Daily cases have begun to increase and transmission has intensified in the northern half of the United States. We expect deaths to stop declining and begin increasing in the next 1–2 weeks. The winter surge appears to have begun somewhat later than the surge in Europe. Daily deaths will reach over 2,000 a day in January even with many states re-imposing mandates before the end of the year. Expanding mask use remains the best strategy to delay and reduce the magnitude of the surge.

Current situation

- Daily cases now appear to be rising, reaching 45,000 a day, up from 40,000 last week (Figure 1).
- Despite the increase in cases, deaths have remained constant at 680 a day (Figure 2).
- Effective R computed based on cases, hospitalizations, and deaths is above 1 across most of the northern half of the continental states, representing a larger range of states than last week (Figure 3).
- The daily death rate is over 4 per million in North Dakota, South Dakota, Arkansas, Tennessee, and Florida (Figure 6). North Dakota presently has one of the highest COVID-19 death rates in the world.

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

- Florida and Indiana removed any business closures; all other mandates remained the same (Figure 7).
- Mobility in the last week has remained constant. The vast majority of states, including many with effective R over 1, have mobility levels within 10% of the pre-COVID-19 baseline (Figure 8).
- Mask use has remained constant over the last week. North Dakota and South Dakota, with the highest death rates in the country, have the lowest mask use (Figure 9).
- Diagnostic tests continue to increase slowly (Figure 10).

Projections

- Daily deaths in our reference scenario, the scenario that we think is most likely to occur, will peak in mid-January due to the winter surge at around 2,200 a day (Figure 13).
- Cumulative deaths by February 1 are expected to reach 389,000 (Figure 12).
- Increasing mask use from 69%, the current US average, to 95%, the level seen in Singapore, could save 74,000 lives (Figure 12).
- We expect in the reference scenario that many Midwestern states will have to re-impose mandates before the end of this year (Figure 15).
- Figure 18 compares our model forecasts to other publicly archived forecasts. While this week our forecasts have not changed substantially, other models have revised their forecasts up substantially. The USC (SIKJalpha) model now shows a winter surge, but substantially smaller than in our model. The Imperial forecasts have not been revised upward but still show declines through into January in daily deaths. The MIT (Delphi) model has also been revised upward but still suggests a steady decline into mid-December. The Los Alamos National Labs model continues to show a brisk decline in daily deaths through to the end of November.

Model updates

There are no major updates to our model this week. We continue to search for evidence on whether the infection-fatality rate (IFR) has changed during the pandemic. There is a clear shift to younger ages in diagnosed cases. This shift alone would – because of the age dependence of the IFR – reduce the all-age IFR even if treatments have not improved. However, the shift in the age distribution of confirmed cases may be due to the scale-up in testing capacity. Analysis underway of data on individual clinical treatments and outcomes may provide a more direct measure of whether the IFR

by age has changed. If the IFR has declined, this would alter our forecasted death rates; to date, however, we have not been able to find sufficient evidence to support this change to our model.

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: United States of America

Institute for Health Metrics and Evaluation (IHME)

October 15, 2020

This briefing contains summary information on the latest projections from the IHME model on COVID-19 in United States of America. The model was run on October 13, 2020.

Model updates

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

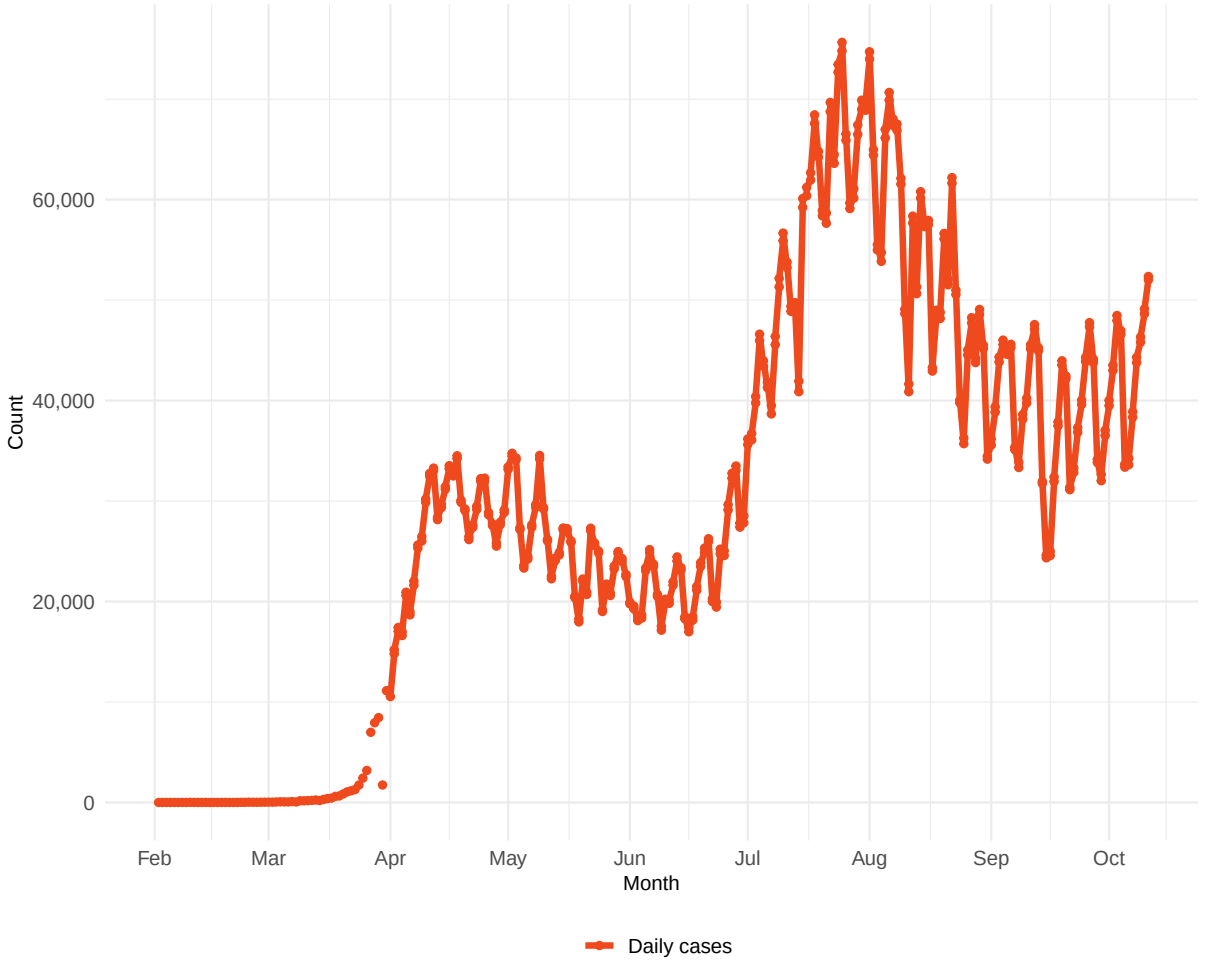


Table 1. Ranking of COVID-19 among the leading causes of mortality this week, assuming uniform deaths of non-COVID causes throughout the year

Cause name	Weekly deaths	Ranking
Ischemic heart disease	10,724	1
COVID-19	4,771	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 and smoothed trend estimate. Points shown are reported deaths, line and ribbon represent estimate with uncertainty.

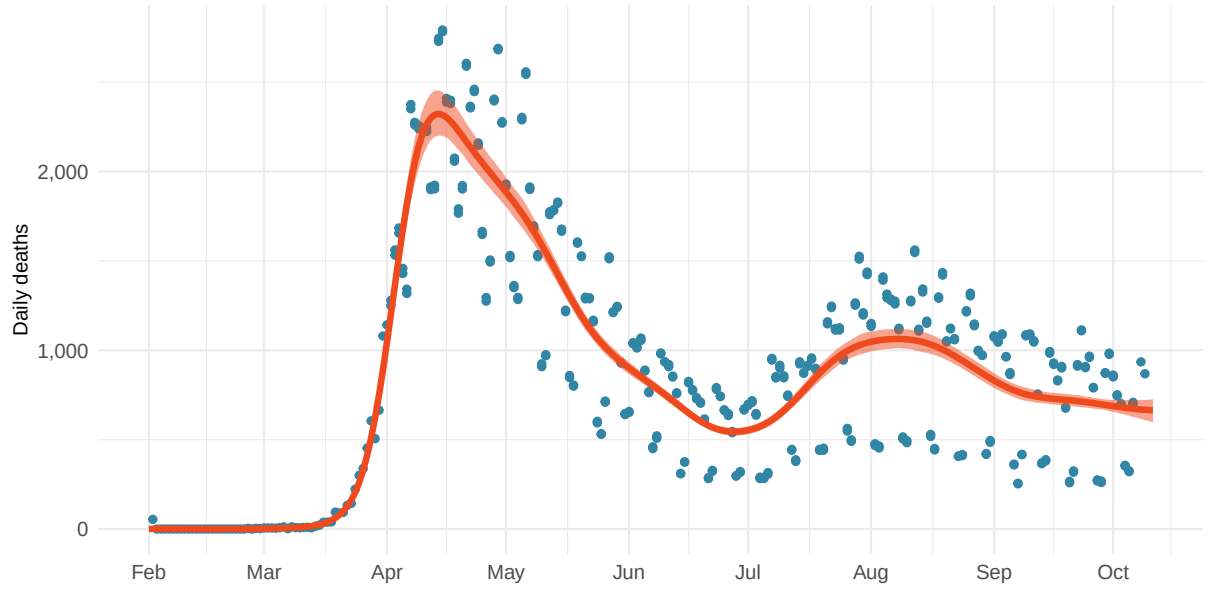


Figure 2b. Estimated cumulative deaths by age group

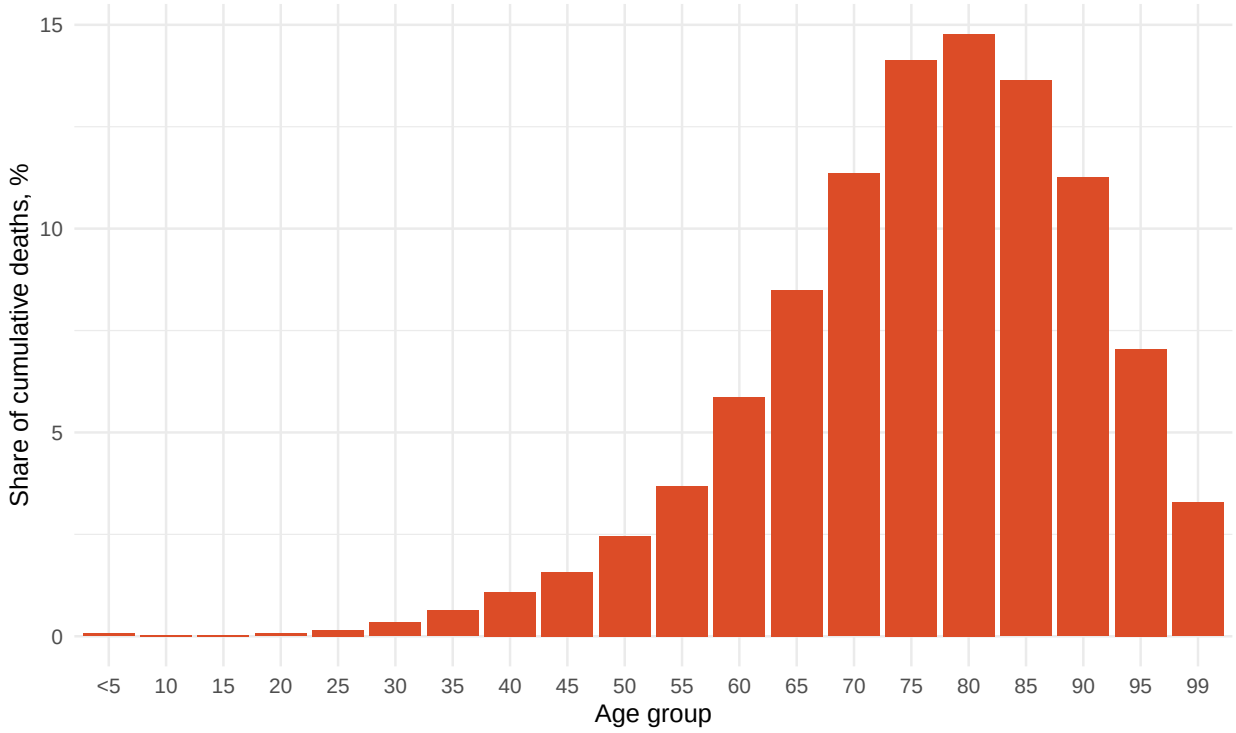


Figure 3. Mean effective R on October 01, 2020. The estimate of effective R is based on the combined analysis of deaths, case reporting and hospitalizations where available. Current reported cases reflect infections 11-13 days prior so estimates of effective R can only be made for the recent past. Effective R less than 1 means that transmission should decline all other things being held the same.

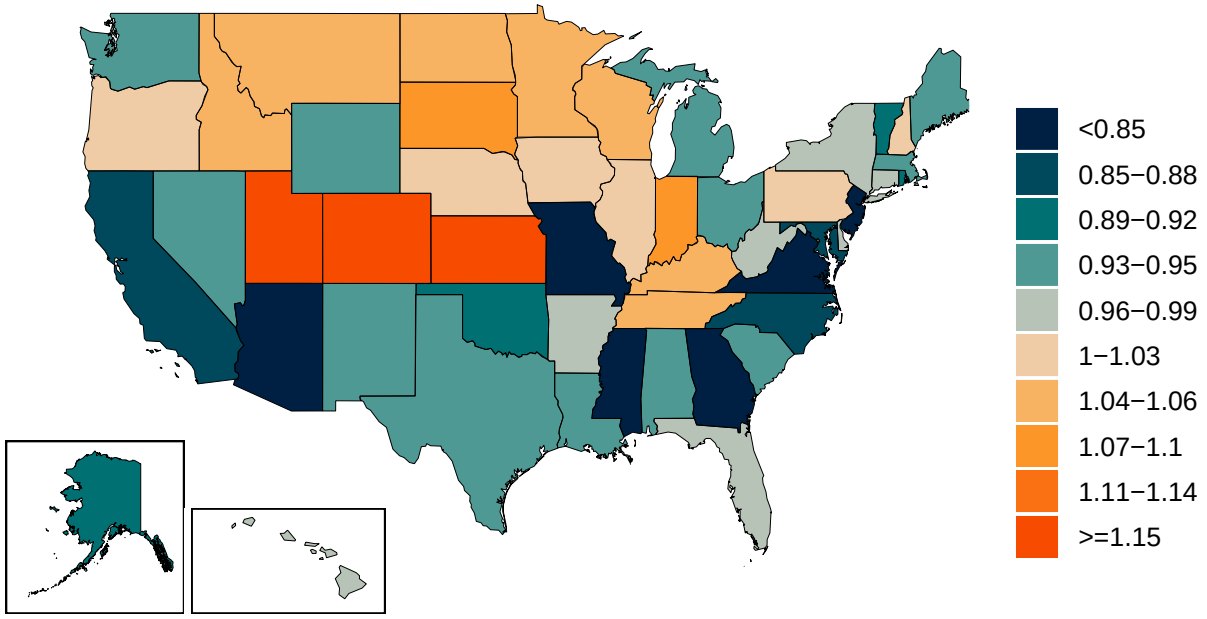


Figure 4. Estimated percent of the population infected with COVID-19 on October 12, 2020

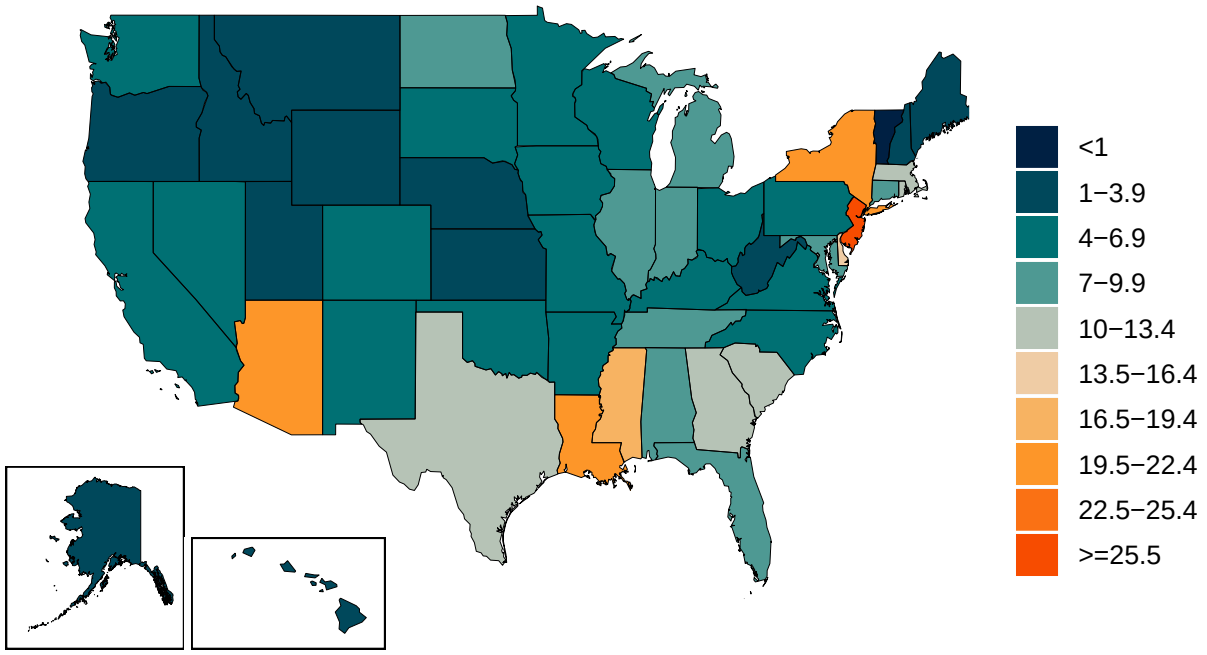


Figure 5. Percent of COVID-19 infections detected. This is estimated as the ratio of reported COVID-19 cases to estimated COVID-19 infections based on the SEIR disease transmission model.

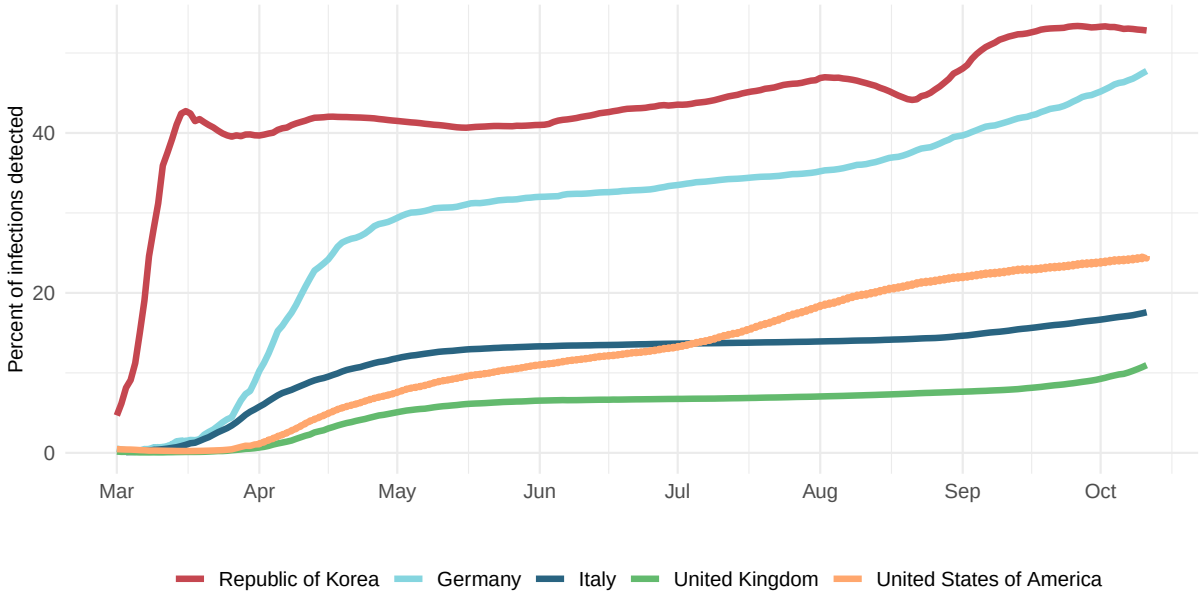
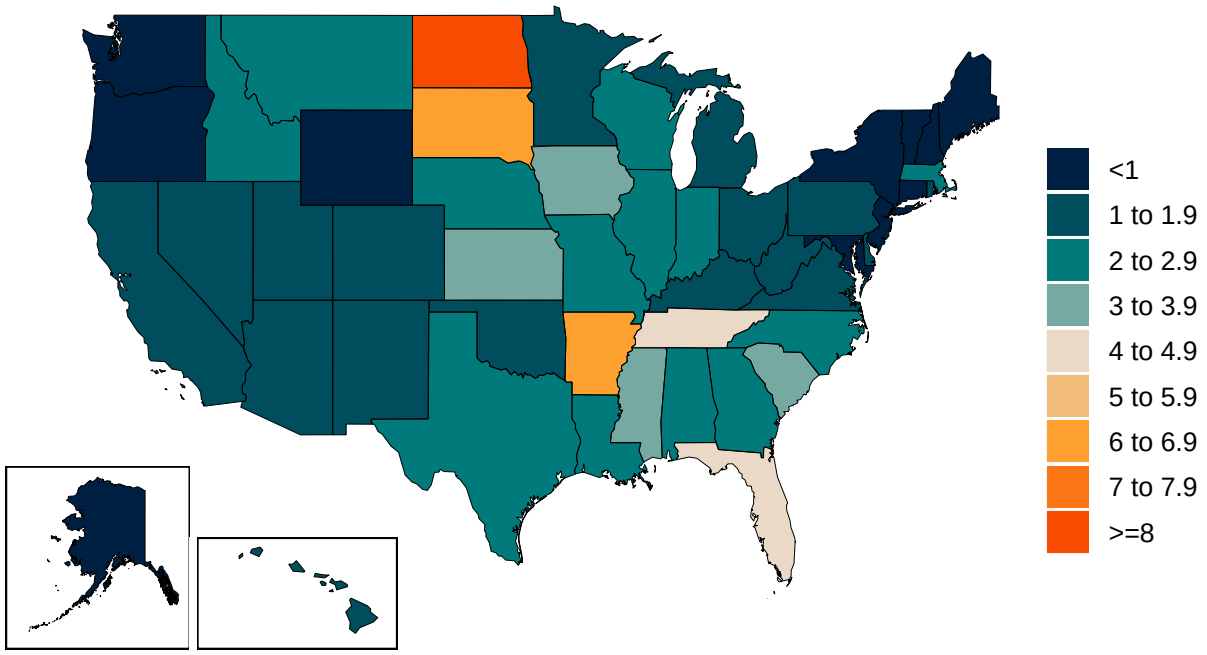


Figure 6. Daily COVID-19 death rate per 1 million on October 12, 2020



Critical drivers

Table 2. Current mandate implementation

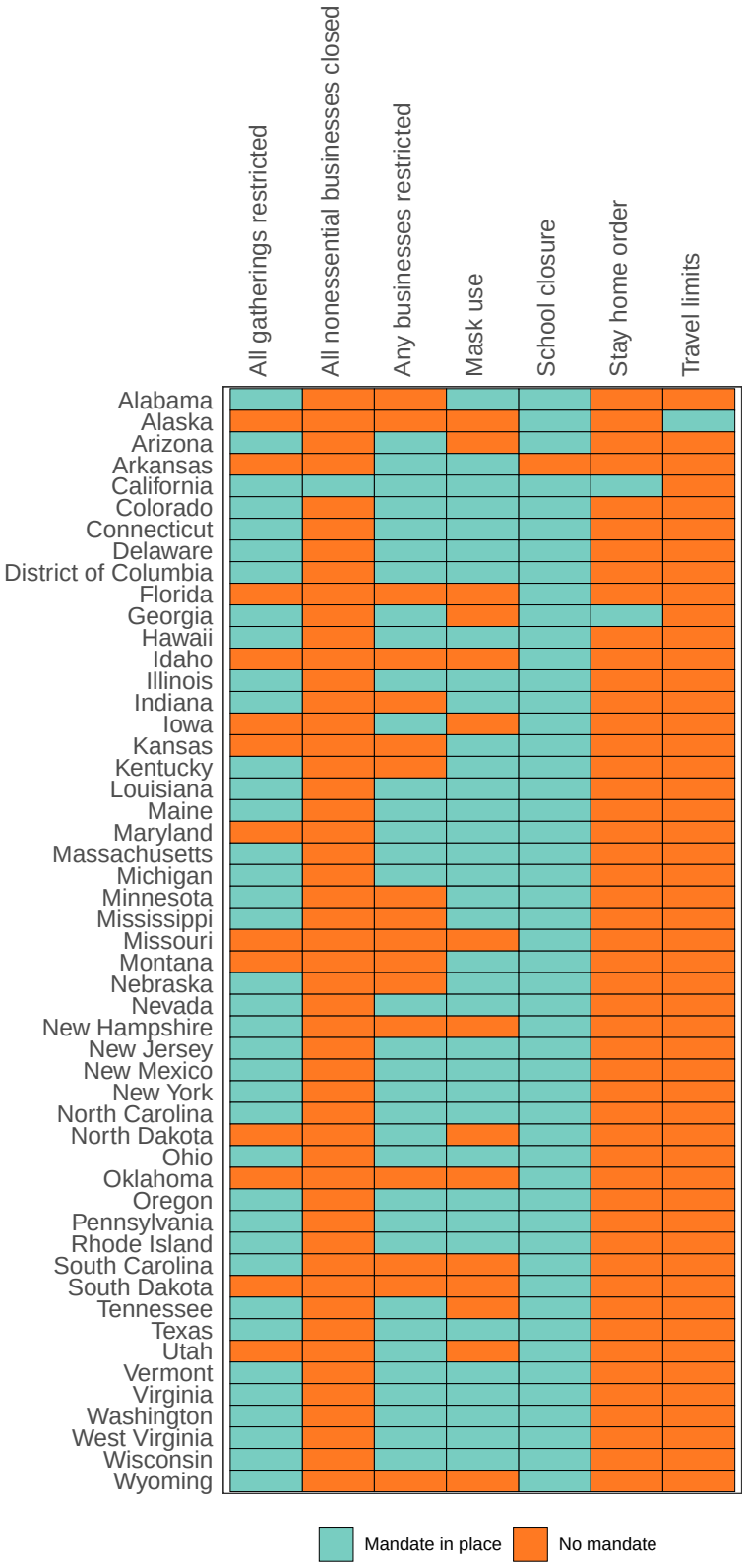


Figure 7. Total number of social distancing mandates (including mask use)

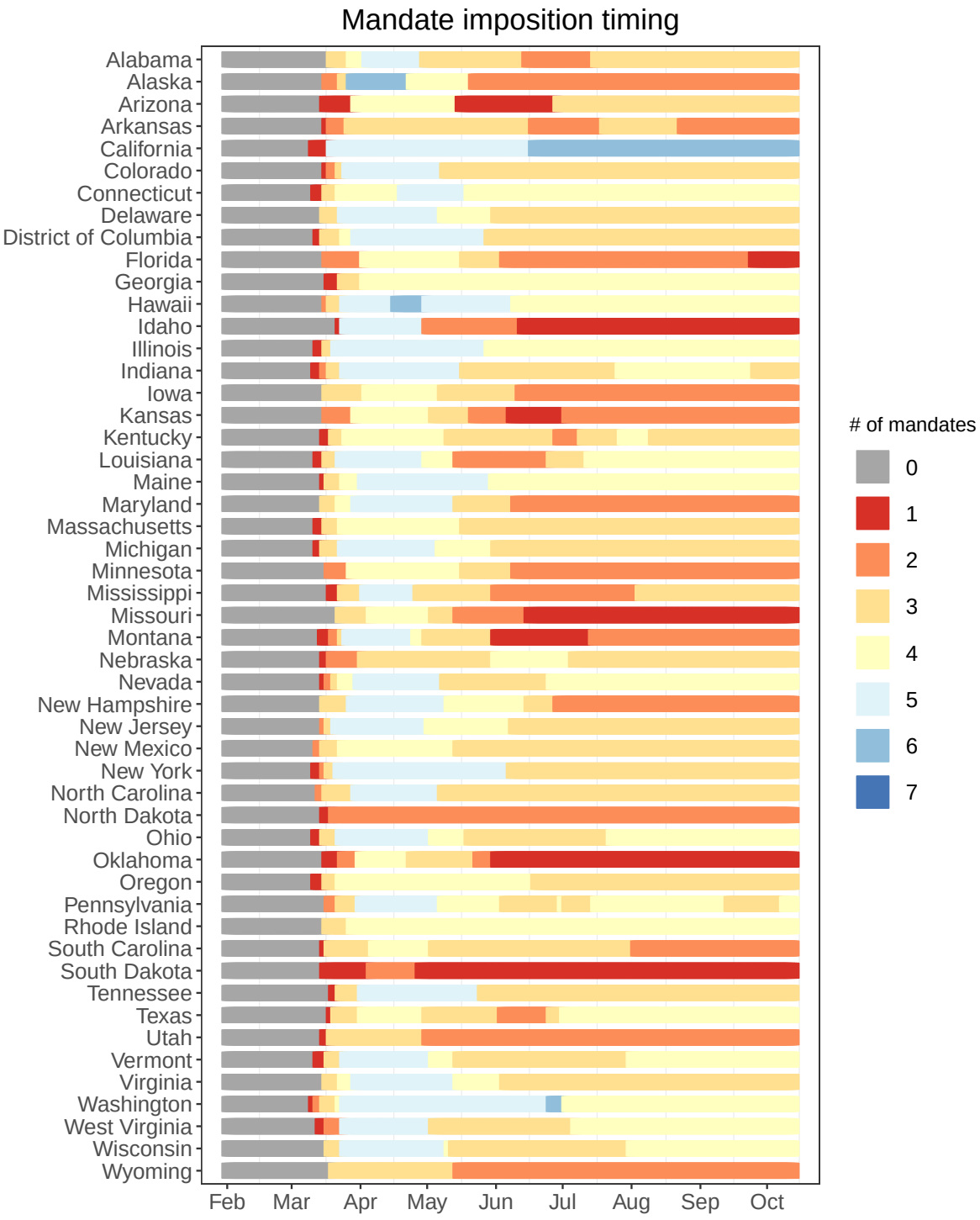


Figure 8a. Trend in mobility as measured through smartphone app use compared to January 2020 baseline

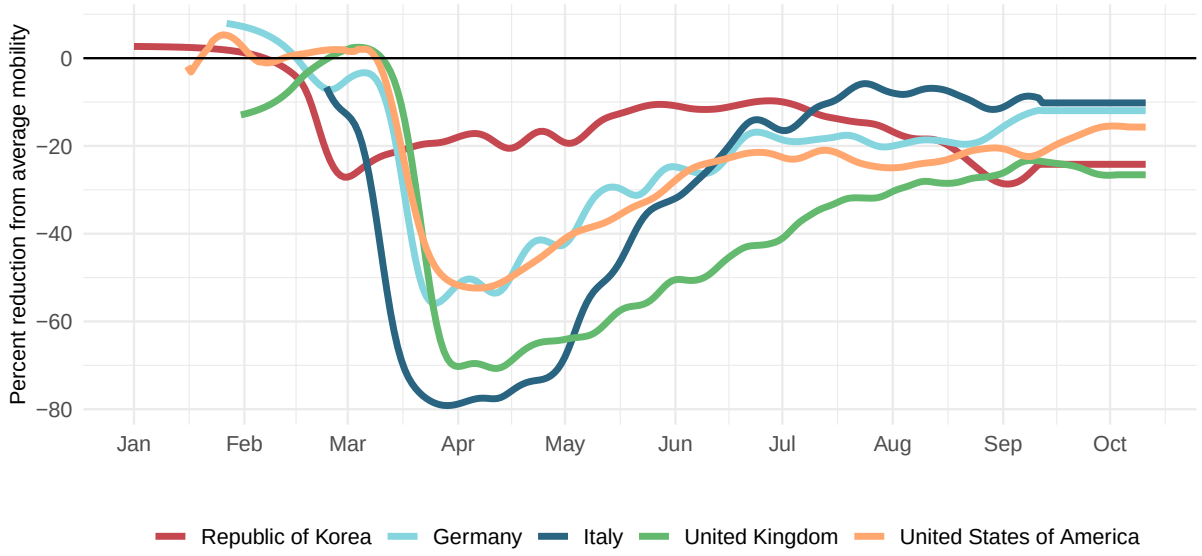


Figure 8b. Mobility level as measured through smartphone app use compared to January 2020 baseline (percent) on October 12, 2020

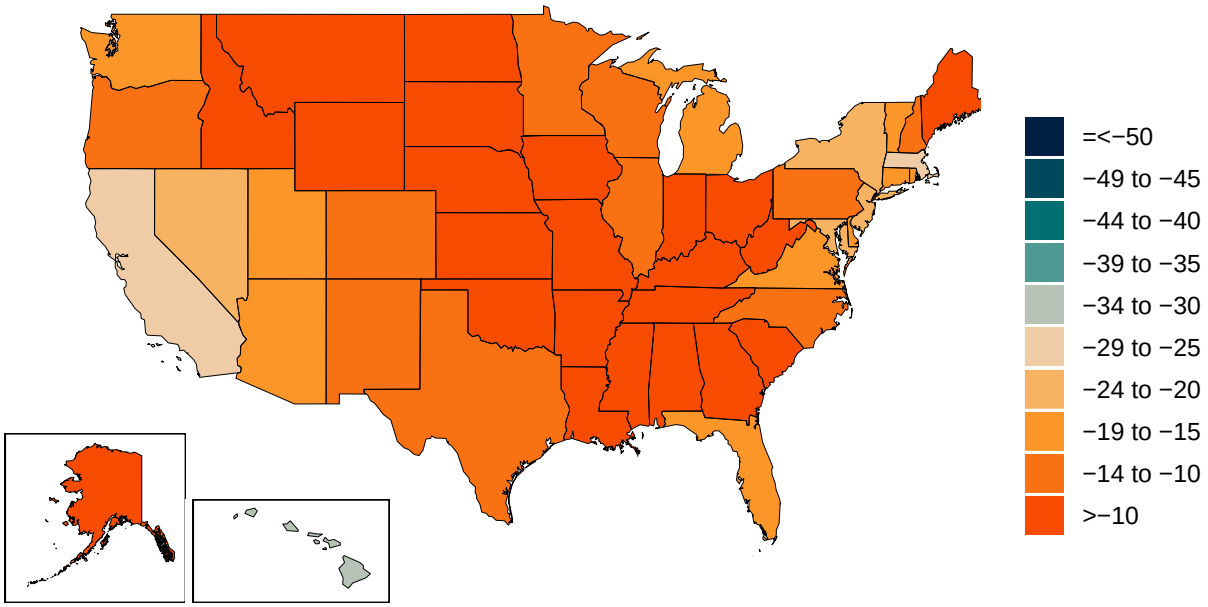


Figure 9a. Trend in the proportion of the population reporting always wearing a mask when leaving home

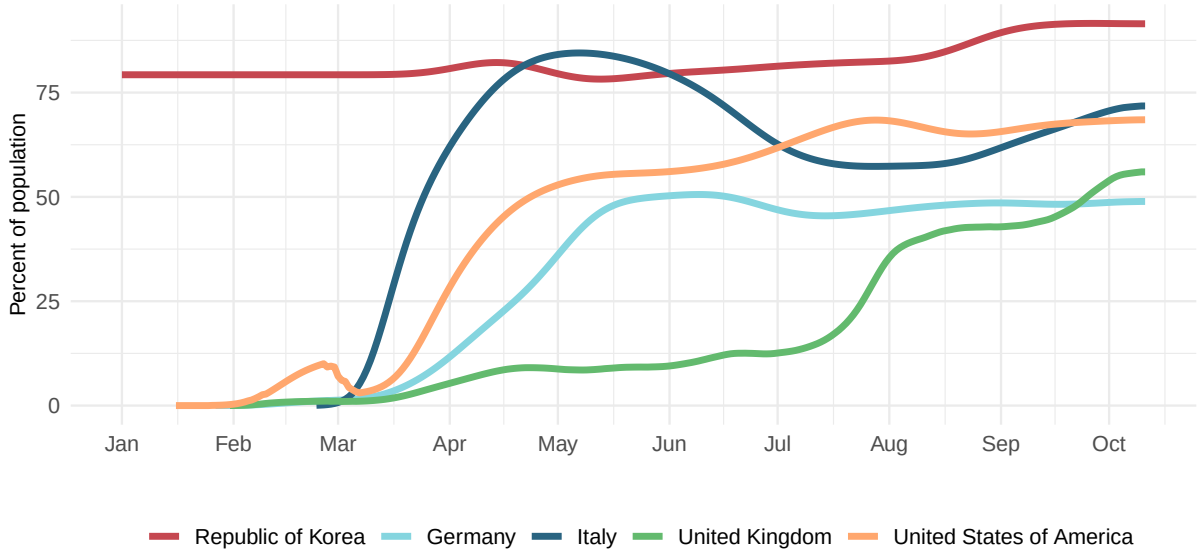


Figure 9b. Proportion of the population reporting always wearing a mask when leaving home on October 12, 2020

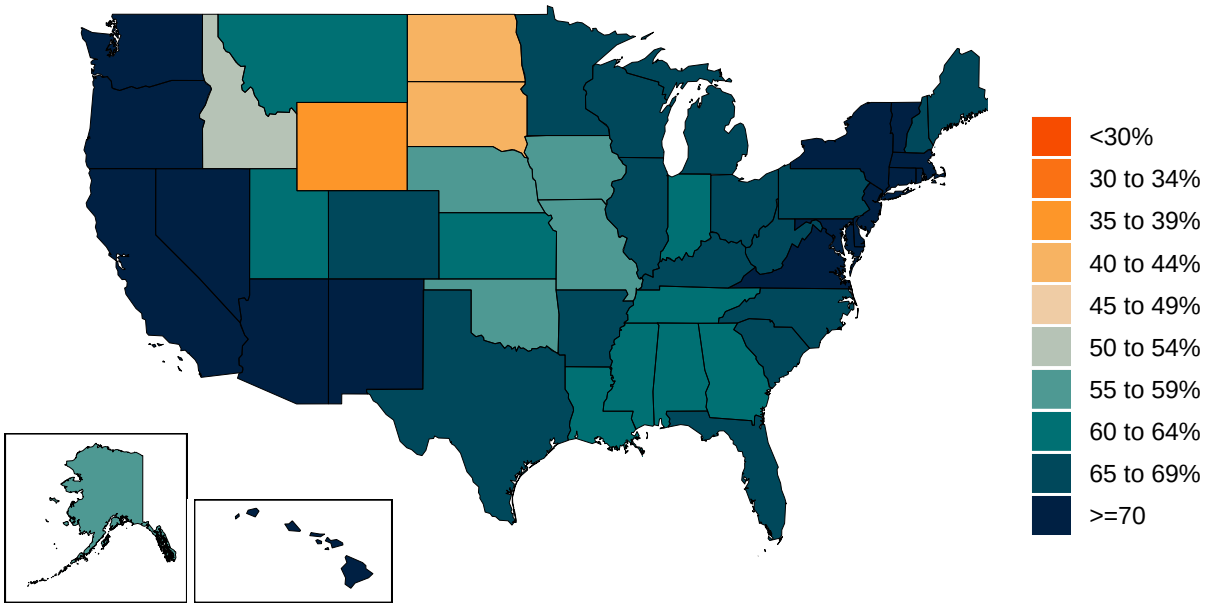


Figure 10a. Trend in COVID-19 diagnostic tests per 100,000 people

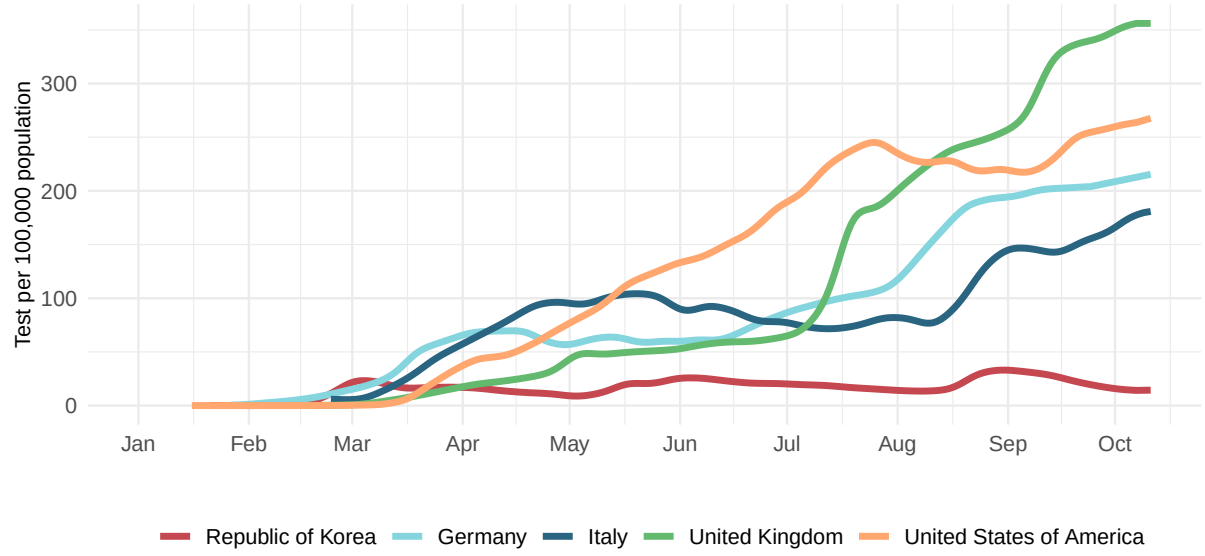


Figure 10b. COVID-19 diagnostic tests per 100,000 people on October 07, 2020

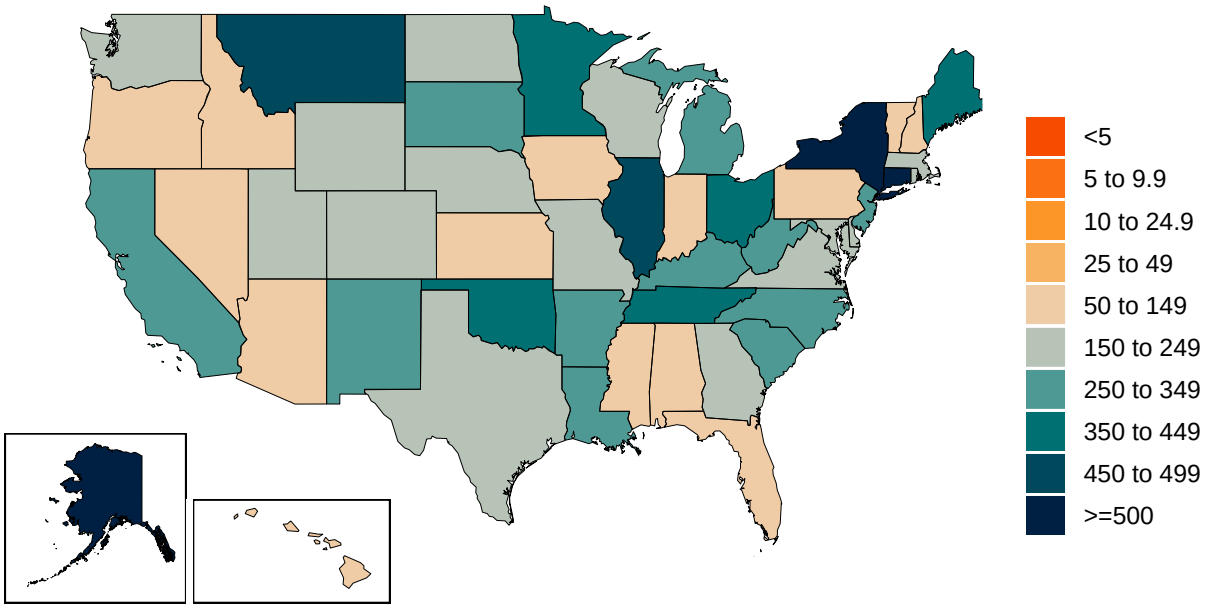
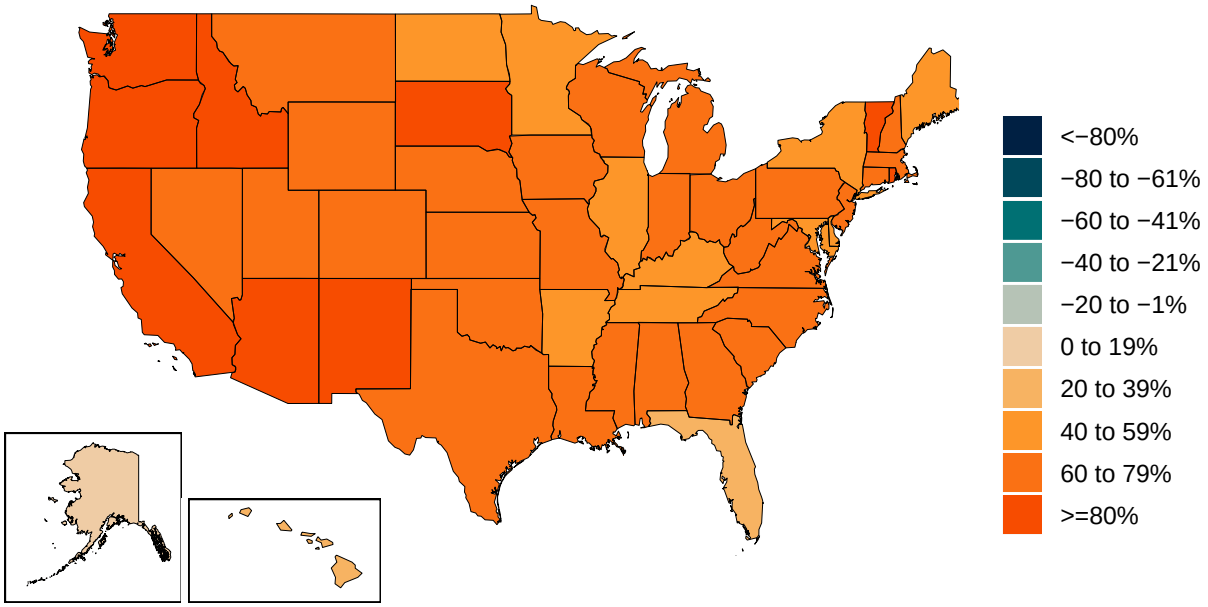


Figure 11. Increase in the risk of death due to pneumonia on February 1 compared to August 1



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.

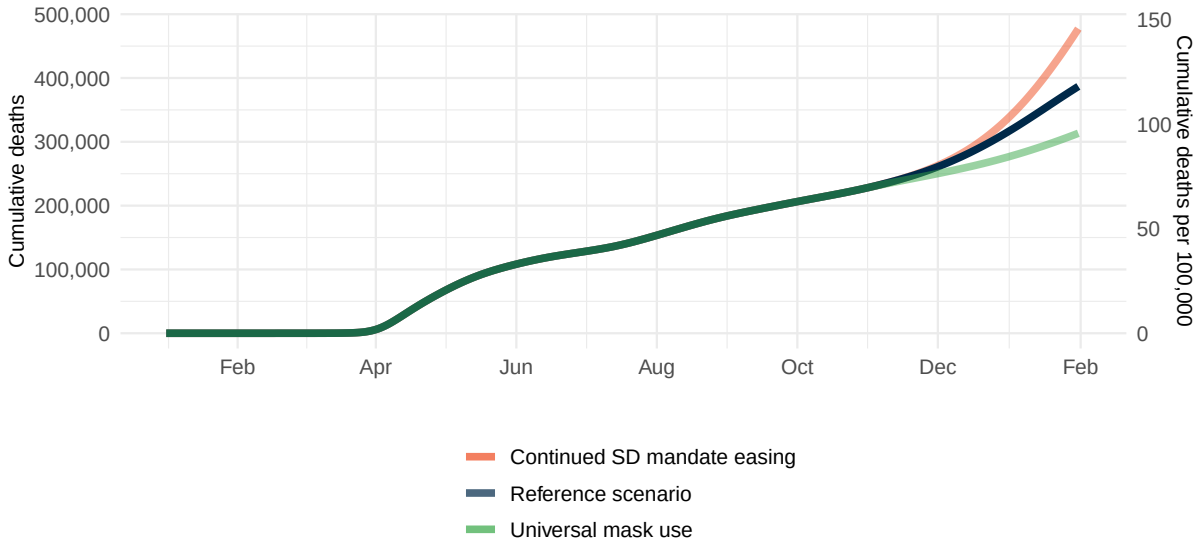


Fig 13. Daily COVID-19 deaths until February 01, 2021 for three scenarios.

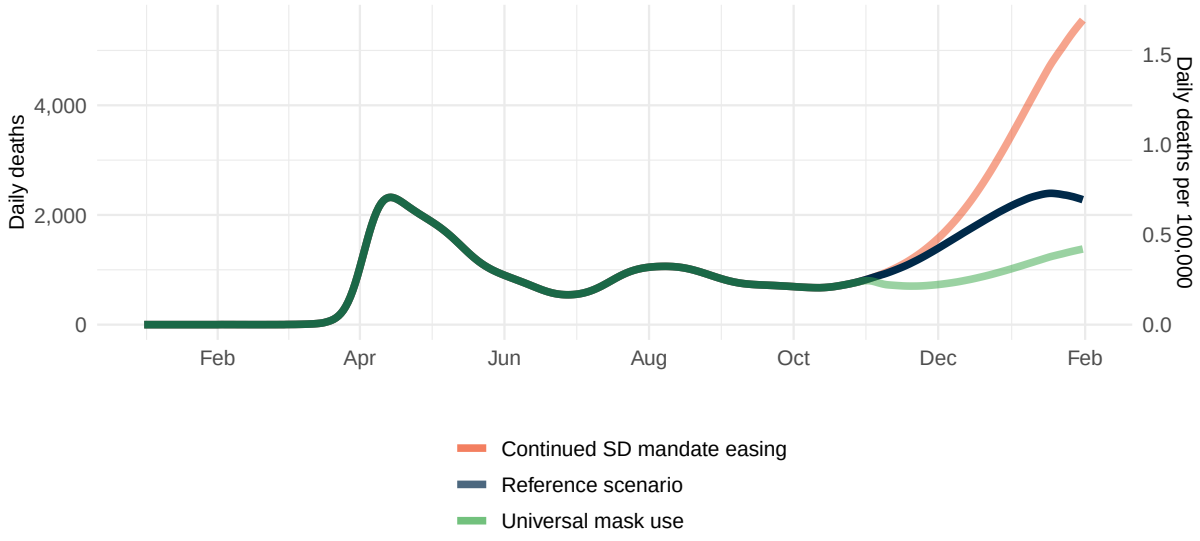


Fig 14. Daily COVID-19 infections until February 01, 2021 for three scenarios.

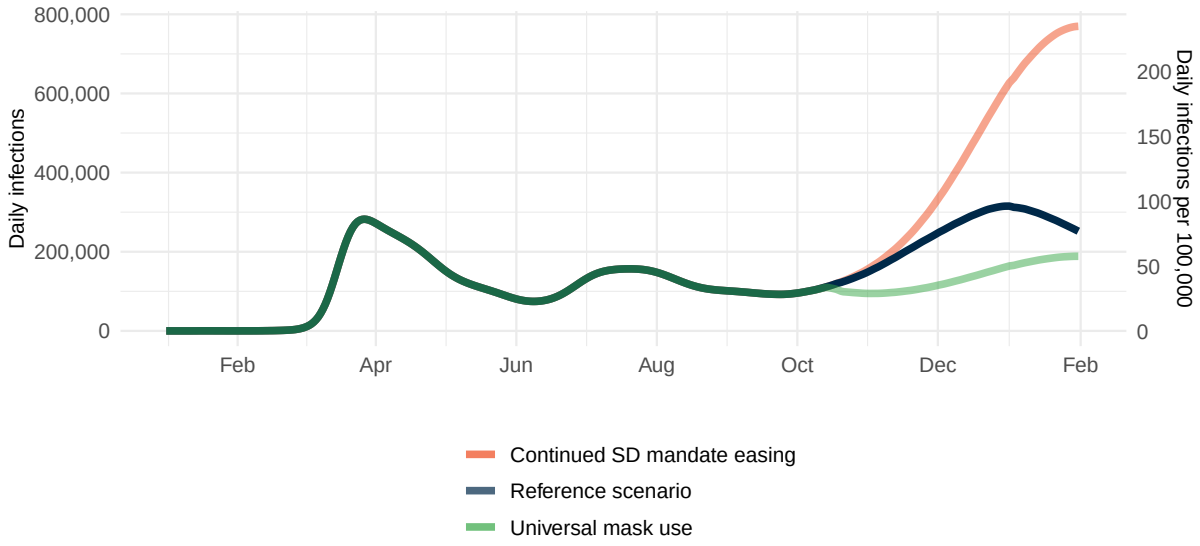


Fig 15. Month of assumed mandate re-implementation. (Month when daily death rate passes 8 per million, when reference scenario model assumes mandates will be re-imposed.)

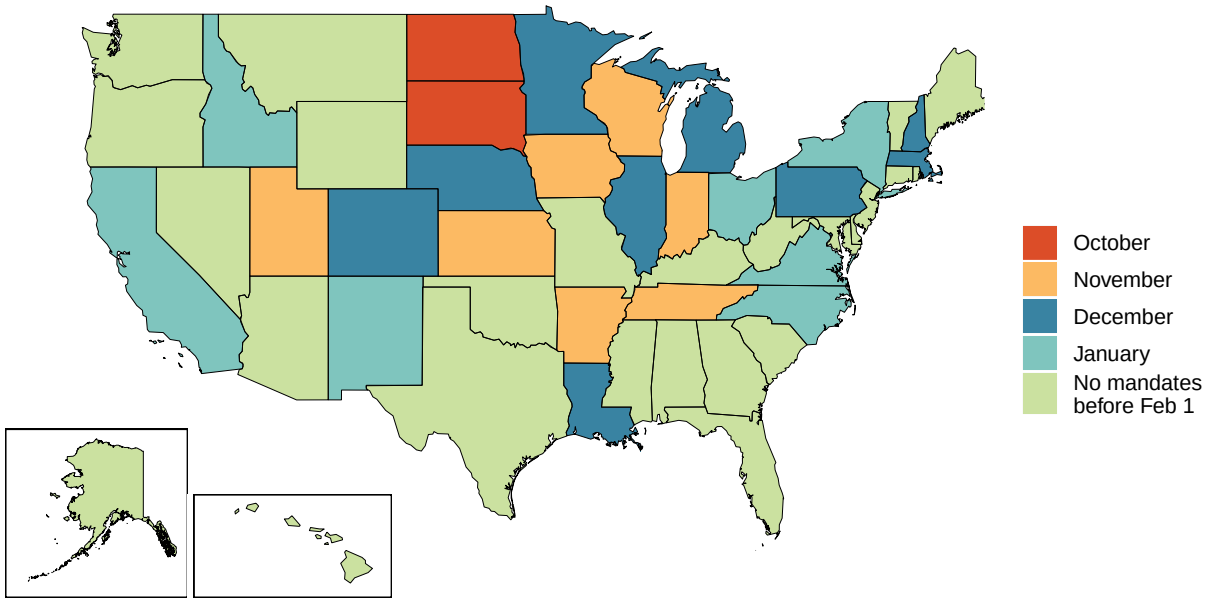


Figure 16. Forecasted percent infected with COVID-19 on February 01, 2021

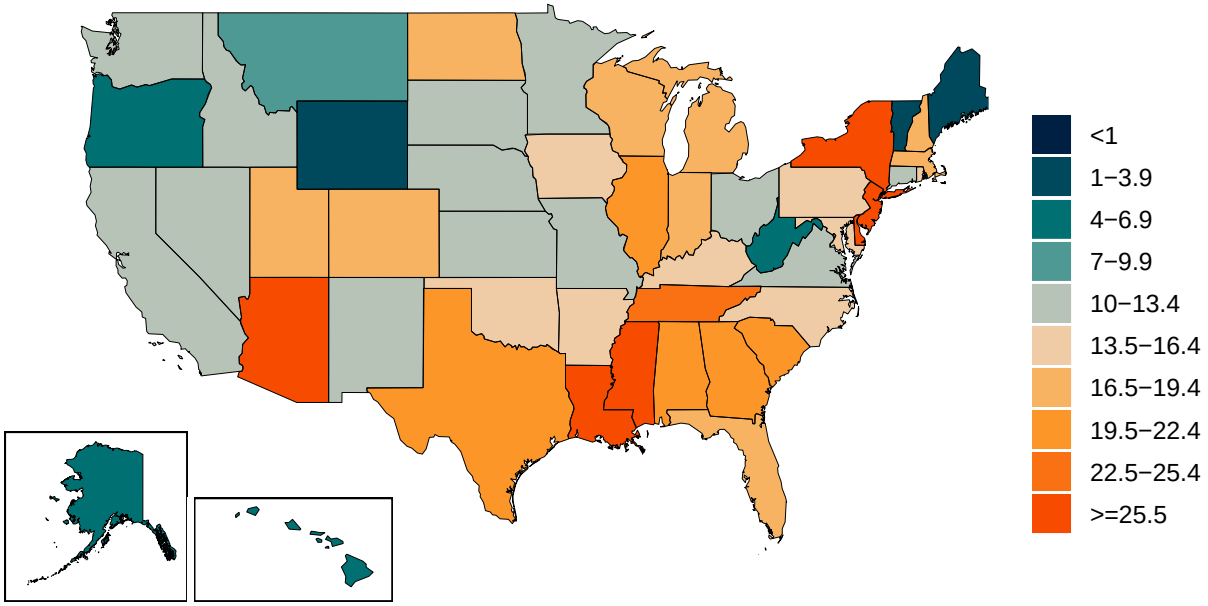


Figure 17. Daily COVID-19 deaths per million forecasted on February 01, 2021 in the reference scenario

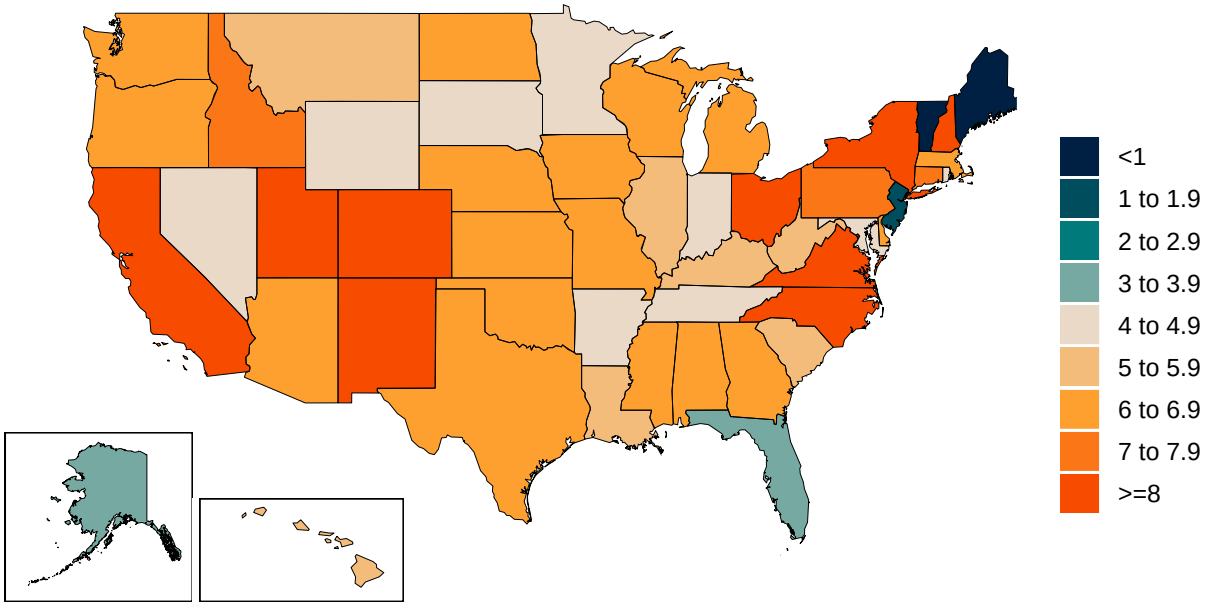


Figure 18. Comparison of reference model projections with other COVID modeling groups. For this comparison, we are including projections of daily COVID-19 deaths from other modeling groups when available: Delphi from the Massachussets Institute of Technology (Delphi; https://www.covidanalytics.io/home), 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.

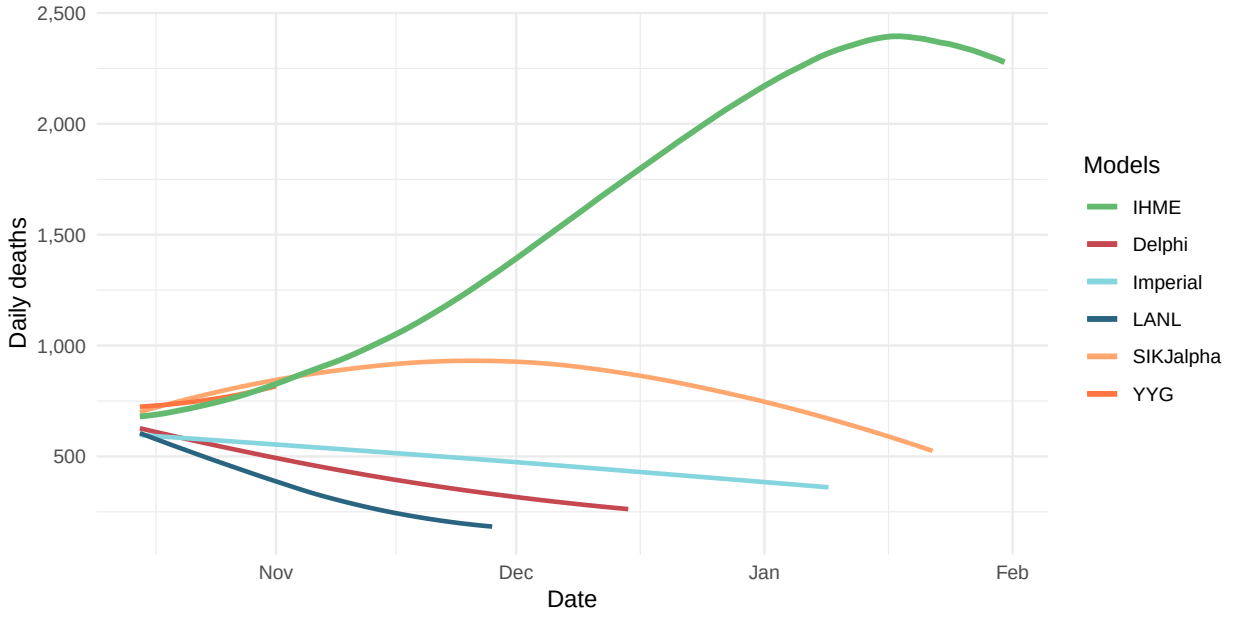


Table 3. Ranking of COVID-19 among the leading causes of mortality in the full year 2020. Deaths from COVID-19 are projections of cumulative deaths on Jan 1, 2021 from the reference scenario. Deaths from other causes are from the Global Burden of Disease study 2019 (rounded to the nearest 100).

Cause name	Annual deaths	Ranking
Ischemic heart disease	557,600	1
COVID-19	316,935	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.