IHME's latest COVID-19 forecasts indicate that the US will reach nearly 317,000 deaths by December 1, 2020. If mask wearing in public increases to 95%, more than 67,000 lives could be saved.

Model improvements

1. In this update, we have revised the infection-fatality rate (IFR), the number of deaths per infection by age, using seroprevalence data by age and matched COVID-19 death data from 41 locations. Previously, we had used deaths compared to reported cases and used the location with the lowest reported case-fatality rate to approximate the IFR. Preface Figure 1a compares the new directly measured infection-fatality rate to our previous version. The key difference is that the infection fatality rate (IFR) has a J-shape, namely the infection-fatality rate declines over the first 10 years of life and then increases steadily with age. The J-shape means that a newborn has the same risk of death if infected with COVID-19 as a 25-year-old. Preface Figure 1b shows the inverse, the number of infections per death by age. Because the IFR based on the seroprevalence data is lower at younger ages than previously estimated, this implies more infections have occurred based on the volume of deaths observed at these younger ages. The revised IFR will influence long-term forecasts as the percentage of the population in each state that has been infected is higher, bringing each state closer in the long term to herd immunity.

Current situation

2. COVID-19 transmission as captured by reported cases has started to trend up again (Figure 1), while deaths stayed steady for the last three weeks at around 1,000 deaths a day. Examination of effective R based on the combined analysis of data on cases, hospitalizations, and deaths suggests that transmission is increasing in a cluster of states in the upper Mississippi basin, including Iowa, Indiana, Missouri, Kentucky, and Tennessee. Effective R is also over 1 in Oklahoma. In all other states effective R is less than 1.
3. The daily death rate remains over 4 per million in a band of Southern states including Texas, Louisiana, Mississippi, Georgia, South Carolina, Tennessee, and Florida. In addition, Arizona and Nevada have death rates exceeding this level (see Figure 6).
4. In the US this week, COVID-19 is the second leading cause of death after ischemic heart disease (see Table 1).
5. The US has reached a point where over 20% of cumulative infections have been detected as confirmed cases (see Figure 5).

Drivers of transmission trends (mobility, mask use, testing, and seasonality)

6. Social distancing mandates have stayed relatively constant over the last week at the state level, with the exception of Kansas lifting any business restrictions.
7. Mobility measured by app use on smartphones including Android and Apple iOS has increased at the national level slightly in the last week. Some states, including California, Arizona, and Nevada, have seen declines in mobility, while in many others there have been modest increases.
8. Despite mask mandates being introduced in Arkansas and various campaigns for mask use such as the COVID Coalition, national mask use has declined to less than 50% as recorded in the Premise survey platform.
9. National testing rates, after declining in early August, have increased slightly over the last week. More than 10 states have testing rates over 300 per 100,000.

Projections

10. Our estimate of cumulative deaths by December 1 for the US has increased to 317,000 deaths, up 8,000 deaths from our August 21 brief. Our estimates suggest 138,000 deaths from now until December 1. Over the last week some estimates for states such as California and Texas have decreased, while Florida, Georgia, and Illinois have increased. Daily deaths in the US are expected to reach over 2000 by December 1 (see Figures 12 and 13).
11. These forecasts assume that states will on average reimpose a package of social distancing mandates when the daily death rate reaches 8 per million. Figure 16 shows the month in which we assume that mandates will be reimposed in each state.
12. If mask use were increased to 95%, the level observed in Singapore and several countries in Latin America, the number of deaths by December 1 could be reduced to 250,000, saving 67,000 American lives. This is a 49% reduction in the number of deaths expected between now and December 1 (see Figures 12 and 13).
13. By the week of December 1, COVID-19 is expected to the leading cause of death in the US.

COVID-19 Results Briefing: United States of America

Institute for Health Metrics & Evaluation (IHME)

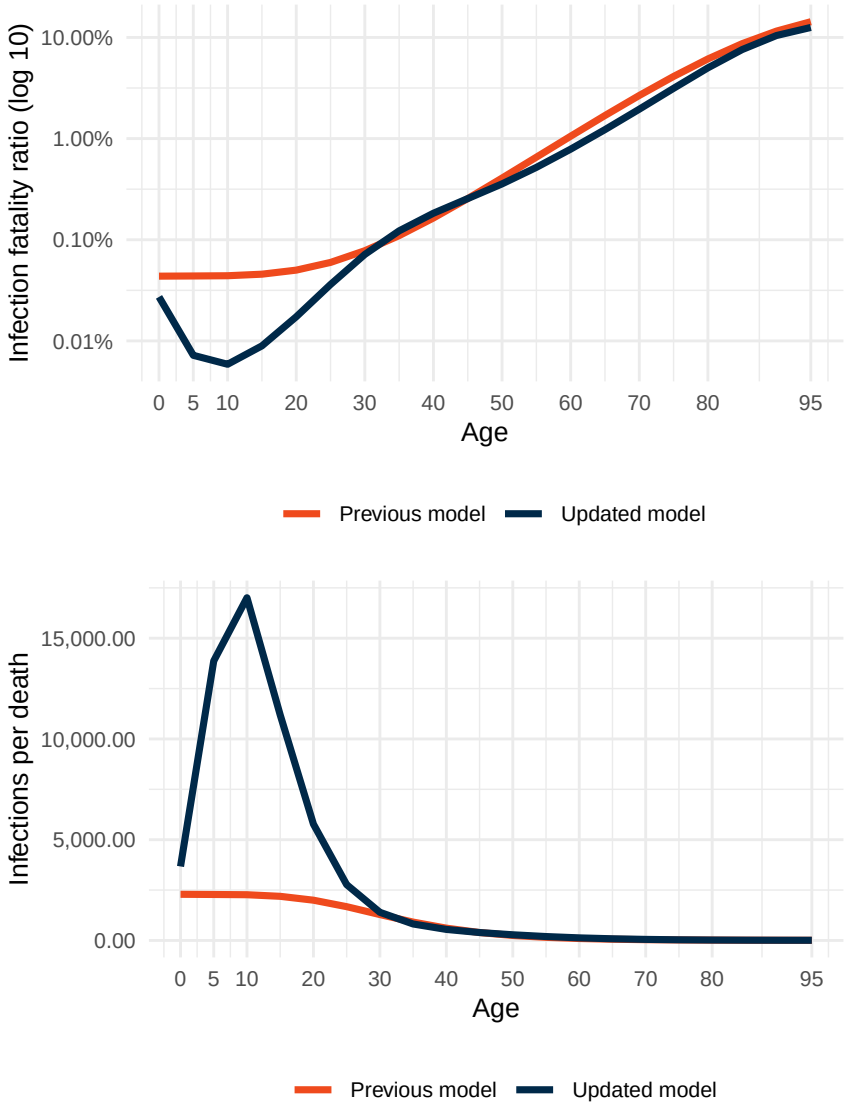
27 August 2020

This short briefing contains summary information on the latest projections from the Institute for Health Metrics and Evaluation (IHME) model on COVID-19 in United States of America.

Model Updates for August 27

This week we introduced an important change to our age pattern of the infection to fatality ratio (IFR). The Preface Figure shows the age pattern as previously used and the new age pattern introduced this week. The update is the result of a substantial re-analysis and inclusion of additional sources of age-specific mortality and seroprevalence data. This curve is a global pattern and affects all locations. The impact of the update is to increase the number of estimated infections, particularly in younger age groups.

Preface Figure.



Current Situation

Figure 1. Reported daily COVID-19 cases

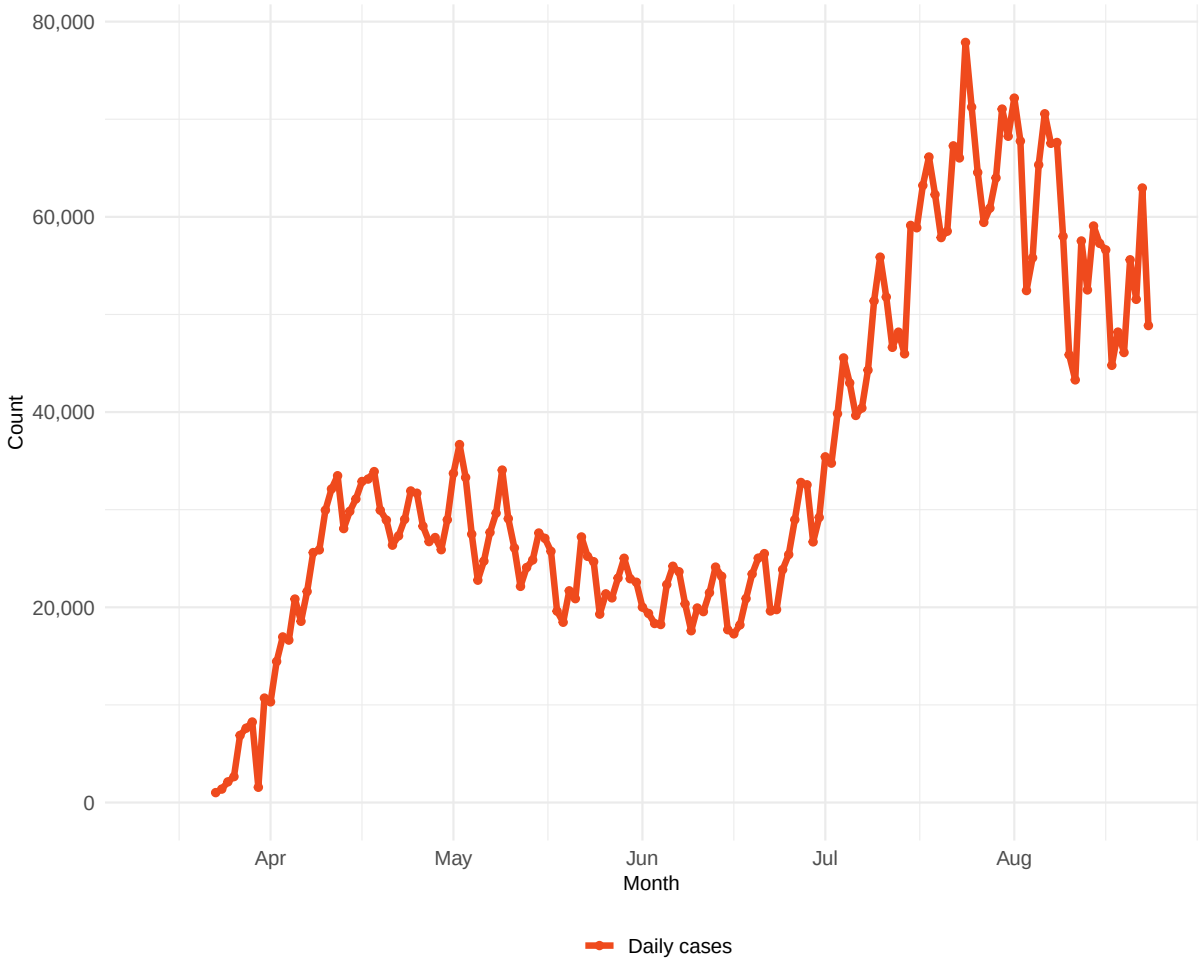


Table 1. Ranking of COVID-19 among the leading causes of mortality this week, assuming uniform deaths of non-COVID causes throughout the year

Cause name	Weekly deaths	Ranking
Ischemic heart disease	10,724	1
COVID-19	6,775	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

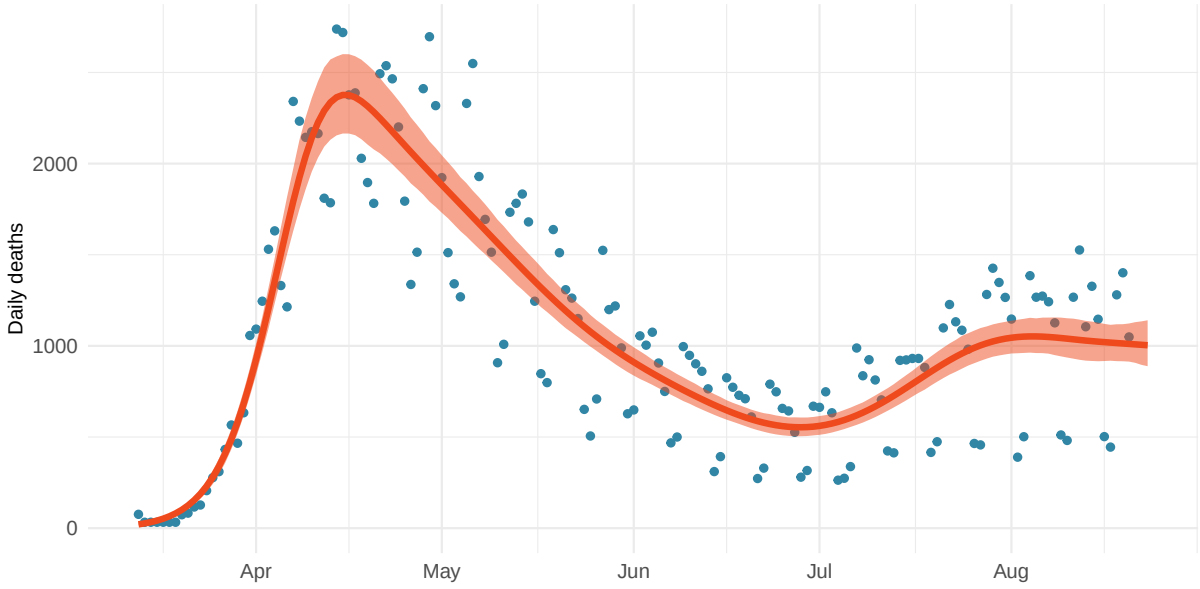


Figure 2b. Estimated cumulative deaths by age group

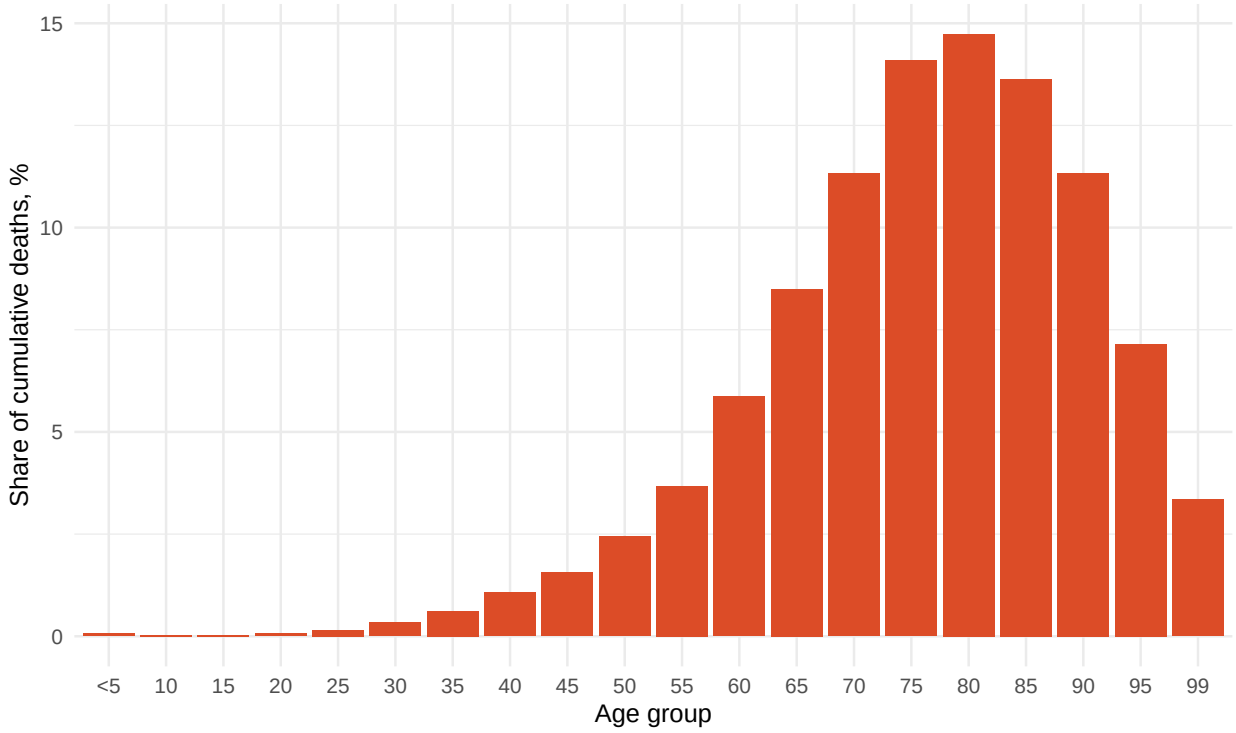


Figure 3. Mean effective R on 2020-08-13. The estimate of effective R is based on the combined analysis of deaths, case reporting and hospitalizations where available. Current reported cases reflect infections 11-13 days prior so estimates of effective R can only be made for the recent past. Effective R less than 1 means that transmission should decline all other things being held the same.

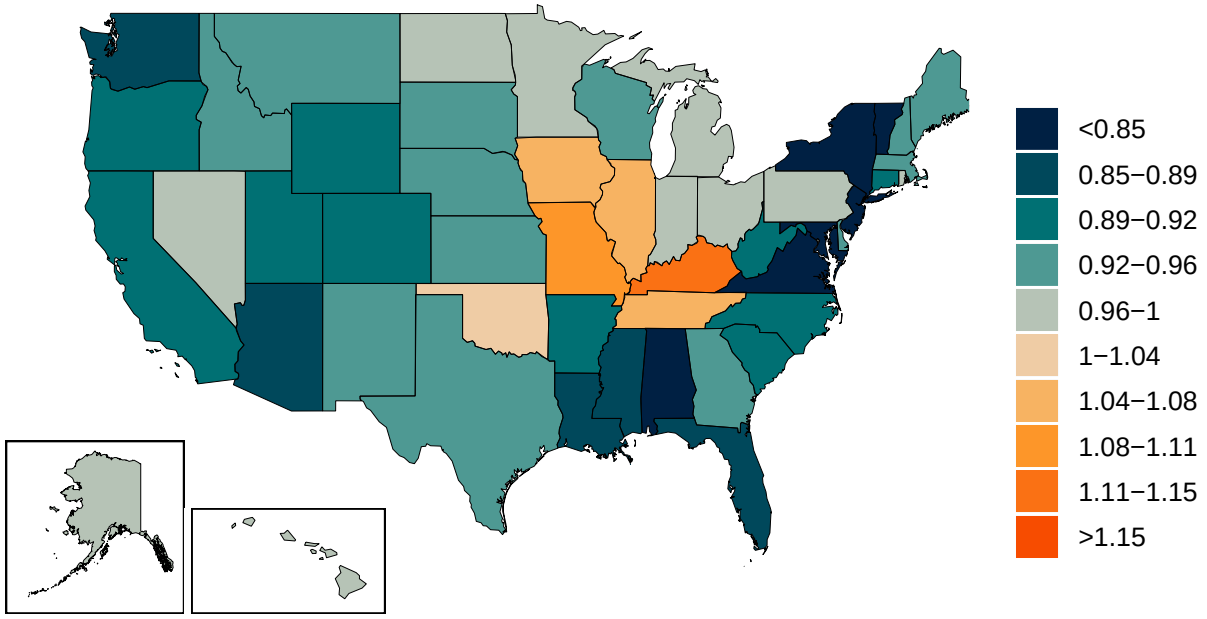


Figure 4. Estimated percent infected with COVID-19 on August 24 2020

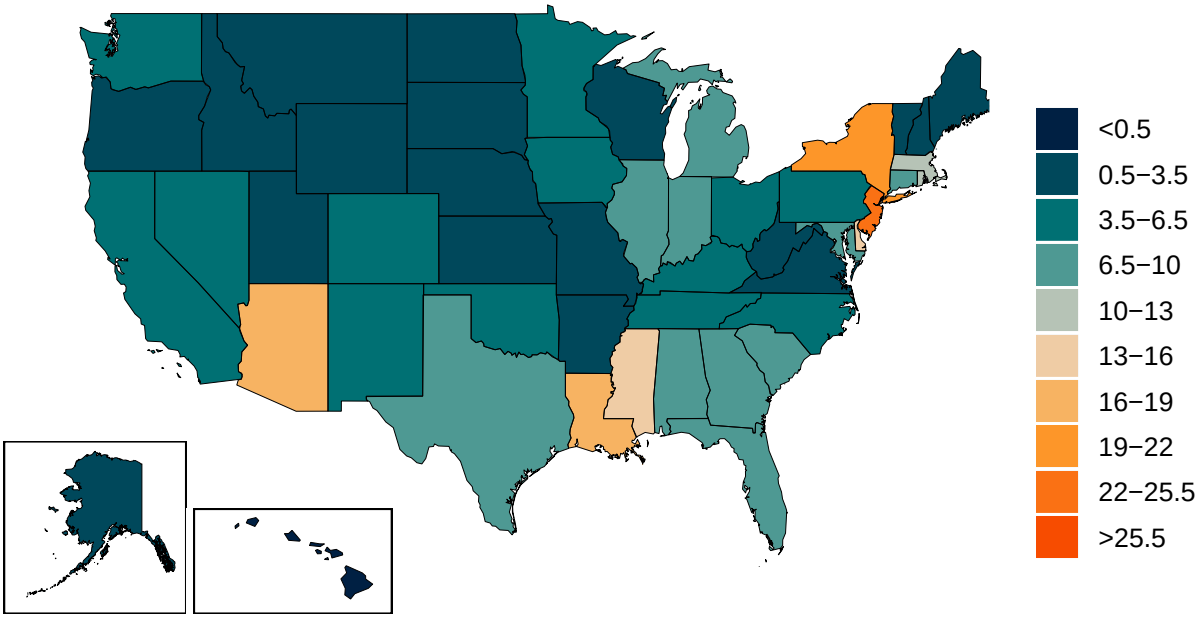


Figure 5. Percent of COVID-19 infections detected. This is estimated as the ratio of reported COVID-19 cases to estimated COVID-19 infections based on the SEIR model.

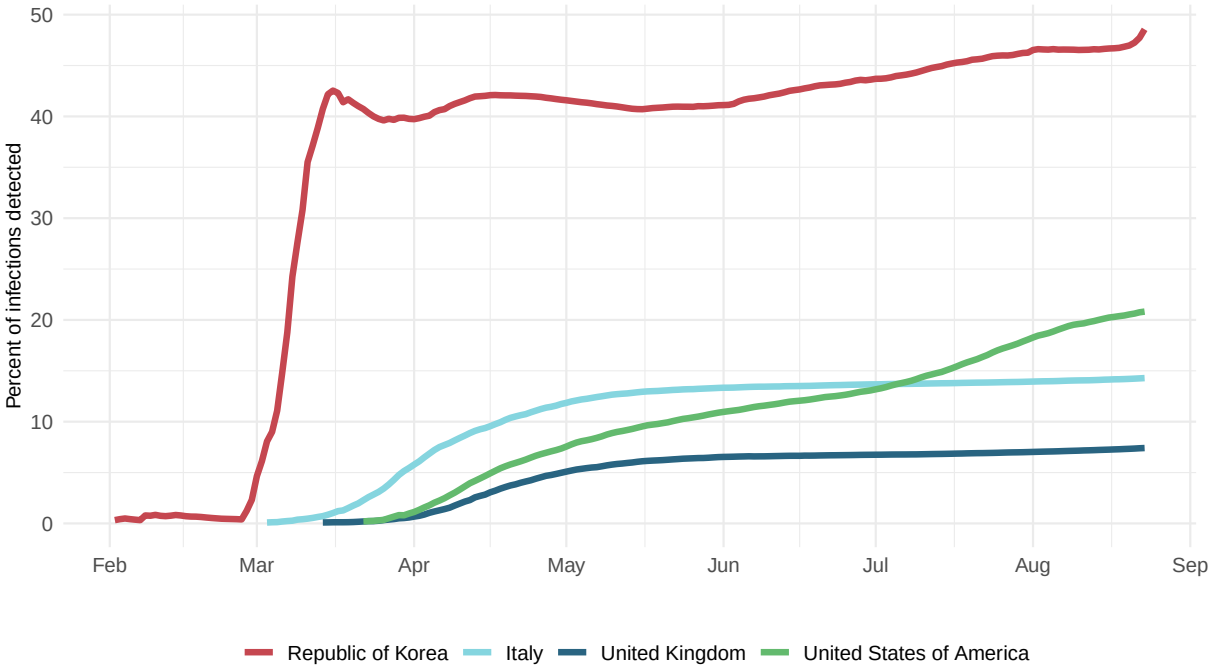
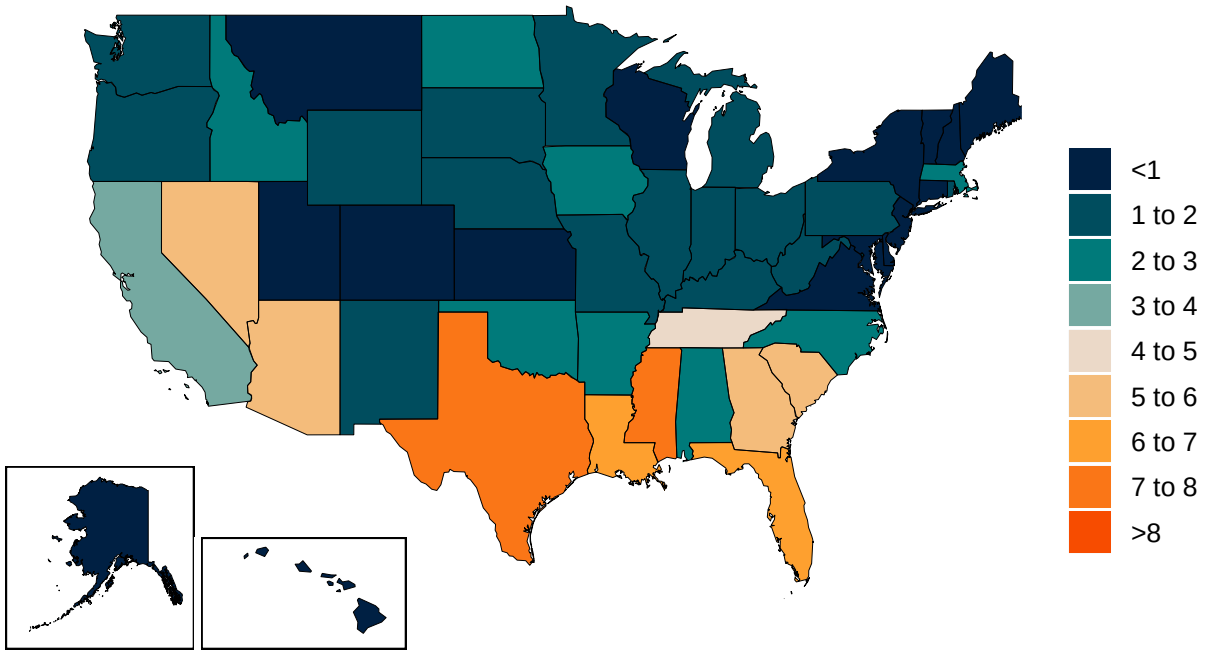


Figure 6. Daily COVID-19 death rate per 1 million on August 24 2020



Critical Drivers

Table 2. Current mandate implementation

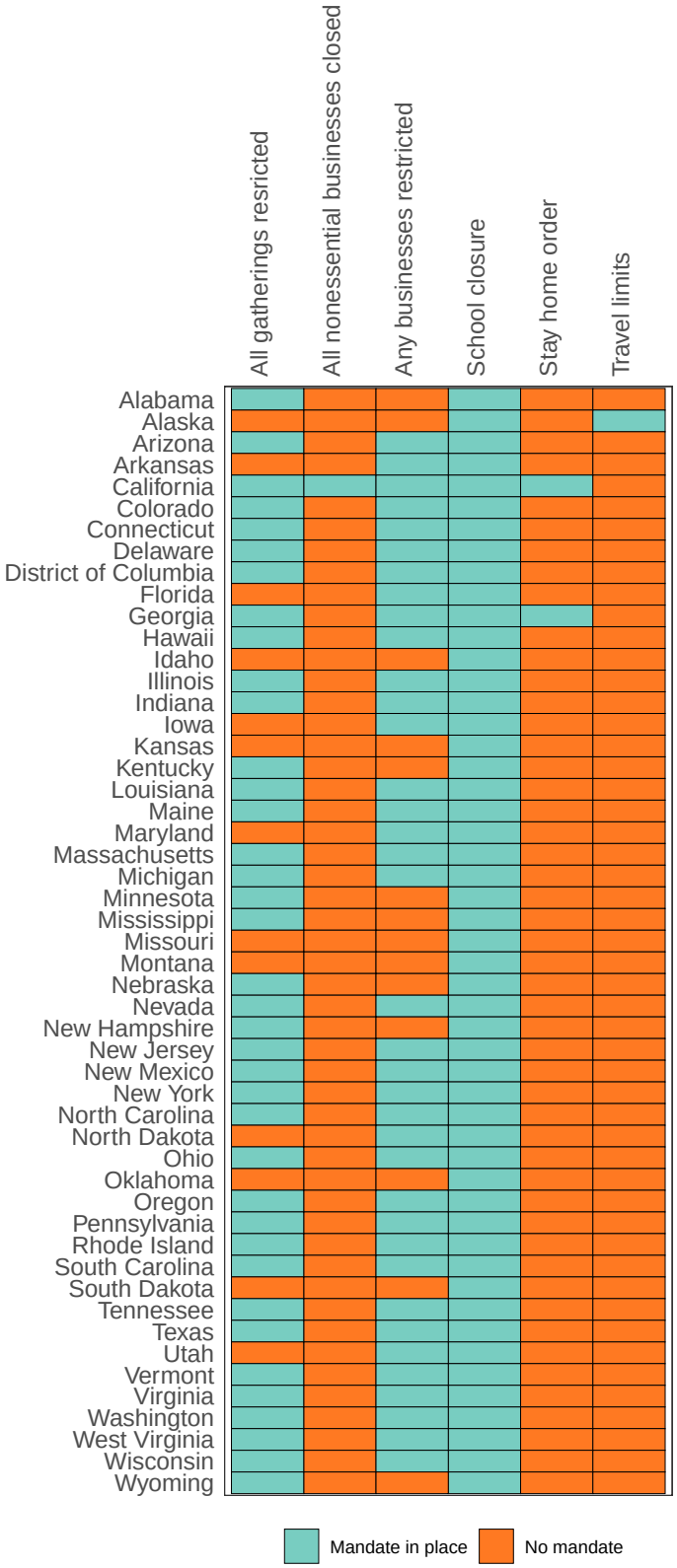


Figure 7. Total number of mandates

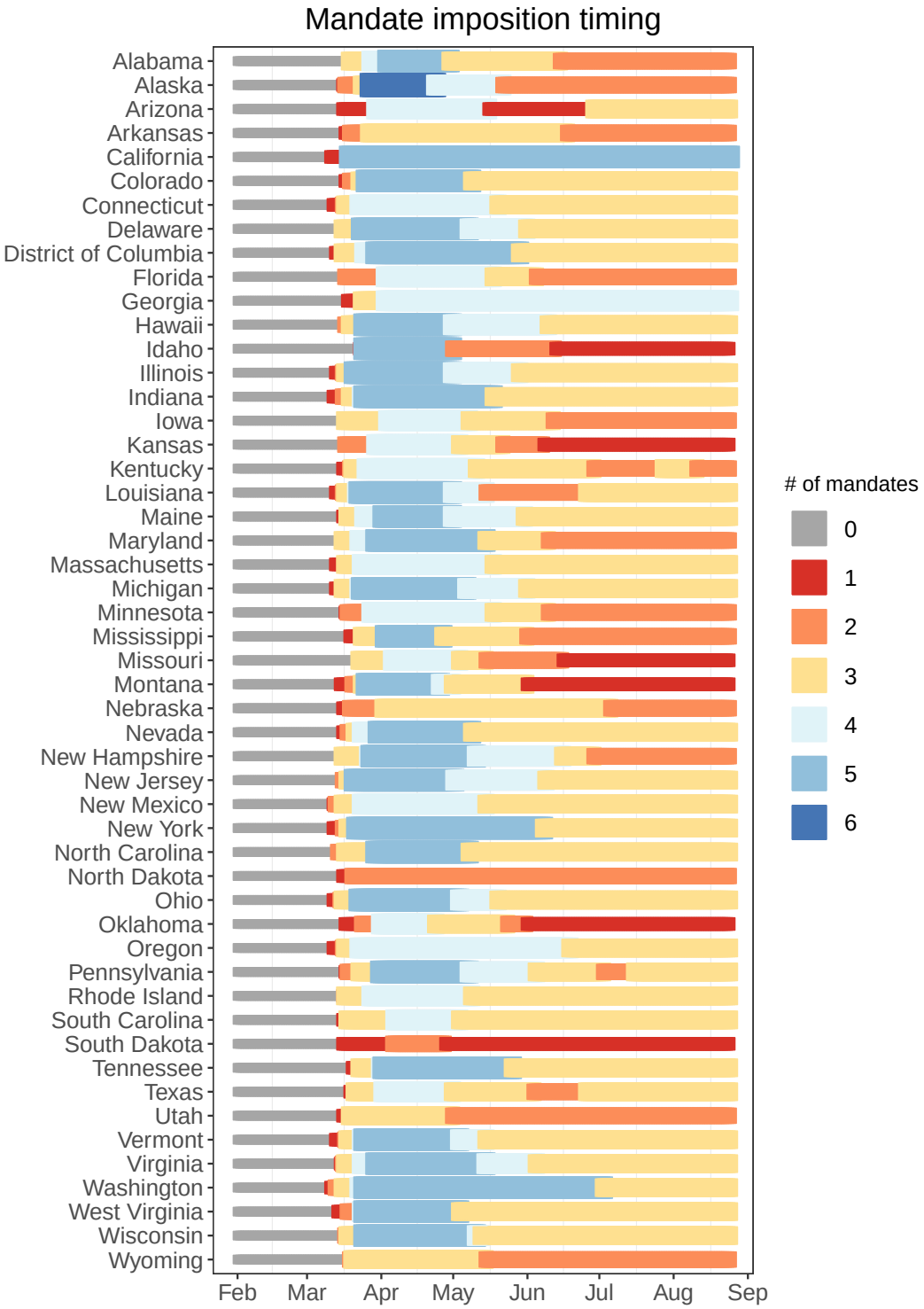


Figure 8a. Trend in mobility as measured through smartphone app use compared to January 2020 baseline

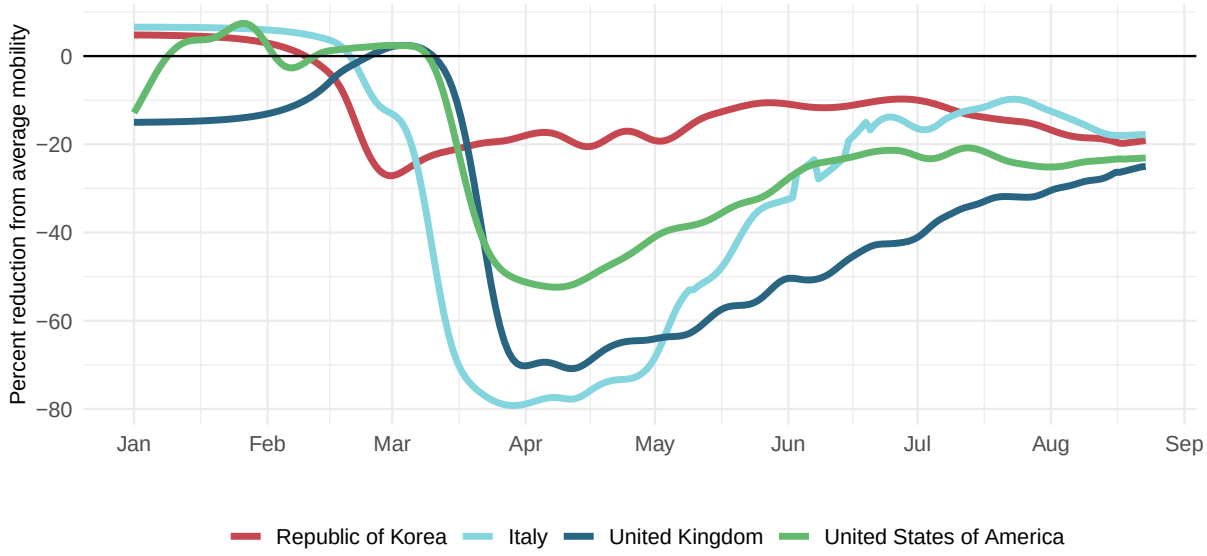


Figure 8b. Mobility level as measured through smartphone app use compared to January 2020 baseline (percent)

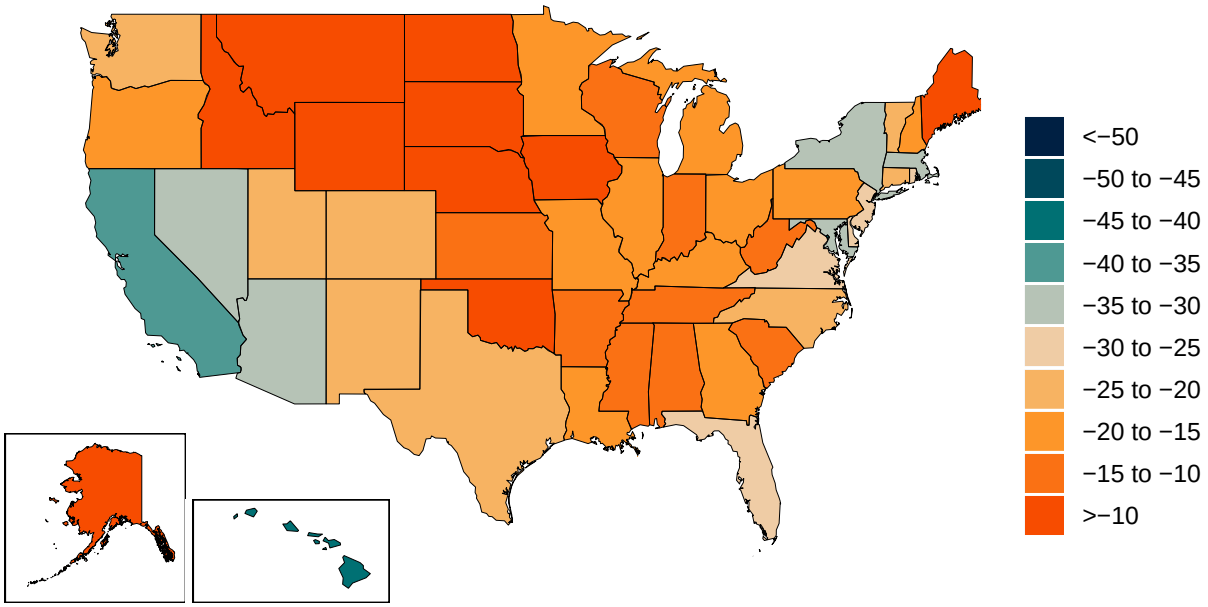


Figure 9a. Trend in the proportion of the population reporting always wearing a mask when leaving home

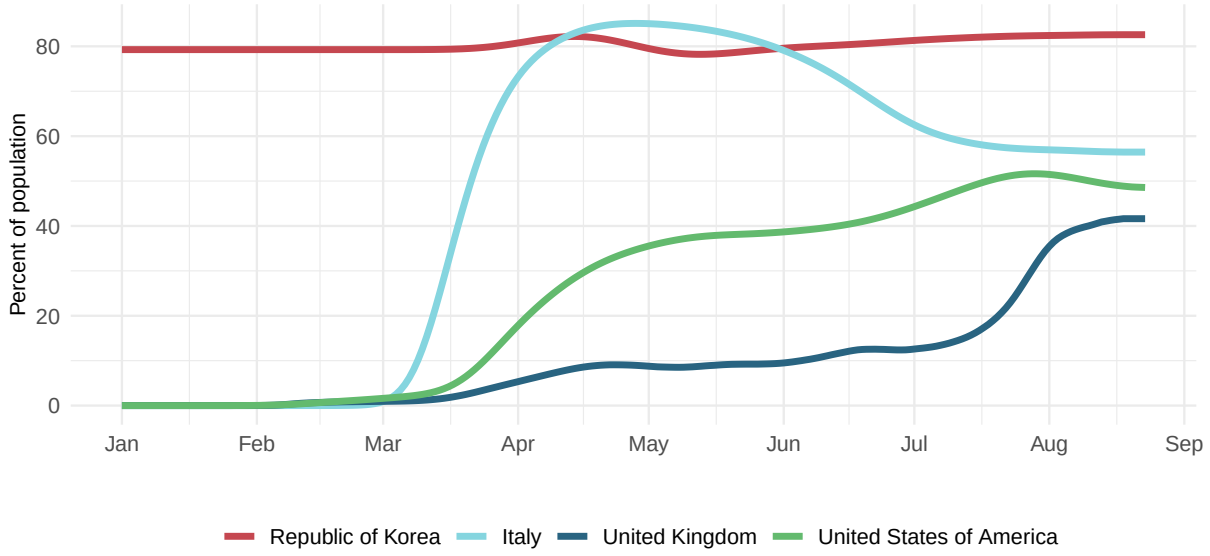


Figure 9b. Proportion of the population reporting always wearing a mask when leaving home on August 24 2020

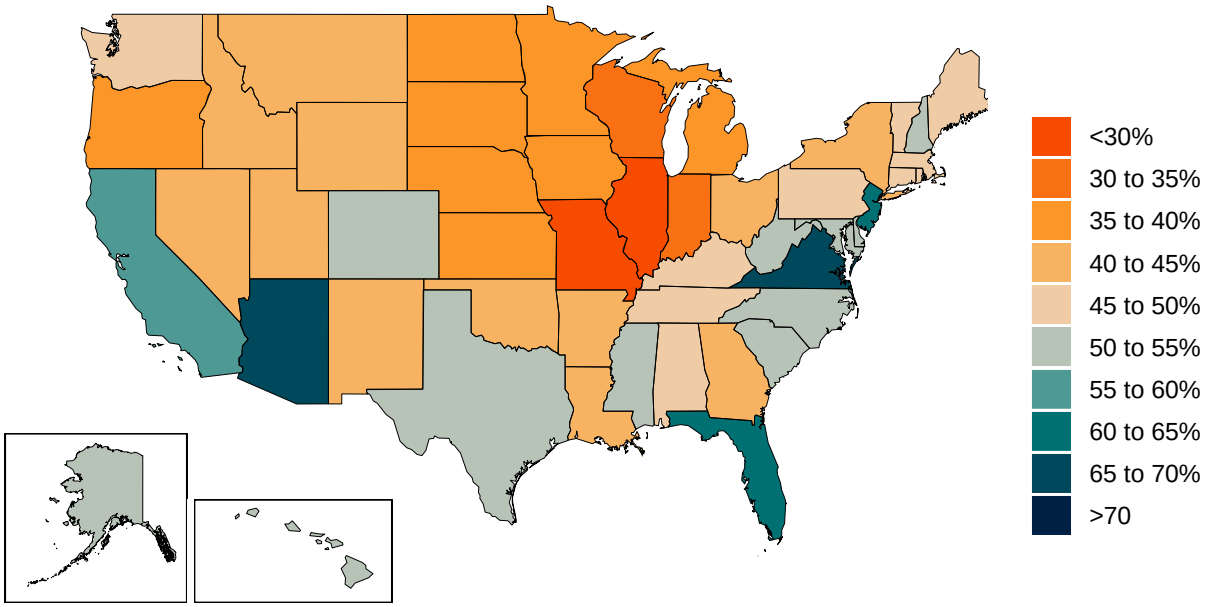


Figure 10a. Trend in COVID-19 diagnostic tests per 100,000

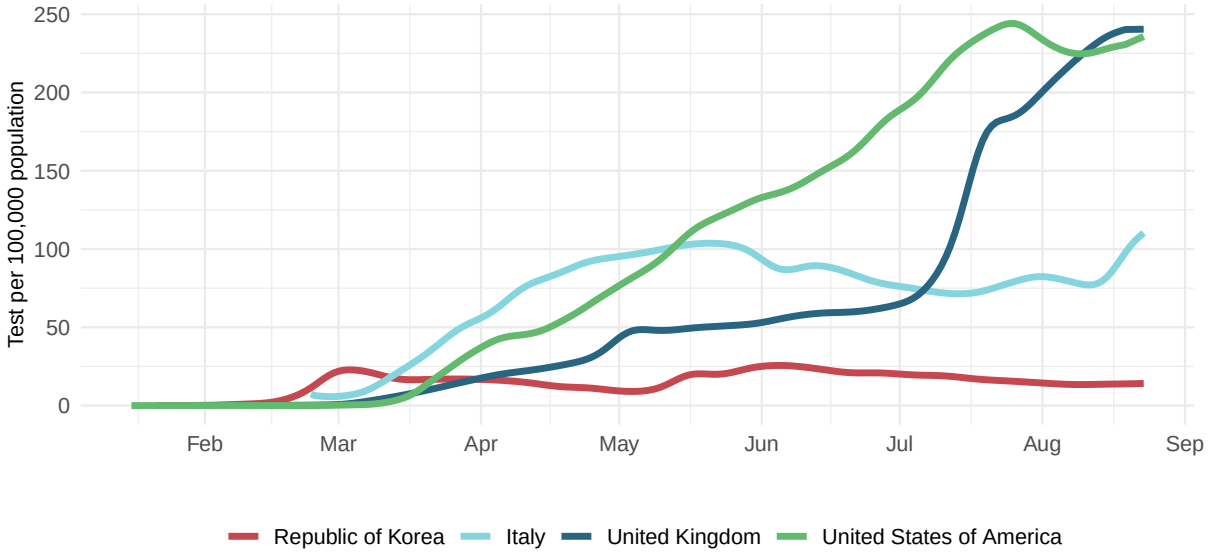


Figure 10b. COVID-19 diagnostic tests per 100,000 people on August 19 2020

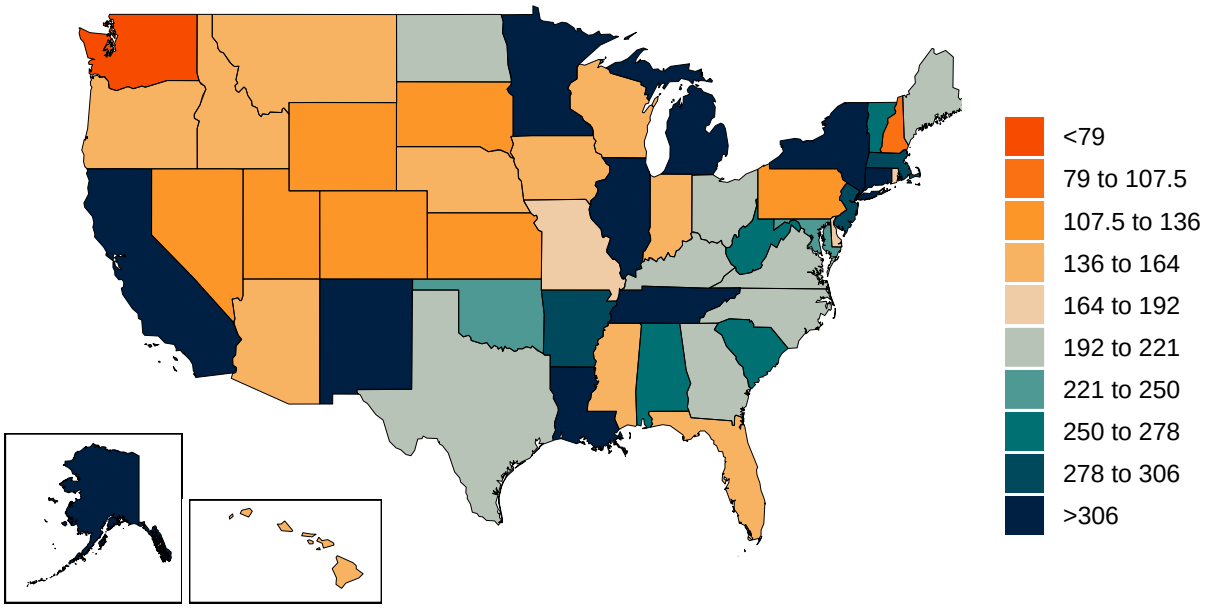
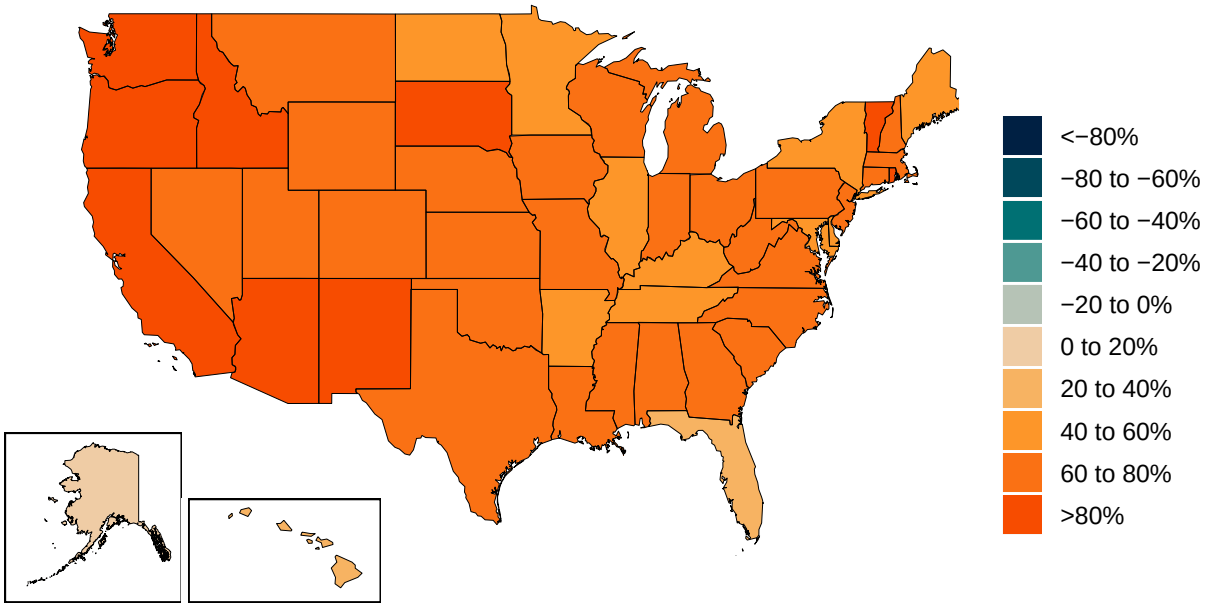


Figure 11. Increase in the risk of death due to pneumonia on February 1 compared to August 1



Projections and Scenarios

Figure 12. Cumulative COVID-19 deaths until December 01 2020 for three scenarios. The reference scenario is our forecast of what we think is most likely to happen. The mandate easing scenario is what would happen if governments continue to ease social distancing mandates. The universal mask mandate scenario is what would happen if mask use increased immediately to 95%.

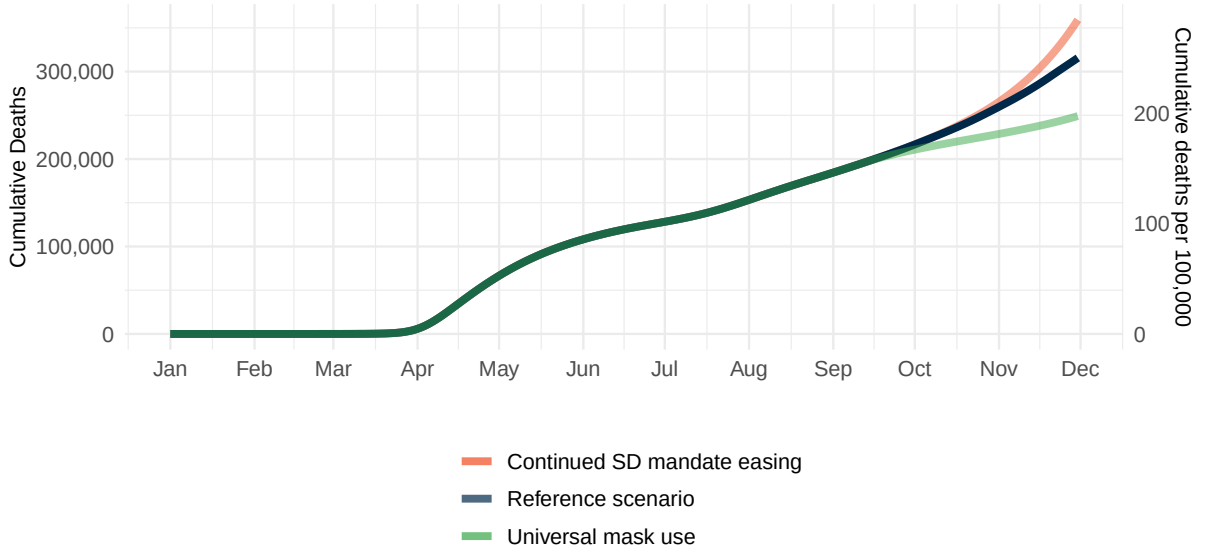


Fig 13. Daily COVID-19 deaths until December 01 2020 for three scenarios. The reference scenario is our forecast of what we think is most likely to happen. The mandate easing scenario is what would happen if governments continue to ease social distancing mandates. The universal mask mandate scenario is what would happen if mask use increased immediately to 95%.

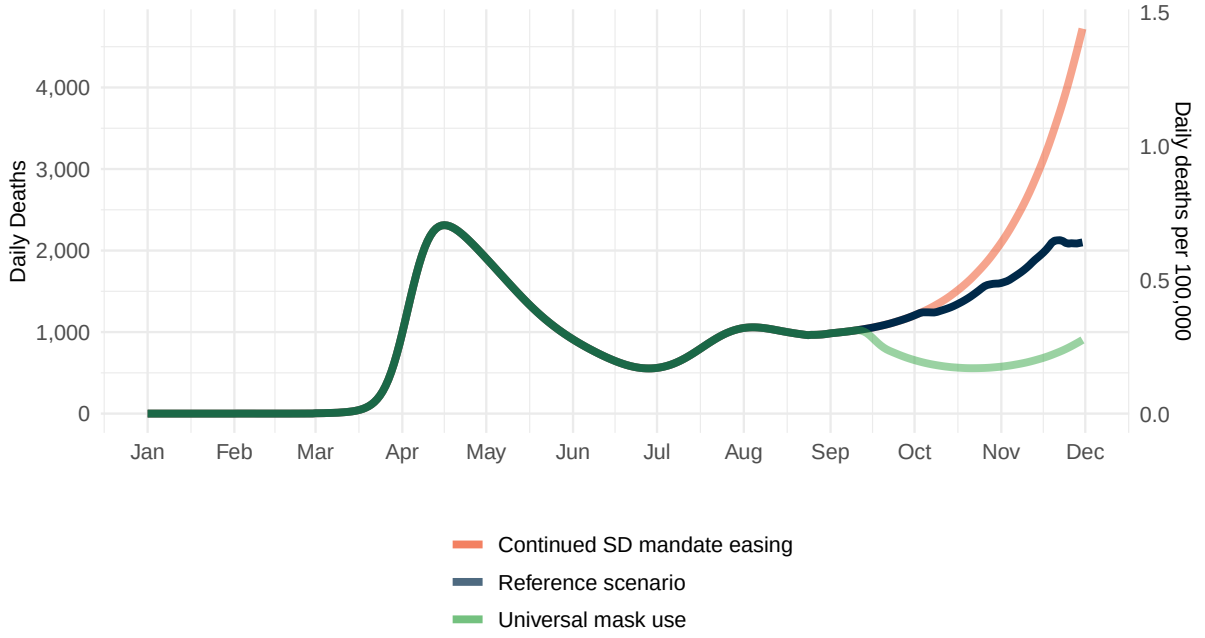


Fig 14. Daily COVID-19 infections until December 01 2020 for three scenarios. The reference scenario is our forecast of what we think is most likely to happen. The mandate easing scenario is what would happen if governments continue to ease social distancing mandates. The universal mask mandate scenario is what would happen if mask use increased immediately to 95%.

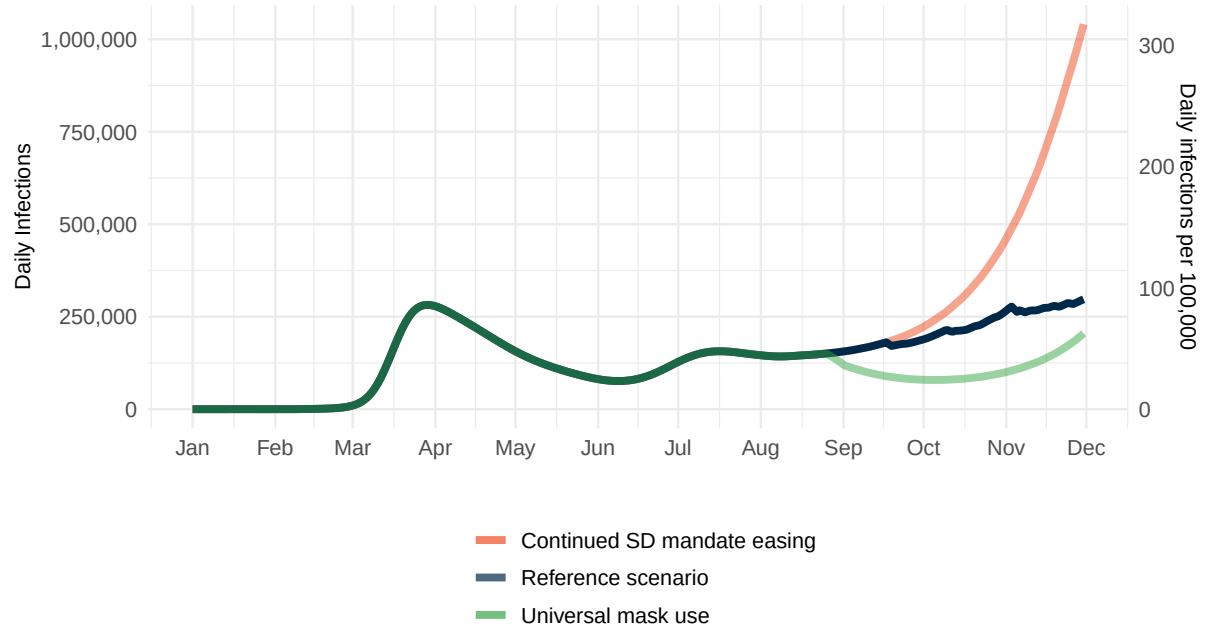


Fig 15. Month of assumed mandate reimplementation. (Month when daily death rate passes 8 per million, when model assumes mandates will be reimposed.)

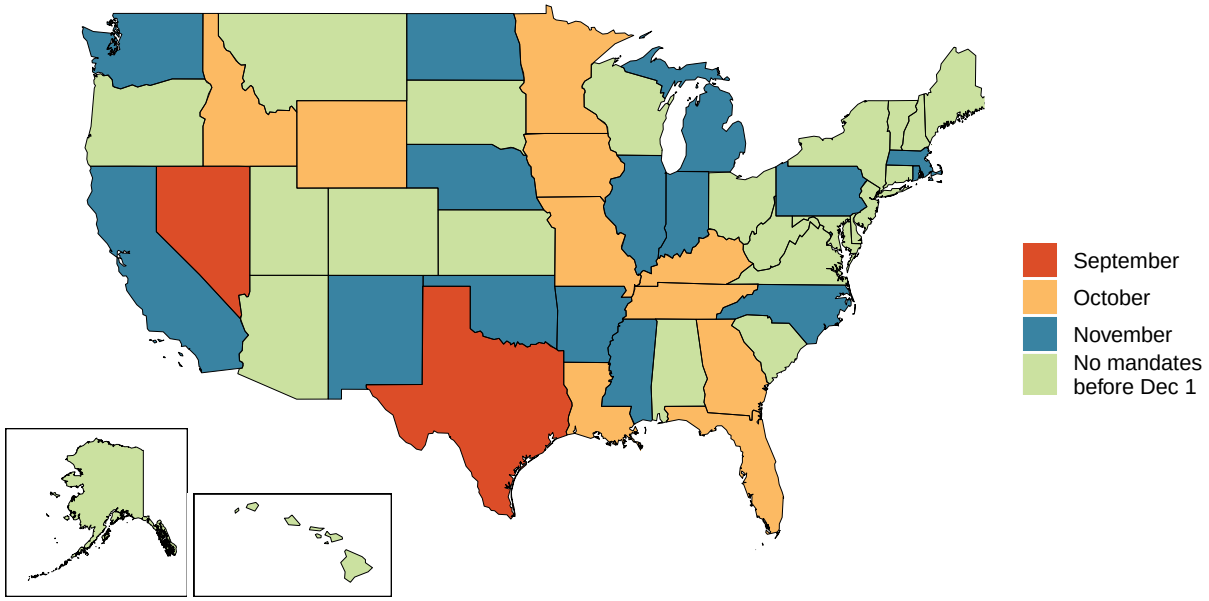


Figure 16. Forecasted percent infected with COVID-19 on December 01 2020

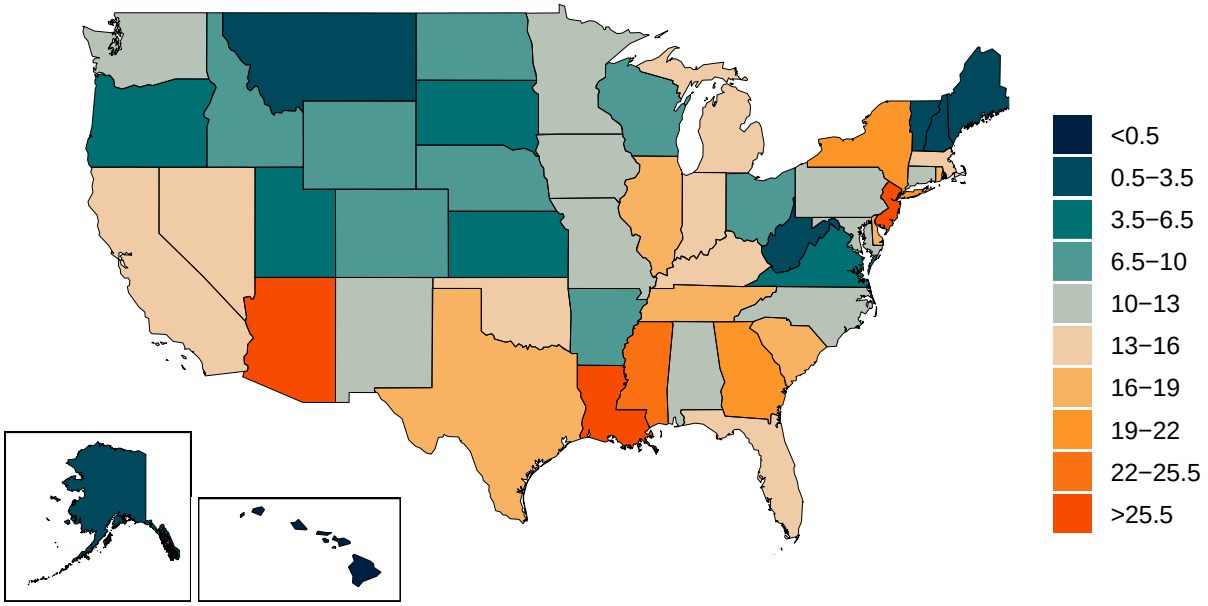


Figure 17. Daily COVID-19 deaths per million forecasted on December 01 2020 in the reference scenario

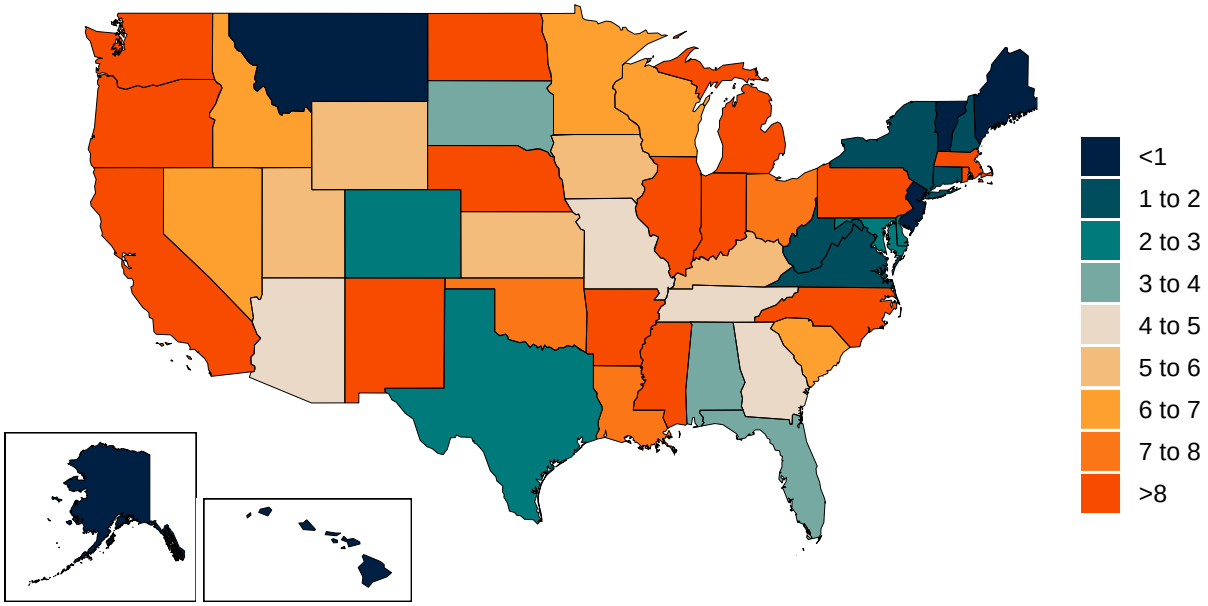


Table 3. Ranking of COVID-19 among the leading causes of mortality in the week of December 01 2020, assuming uniform deaths of non-COVID causes throughout the year

Cause name	Weekly deaths	Ranking
COVID-19	14,895	1
Ischemic heart disease	10,724	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

Mask data source: Premise; Facebook Global symptom survey (This research is based on survey results from University of Maryland Social Data Science Center.); 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.

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