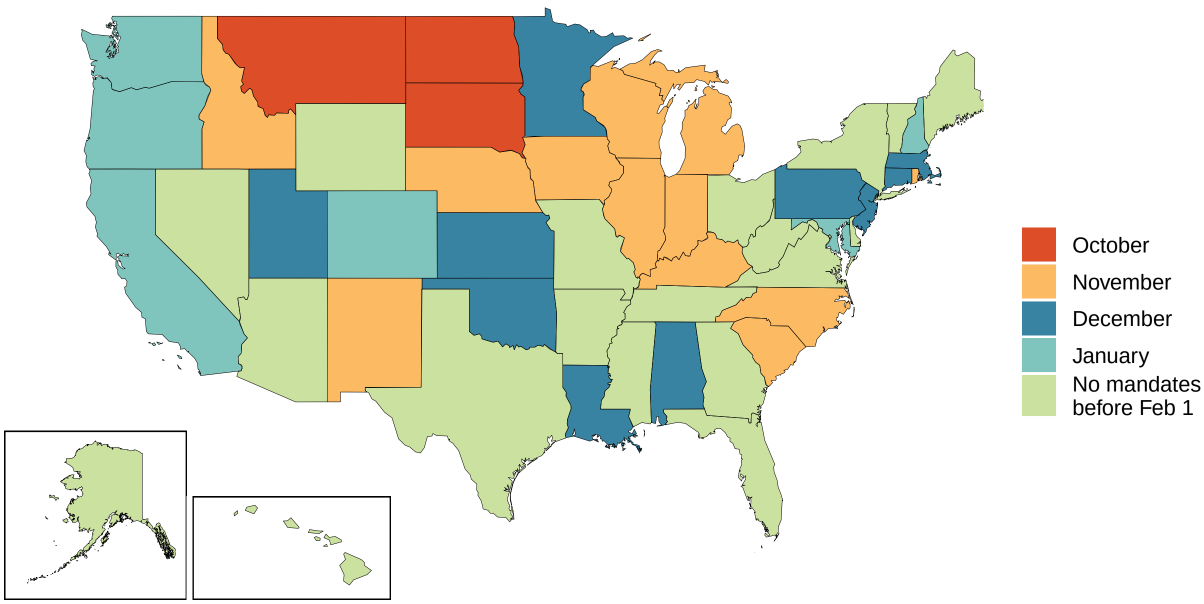


Figure 16. Forecasted percent infected with COVID-19 on February 01, 2021

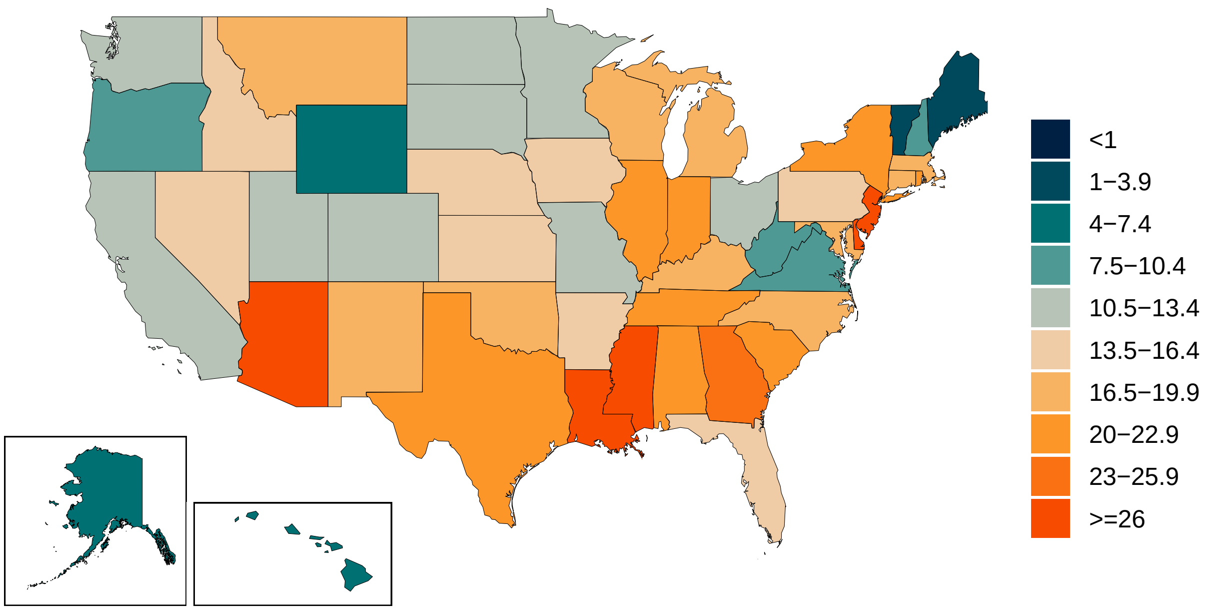


Figure 17. Daily COVID-19 deaths per million forecasted on February 01, 2021 in the reference scenario

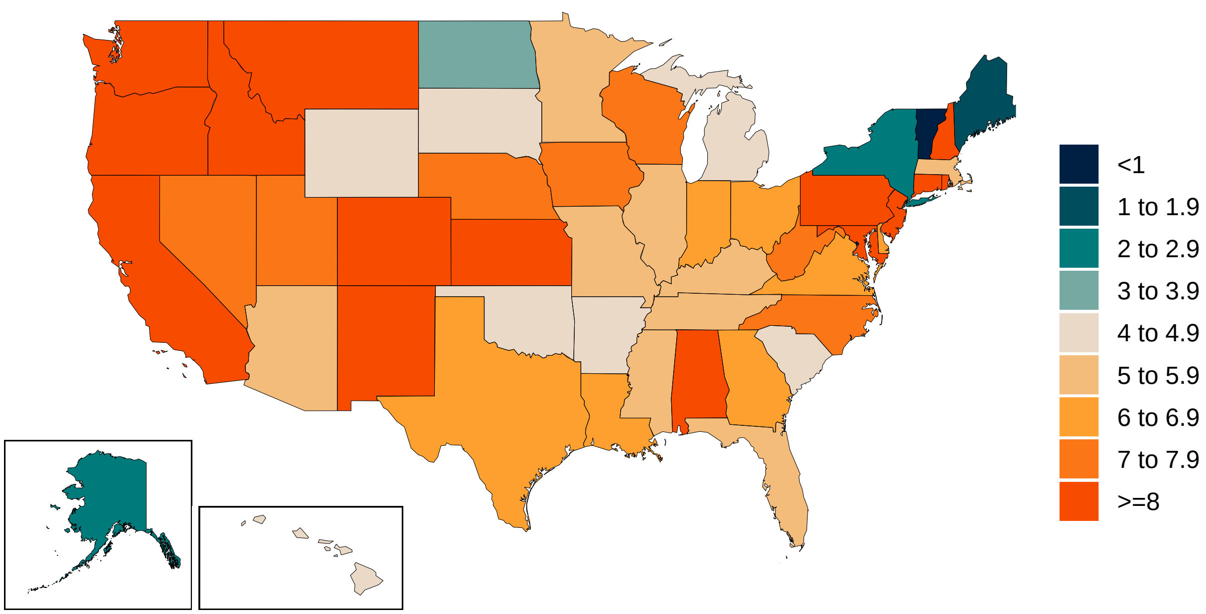


Figure 18. Comparison of reference model projections with other COVID modeling groups. For this comparison, we are including projections of daily COVID-19 deaths from other modeling groups when available: Delphi from the Massachussets Institute of Technology (Delphi; https://www.covidanalytics.io/home), Imperial College London (Imperial; https://www.covidsim.org), The Los Alamos National Laboratory (LANL; https://covid-19.bsvgateway.org/), the SI-KJalpha model from the University of Southern California (SIKJalpha; https://github.com/scc-usc/ReCOVER-COVID-19), and Youyang Gu (YYG; https://covid19-projections.com/). Daily deaths from other modeling groups are smoothed to remove inconsistencies with rounding. Regional values are aggregates from availble locations in that region.

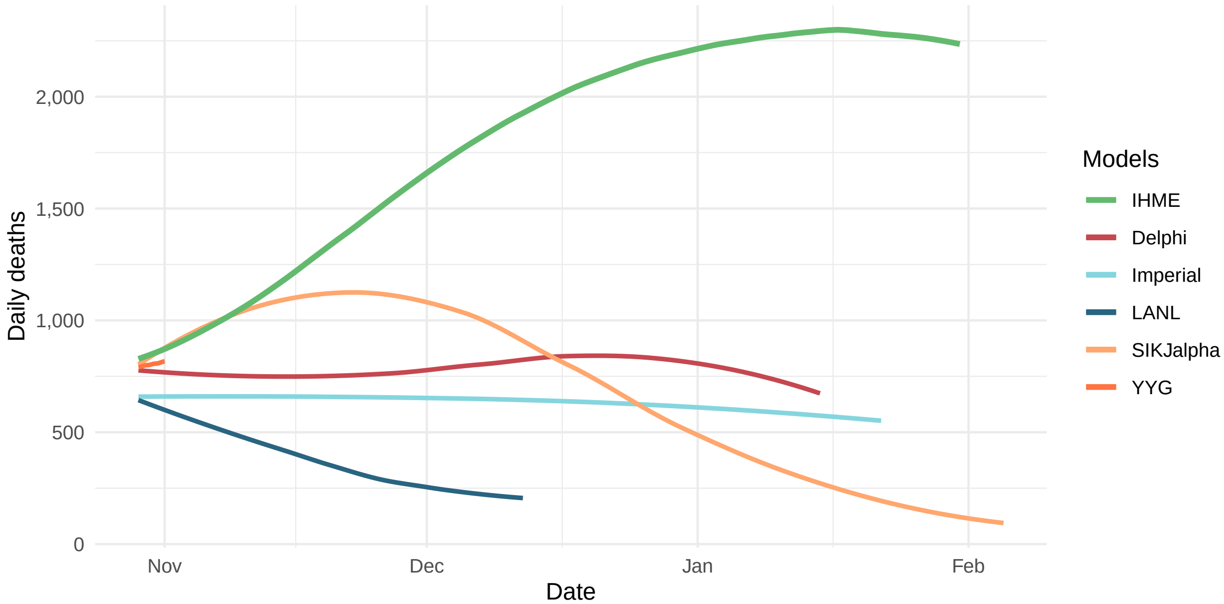


Figure 19. The estimated inpatient hospital usage is shown over time. The percent of hospital beds occupied by COVID-19 patients is color coded based on observed quantiles of the maximum proportion of beds occupied by COVID-19 patients. Less than 5% is considered *low stress*, 5-9% is considered *moderate stress*, 10-19% is considered *high stress* and greater than 20% is considered *extreme stress*.

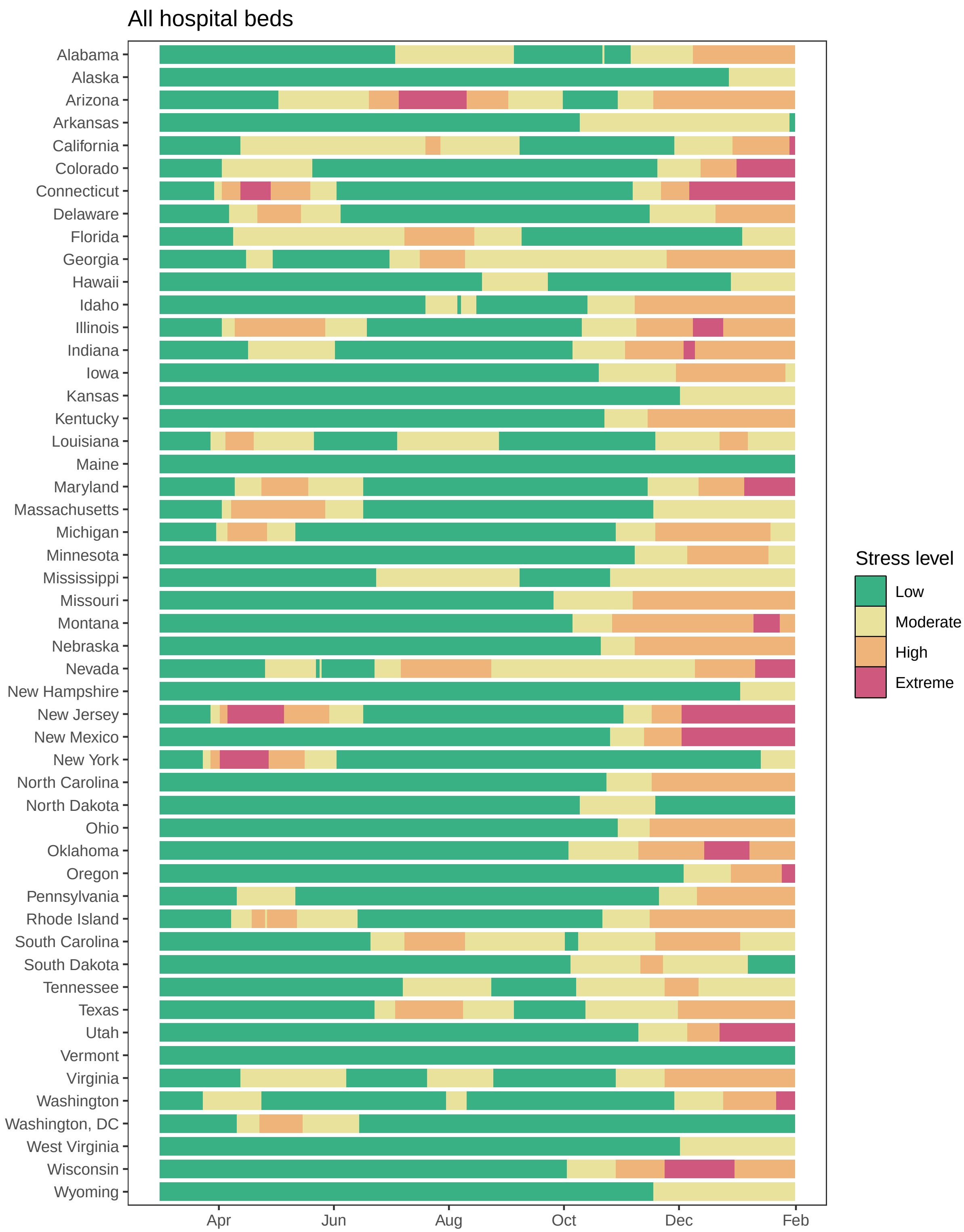


Figure 20. The estimated intensive care unit (ICU) usage is shown over time. The percent of ICU beds occupied by COVID-19 patients is color coded based on observed quantiles of the maximum proportion of ICU beds occupied by COVID-19 patients. Less than 10% is considered *low stress*, 10-29% is considered *moderate stress*, 30-59% is considered *high stress* and greater than 60% is considered *extreme stress*.

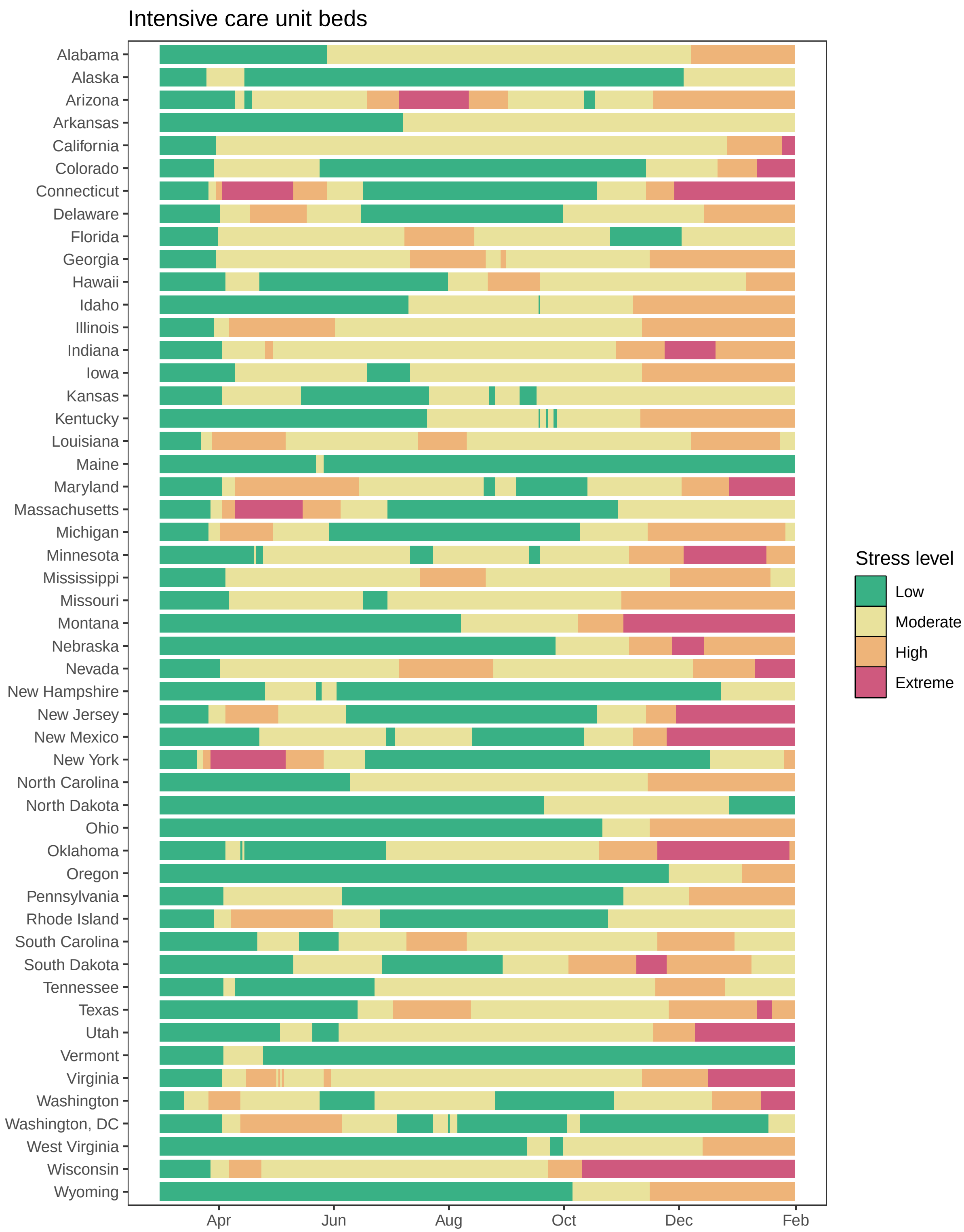


Table 3. Ranking of COVID-19 among the leading causes of mortality in the full year 2020. Deaths from COVID-19 are projections of cumulative deaths on Jan 1, 2021 from the reference scenario. Deaths from other causes are from the Global Burden of Disease study 2019 (rounded to the nearest 100).

Cause name	Annual deaths	Ranking
Ischemic heart disease	557,600	1
COVID-19	328,871	2
Tracheal, bronchus, and lung cancer	206,200	3
Chronic obstructive pulmonary disease	195,800	4
Stroke	189,500	5
Alzheimer's disease and other dementias	143,900	6
Chronic kidney disease	107,000	7
Colon and rectum cancer	84,000	8
Lower respiratory infections	81,900	9
Diabetes mellitus	77,700	10

Mask data source: Premise; Facebook Global symptom survey (This research is based on survey results from University of Maryland Social Data Science Center) and the Facebook United States symptom survey (in collaboration with Carnegie Mellon University); Kaiser Family Foundation; YouGov COVID-19 Behaviour Tracker survey.

A note of thanks:

We would like to extend a special thanks to the Pan American Health Organization (PAHO) for key data sources; our partners and collaborators in Argentina, Brazil, Bolivia, Chile, Colombia, Cuba, the Dominican Republic, Ecuador, Egypt, Honduras, Israel, Japan, Malaysia, Mexico, Moldova, Panama, Peru, the Philippines, Russia, Serbia, South Korea, Turkey, and Ukraine for their support and expert advice; and to the tireless data collection and collation efforts of individuals and institutions throughout the world.

In addition, we wish to express our gratitude for efforts to collect social distancing policy information in Latin America to University of Miami Institute for Advanced Study of the Americas (Felicia Knaul, Michael Touchton), with data published here: http://observcovid.miami.edu/; Fundación Mexicana para la Salud (Héctor Arreola-Ornelas) with support from the GDS Services International: Tómatelo a Pecho A.C.; and Centro de Investigaciones en Ciencias de la Salud, Universidad Anáhuac (Héctor Arreola-Ornelas); Lab on Research, Ethics, Aging and Community-Health at Tufts University (REACH Lab) and the University of Miami Institute for Advanced Study of the Americas (Thalia Porteny).

Further, IHME is grateful to the Microsoft AI for Health program for their support in hosting our COVID-19 data visualizations on the Azure Cloud. We would like to also extend a warm thank you to the many others who have made our COVID-19 estimation efforts possible.