

COVID-19 Results Briefing

The United States of America

February 12, 2021

This document 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 February 12, 2021 with data through February 8, 2021.

US daily cases have declined sharply, with daily deaths beginning to decline. The epidemic trajectory over the next four months will be determined by the balance of four factors with many different outcomes possible. Two are driving down transmission: 1) the continued scale-up of vaccination helped by the fraction of adults willing to accept the vaccine reaching 71%, and 2) declining seasonality, which will contribute to declining transmission potential from now until August. Two factors, however, can slow or even reverse the declines that have begun: 1) the spread of variant B.1.1.7, and 2) increased behaviors that favor COVID-19 transmission. Transmission of B.1.1.7 has been confirmed in at least 10 states and will inevitably spread more widely. This has been incorporated in our reference scenario. Transmission has been contained over the winter through mask wearing, decreased mobility, and avoidance of high-risk settings such as indoor dining. As daily case counts decline and vaccination increases, behaviors are likely to change towards increased risk of transmission. Data on this change are currently very limited. In our reference scenario, putting all these factors together, we estimate that cumulative deaths will reach 616,000 by June 1. Infections are expected to increase after mid-March at least for 4-6 weeks, but due to vaccination, deaths should not. With increased mobility and faster variant spread, the death total could reach 645,000 by June 1. We expect vaccination to reach 145 million adults by June 1 and that scale-up will prevent 114,000 deaths. As new data emerge on the pace of vaccination, the behavioral response, and the question of whether infection from previous variants protect against variant B.1.351, our reference scenario is likely to change.

Current situation

- Daily reported cases in the last week decreased to 117,900 per day on average, dropping nearly 50% from early January (Figure 1).
- Daily deaths in the last week decreased to 2,820 per day on average compared to 3,080 the week before (Figure 2). COVID-19 remains the number 1 cause of death in the US this week (Table 1).
- Effective R, computed using cases, hospitalizations, and deaths, is less than 1 in all states (Figure 3).
- We estimated that 18% of people in the US have been infected as of February 8 (Figure 4). Four states have cumulative infection rates greater than 25%: North Dakota, Nebraska, Iowa, and New York.
- The infection-detection rate was over 60% in the last week (Figure 5).

- The daily death rate is greater than 4 per million in 38 states (Figure 6).

Trends in drivers of transmission

- New mandates were implemented in Colorado and Washington. Mandates were removed in Nebraska, New Jersey, and Rhode Island.
- Mobility last week was 33% lower than the pre-COVID-19 baseline (Figure 7). Mobility was near baseline (within 10%) in no states. Mobility was lower than 30% of baseline in 24 states.
- As of February 8, we estimated that 76% of people always wore a mask when leaving their home (Figure 8).
- There were 506 diagnostic tests per 100,000 people on February 8 (Figure 9).
- 71.5% of Americans say they would accept or would probably accept a vaccine for COVID-19. The fraction of the population who are open to receiving a COVID-19 vaccine ranges from 57% in Alaska to 84% in Rhode Island (Figure 11).
- In our current reference scenario, we expect that 144.83 million adults will be vaccinated by June 1 (Figure 12).

Projections

- In our **reference scenario**, which represents what we think is most likely to happen, our model projects 615,000 cumulative deaths on June 1. This represents 152,000 additional deaths from February 8 to June 1 (Figure 13). Daily deaths are expected to steadily decline although the decline slows in April and May (Figure 14).
- By June 1, we project that 114,000 lives will be saved by the projected vaccine rollout.
- If **universal mask coverage (95%)** were attained in the next week, our model projects 34,000 fewer cumulative deaths compared to the reference scenario on June 1 (Figure 13).
- Under our **worse scenario**, our model projects 645,000 cumulative deaths on June 1 (Figure 13), which is 30,000 more deaths than in the reference scenario. Daily deaths would increase in April and then begin to decline in May.
- Daily infections in the reference scenario decline until mid-March and then increase to over 200,000 again by early April. In the worse scenario, daily infections could reach to over 325,000 around April 1.
- Figure 17 compares our reference scenario forecasts to other publicly archived models. All the models suggest declines except the Los Alamos National Labs model, which suggests daily deaths will begin increasing in mid-March.
- At some point from February through June 1, 18 states will have high or extreme stress on hospital beds (Figure 18). At some point from February through June 1, 17 states will have high or extreme stress on ICU capacity (Figure 19).

Model updates

The major update in this week's models has been to incorporate the expected spatial spread of variants to adjacent states or countries. The speed of spread has been based on the observed pace of the spread of the B.1.1.7 variant in England. Expected spread of variants has been incorporated into the reference scenario.

Current situation

Figure 1. Reported daily COVID-19 cases

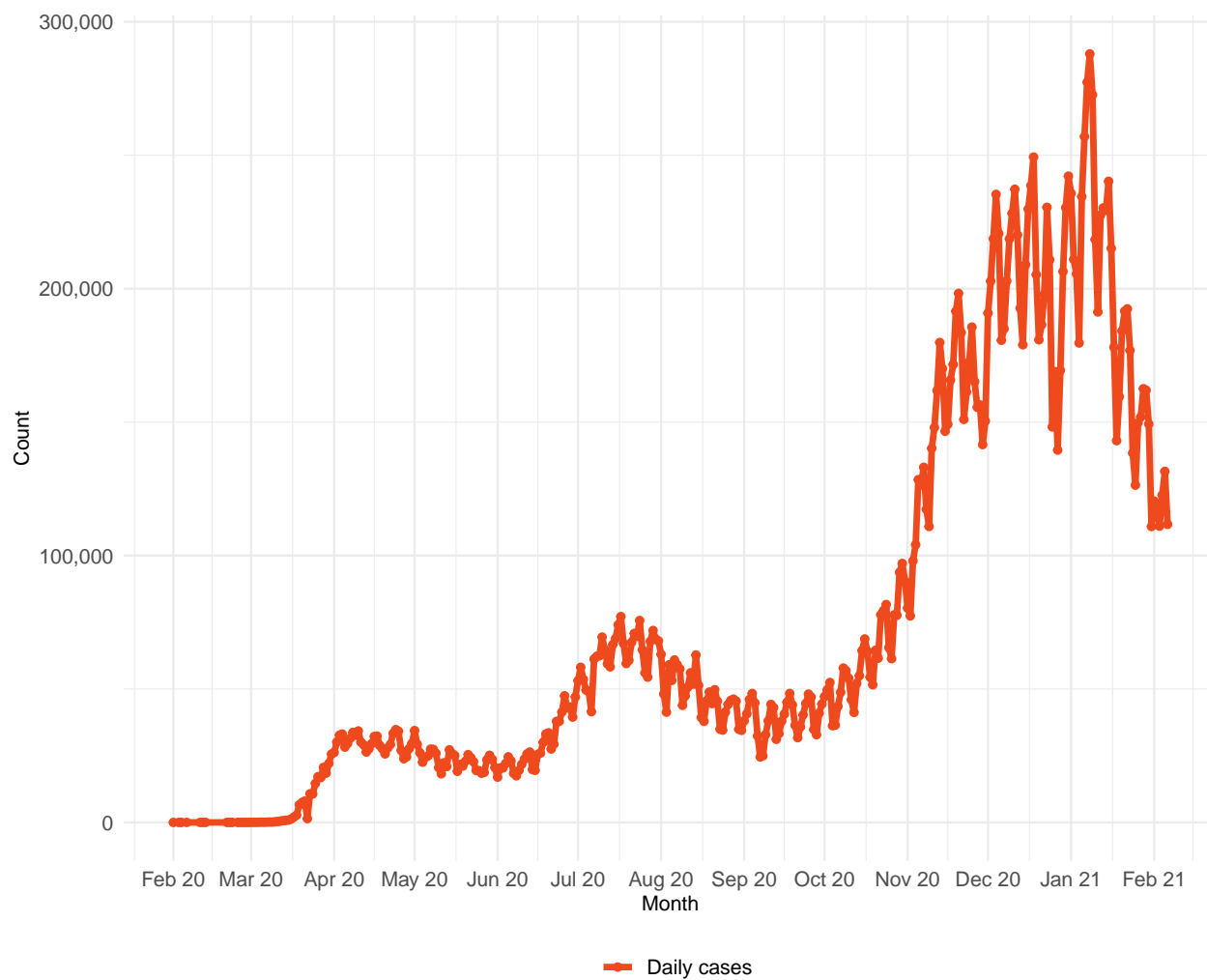


Table 1. Ranking of COVID-19 among the leading causes of mortality this week, assuming uniform deaths of non-COVID causes throughout the year

Cause name	Weekly deaths	Ranking
COVID-19	19,730	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

Figure 2a. Reported daily COVID-19 deaths

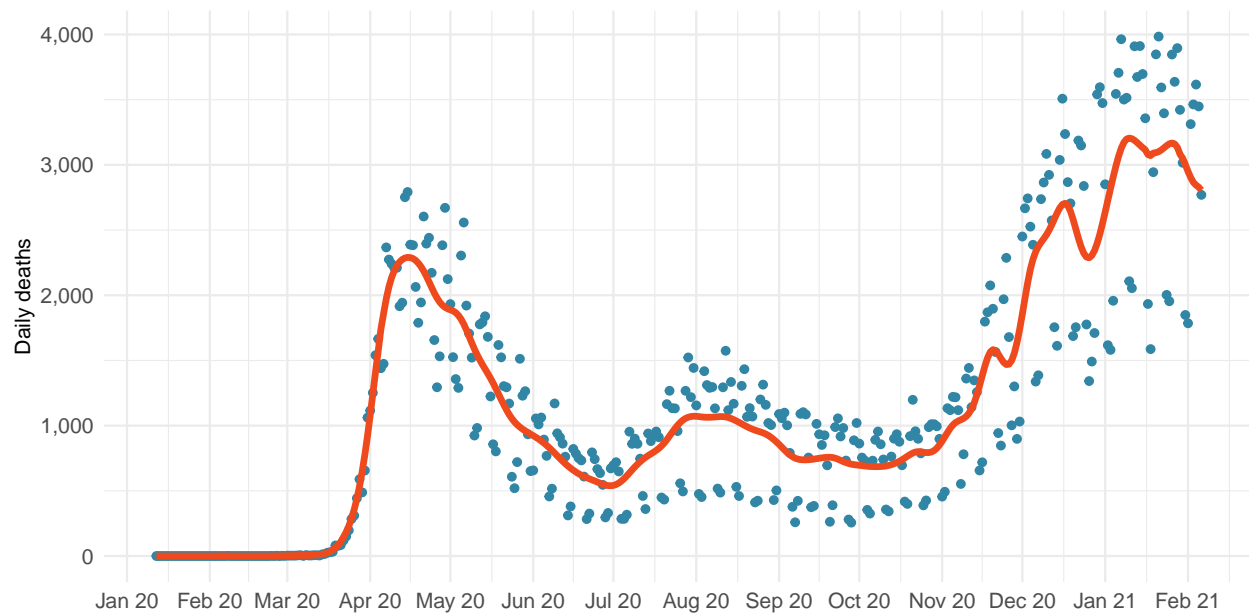


Figure 2b. Estimated cumulative deaths by age group

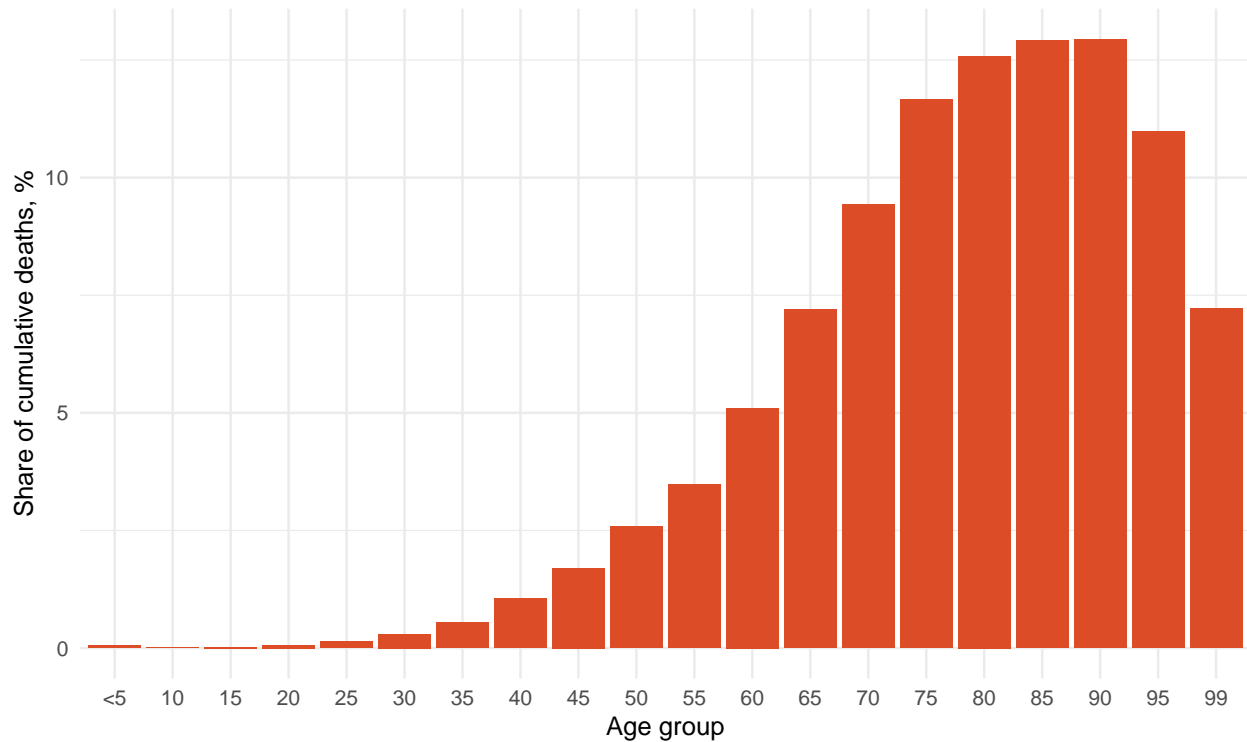


Figure 3. Mean effective R on January 28, 2021. The estimate of effective R is based on the combined analysis of deaths, case reporting, and hospitalizations where available. Current reported cases reflect infections 11-13 days prior, so estimates of effective R can only be made for the recent past. Effective R less than 1 means that transmission should decline, all other things being held the same.

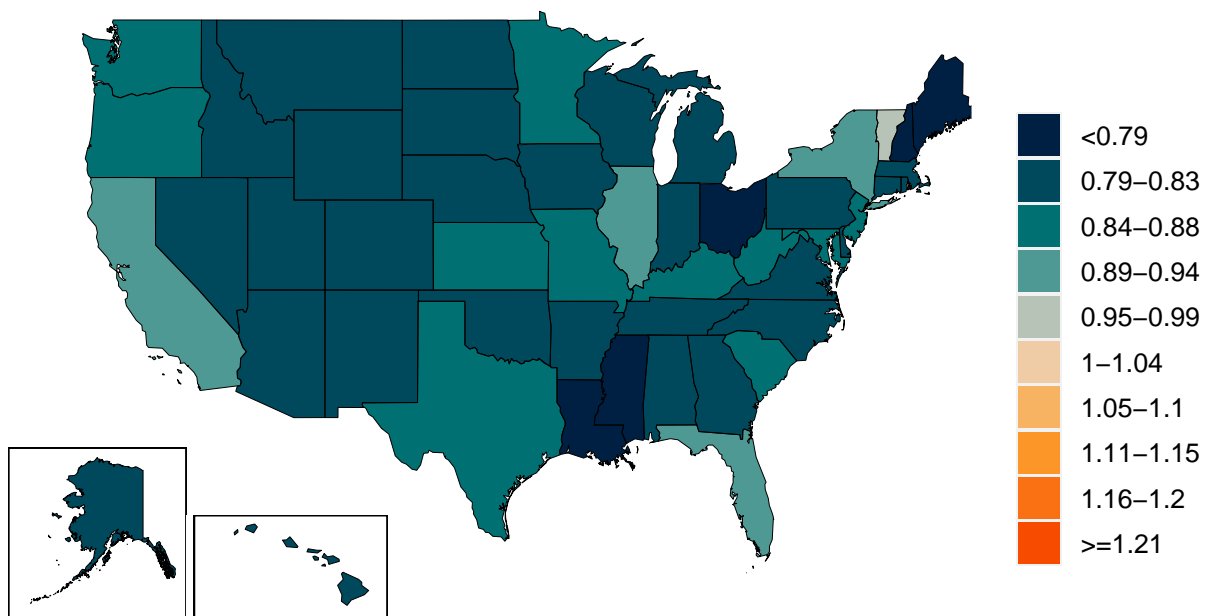


Figure 4. Estimated percent of the population infected with COVID-19 on February 08, 2021

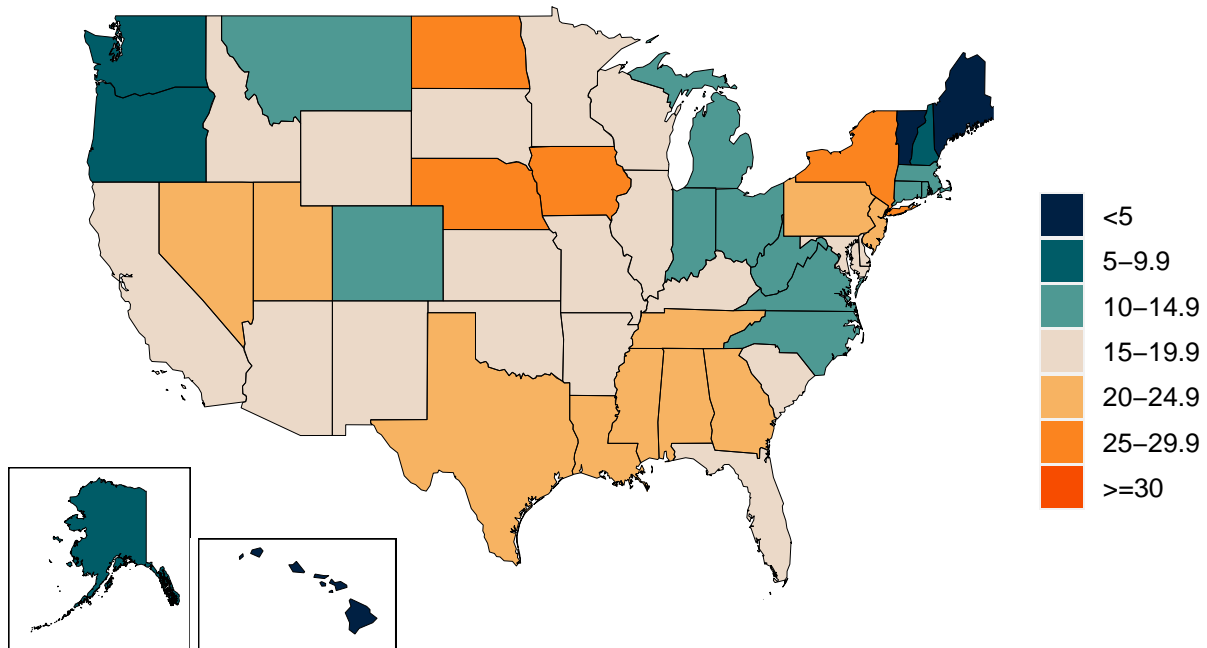


Figure 5. Percent of COVID-19 infections detected. This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model.

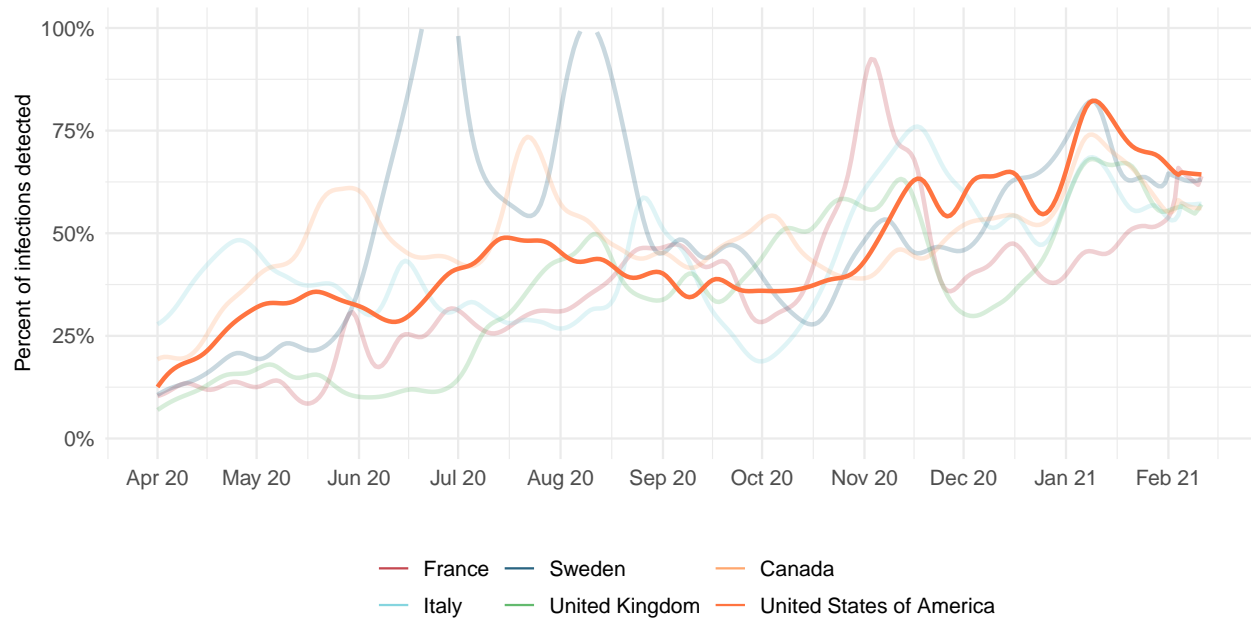
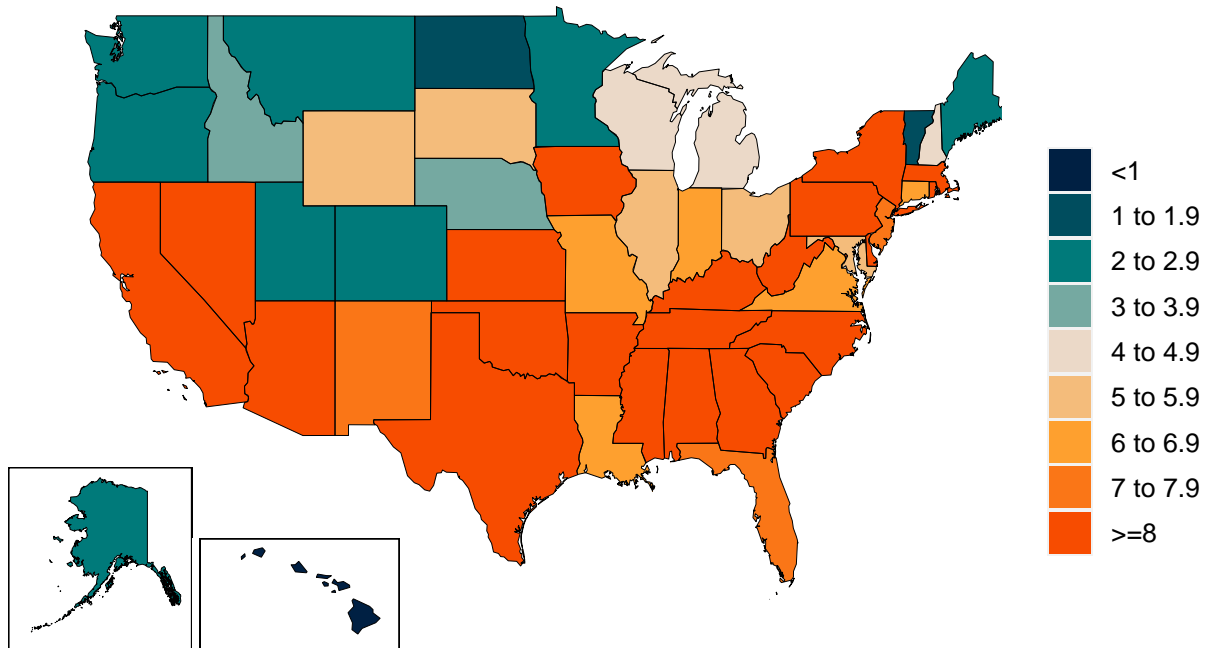
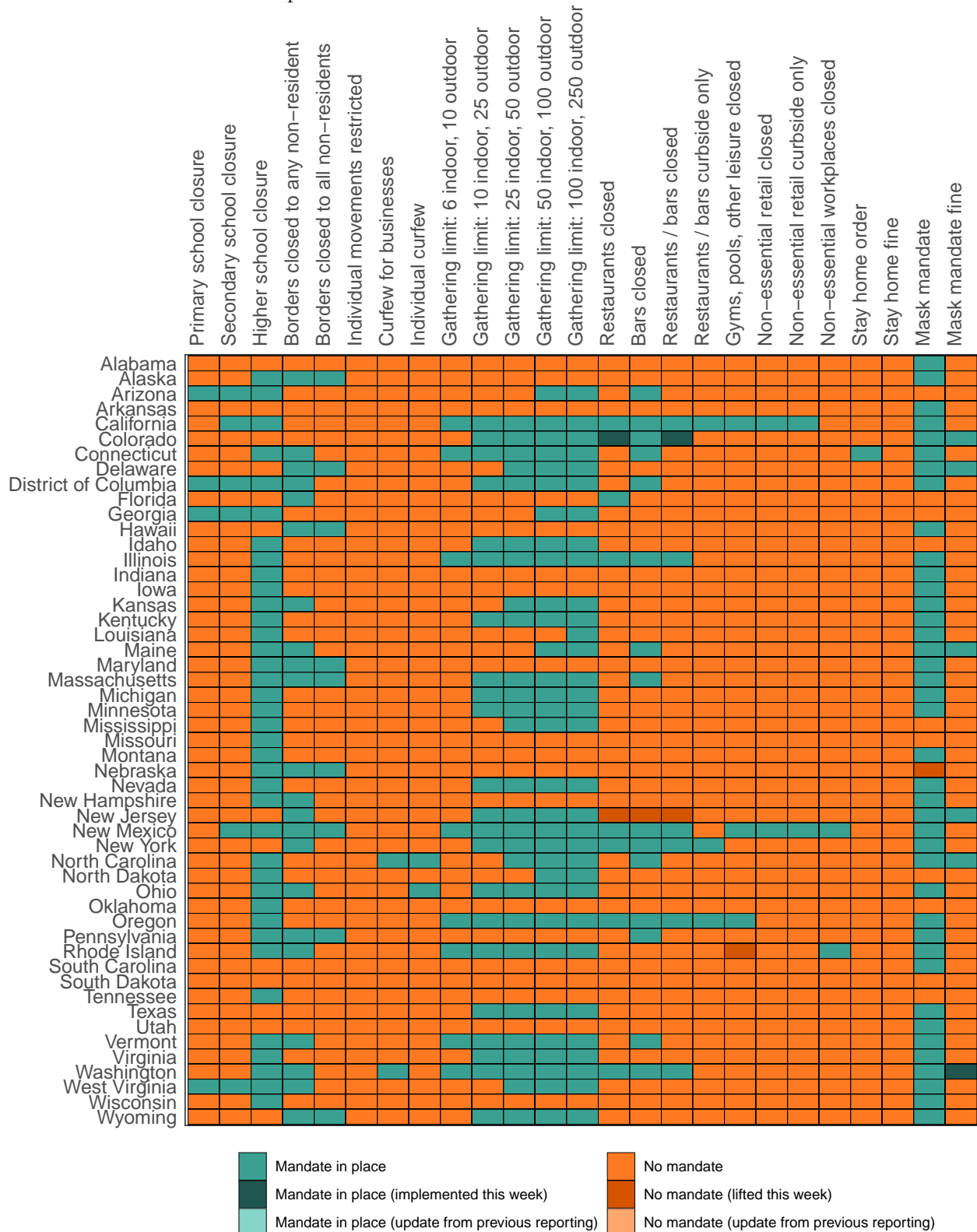


Figure 6. Daily COVID-19 death rate per 1 million on February 08, 2021



Critical drivers

Table 2. Current mandate implementation



*Not all locations are measured at the subnational level.

Figure 7a. Trend in mobility as measured through smartphone app use compared to January 2020 baseline

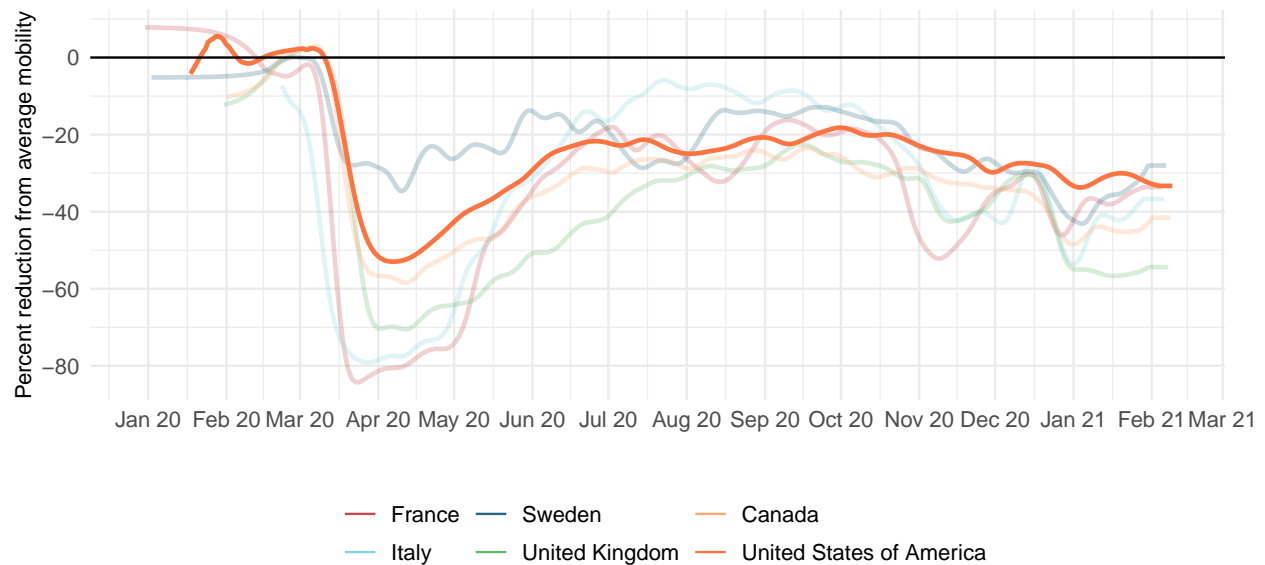


Figure 7b. Mobility level as measured through smartphone app use compared to January 2020 baseline (percent) on February 08, 2021

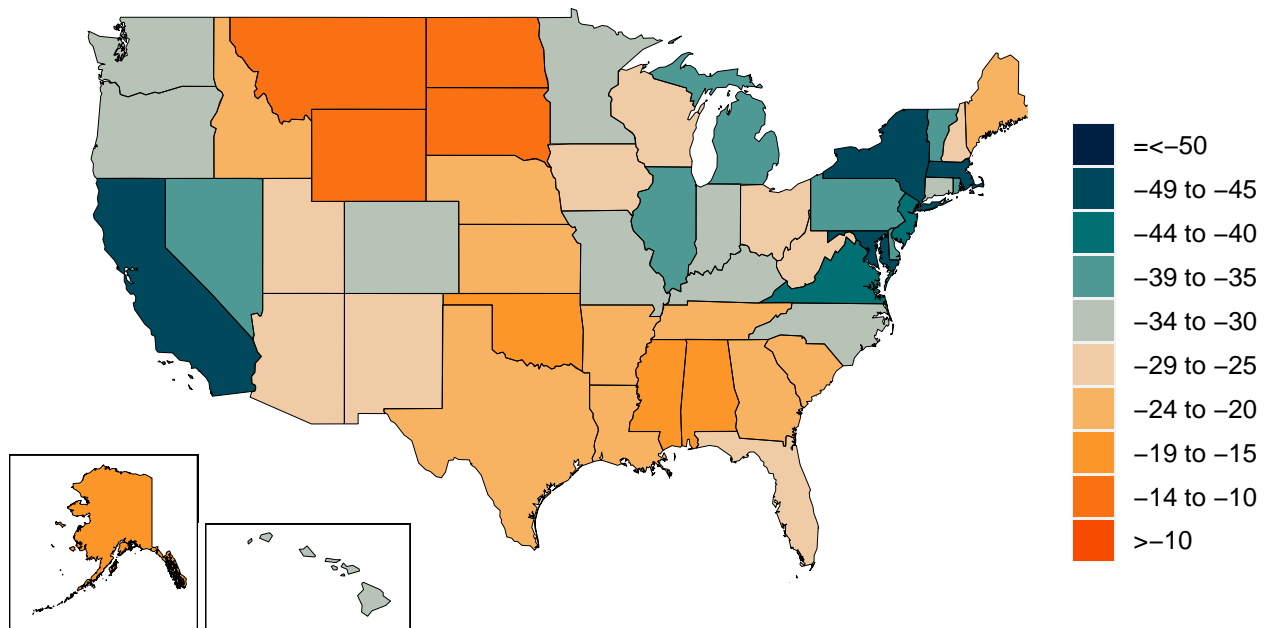


Figure 8a. Trend in the proportion of the population reporting always wearing a mask when leaving home

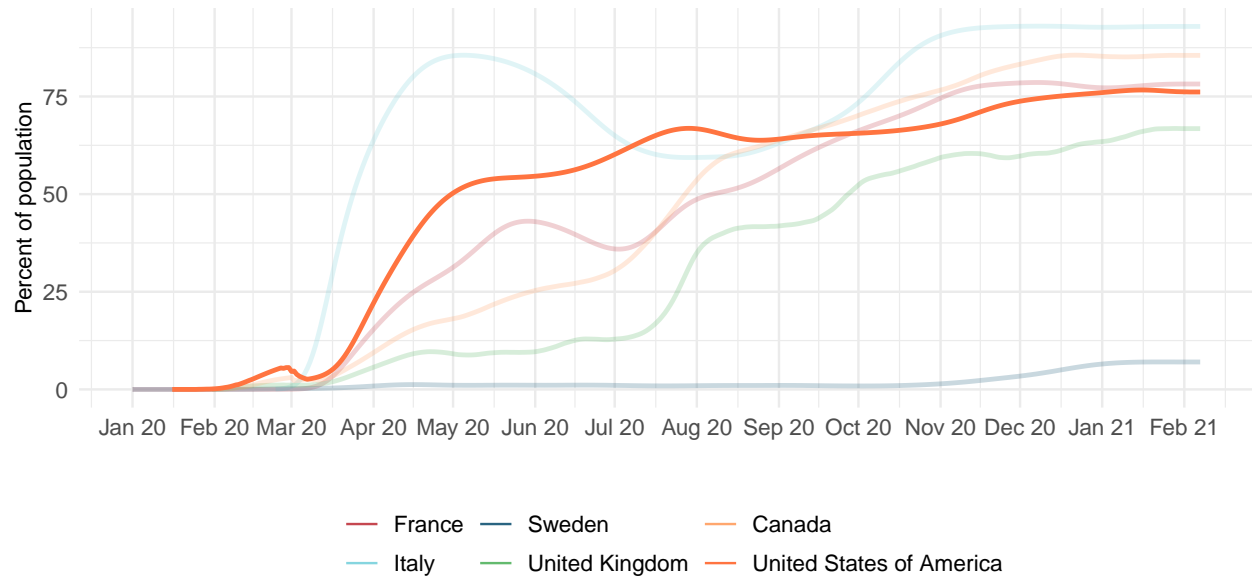


Figure 8b. Proportion of the population reporting always wearing a mask when leaving home on February 08, 2021

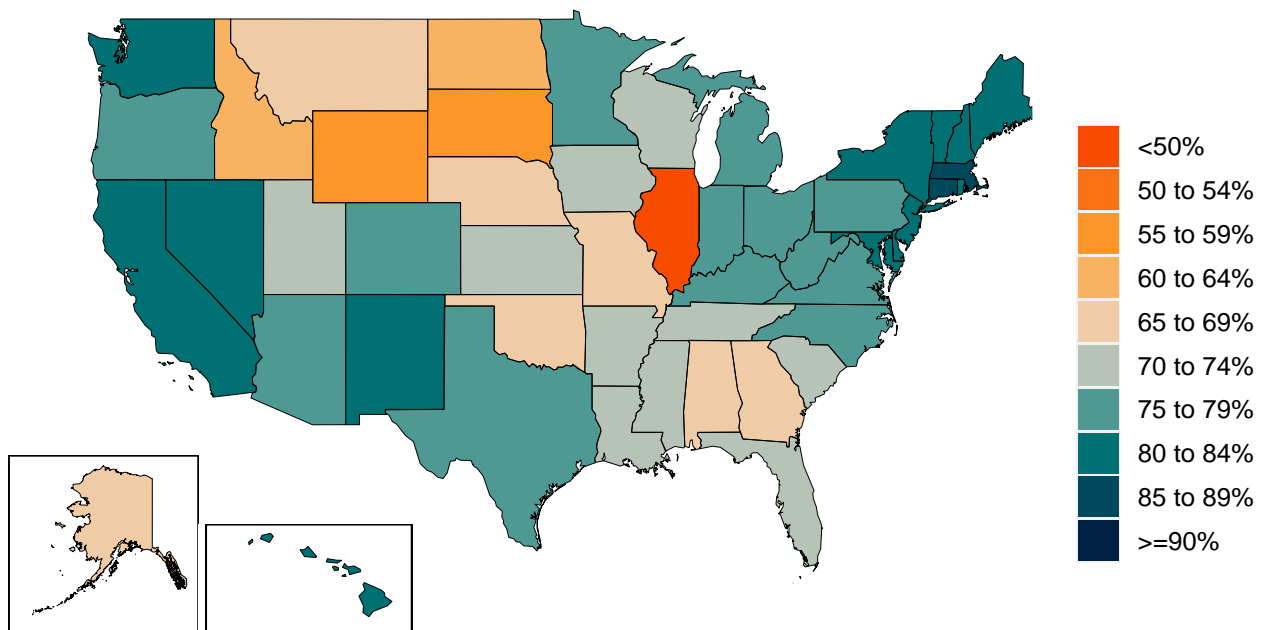


Figure 9a. Trend in COVID-19 diagnostic tests per 100,000 people

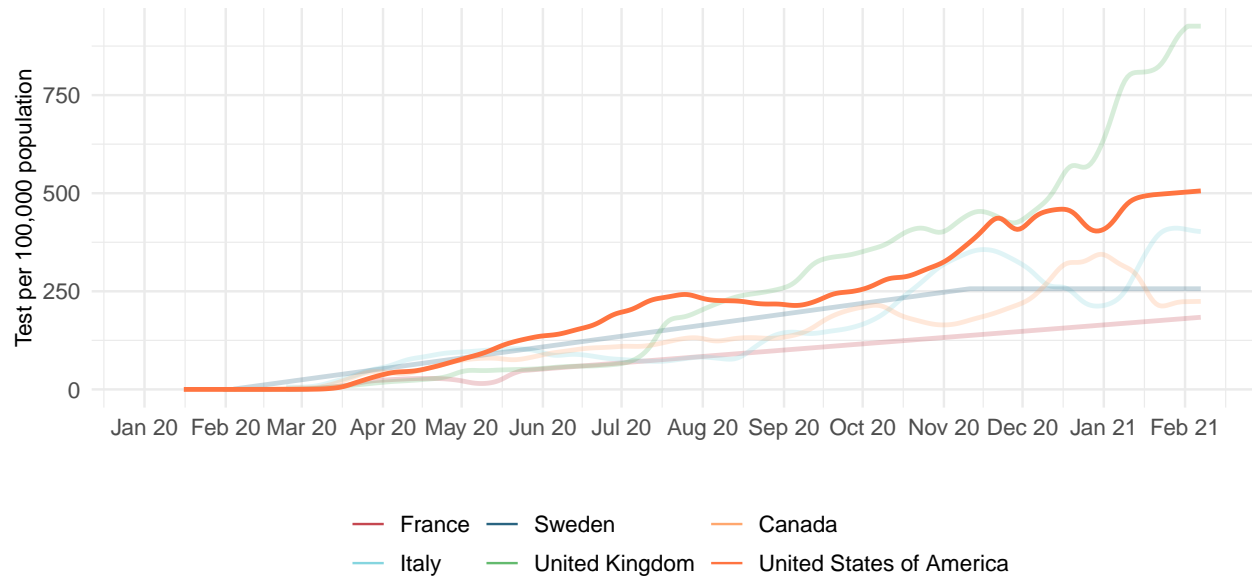


Figure 9b. COVID-19 diagnostic tests per 100,000 people on January 20, 2021

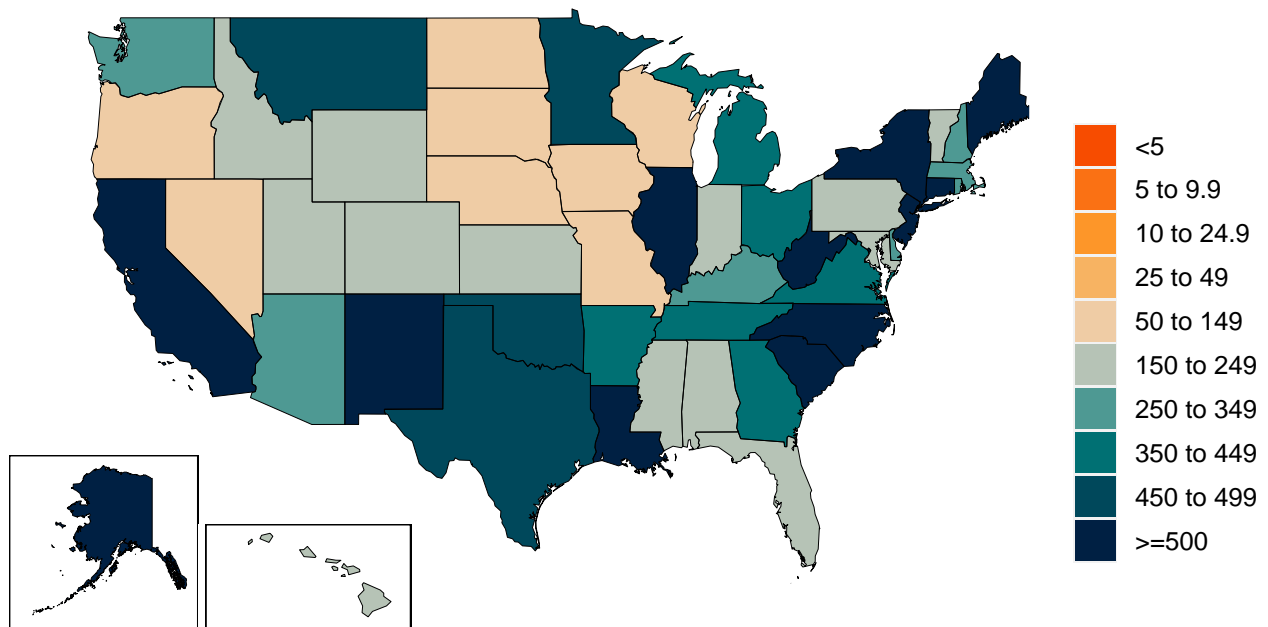


Figure 10. Increase in the risk of death due to pneumonia on February 1 2020 compared to August 1 2020

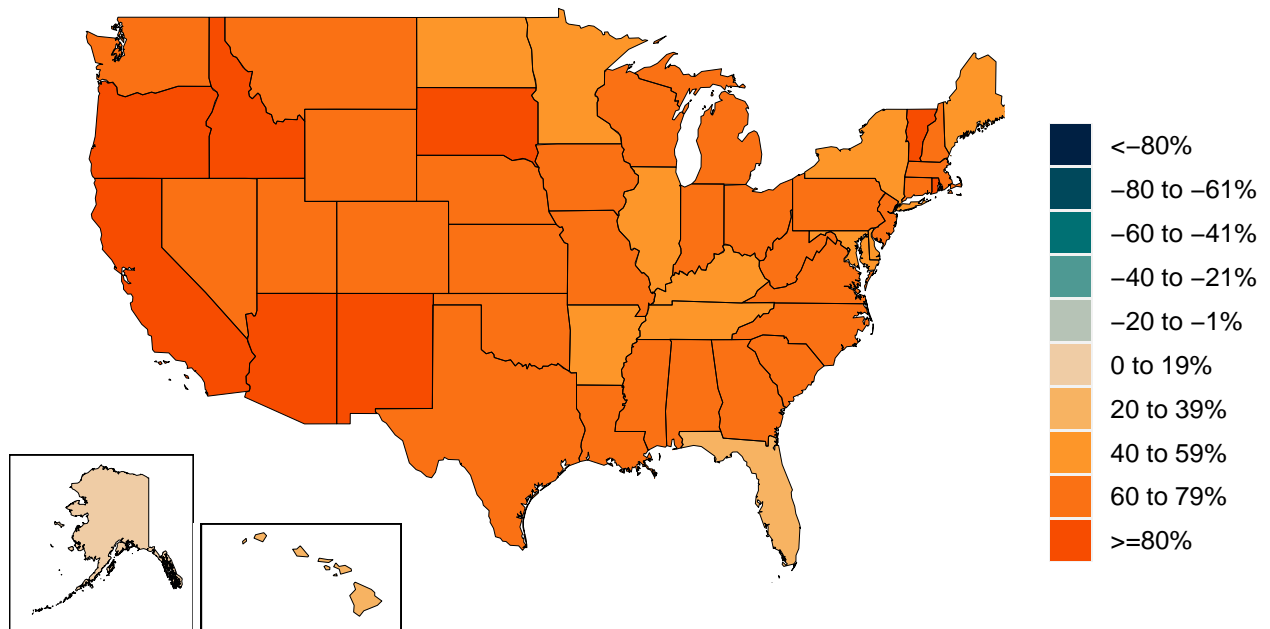


Figure 11. This figure shows the estimated proportion of the adult (18+) population that is open to receiving a COVID-19 vaccine based on Facebook survey responses (yes and unsure).

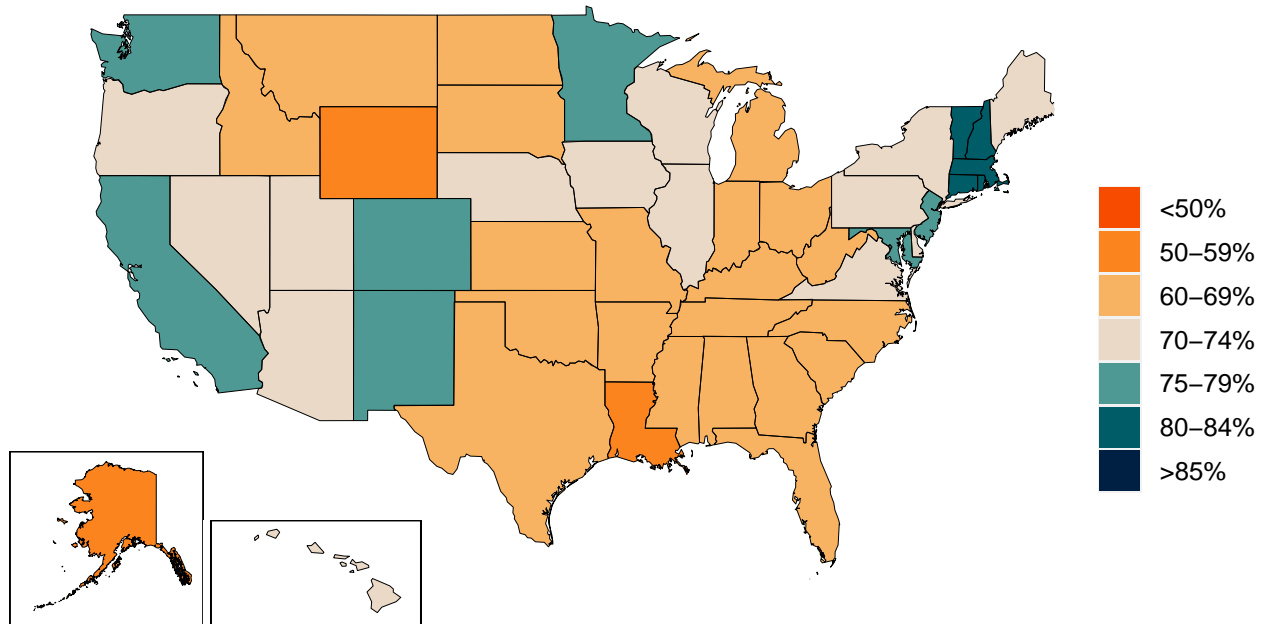
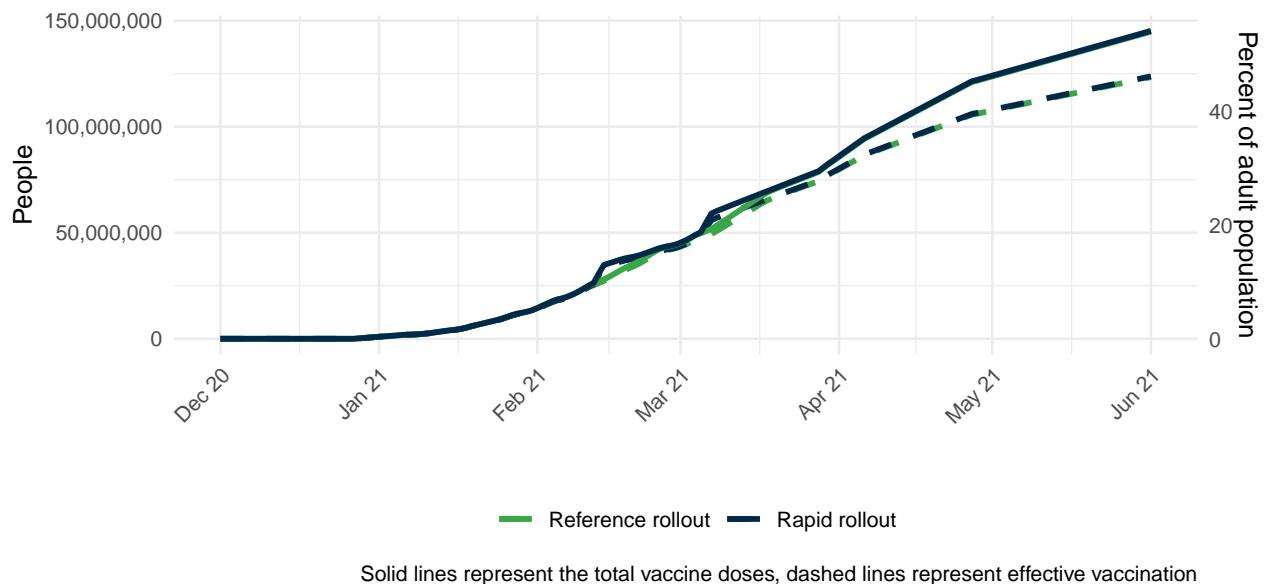


Figure 12. The number of people who receive any vaccine and those who are effectively vaccinated and protected against disease, accounting for efficacy, loss to follow up for two-dose vaccines, partial immunity after one dose, and immunity after two doses.



Projections and scenarios

We produce four scenarios when projecting COVID-19. The reference scenario is our forecast of what we think is most likely to happen. Vaccines are distributed at the expected pace. Governments adapt their response by re-imposing social distancing mandates for 6 weeks whenever daily deaths reach 8 per million, unless a location has already spent at least 7 of the last 14 days with daily deaths above this rate and not yet re-imposed social distancing mandates, in which case mandates are re-imposed when daily deaths reach 15 per million. Variant B.1.1.7 (first identified in the UK) continues to spread in locations where 100 or more isolates have been detected to date.

The rapid variant spread scenario shares assumptions with reference but variant B.1.351 (first identified in South Africa) spreads to everywhere in the world, starting Feb. 1, 2021. Variant B.1.351 spreads at the observed rate that B.1.1.7 spread in London. The variant is assumed to increase the infection-fatality rate by 29% and transmissibility by 25%. This scenario also assumes that those vaccinated are less effectively protected against variant B.1.351: Pfizer, Moderna, Janssen, and Novavax clinical effectiveness is reduced by 20%; all other vaccines clinical effectiveness is reduced by 50%. Governments adapt their response by re-imposing social distancing mandates for 6 weeks whenever daily deaths reach 8 per million, unless a location has already spent at least 7 of the last 14 days with daily deaths above this rate and not yet re-imposed social distancing mandates, in which case mandates are re-imposed when daily deaths reach 15 per million. Variant B.1.1.7 (first identified in the UK) continues to spread in locations where 100 or more isolates have been detected to date.

The worse scenario makes the same assumptions as the rapid variant spread scenario but also assumed that in those that are vaccinated mobility moves towards pre-COVID-19 levels.

The universal masks scenario makes all the same assumptions as the reference scenario but also assumes 95% mask usage adopted in public in every location.

Figure 13. Cumulative COVID-19 deaths until June 01, 2021 for four scenarios

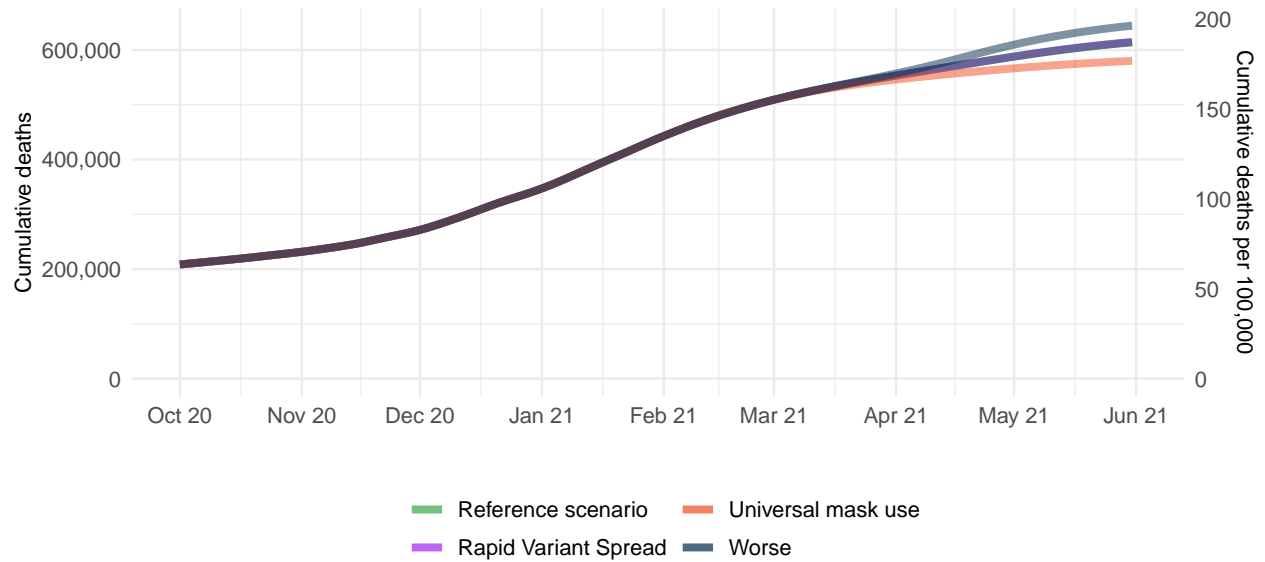


Figure 14. Daily COVID-19 deaths until June 01, 2021 for four scenarios

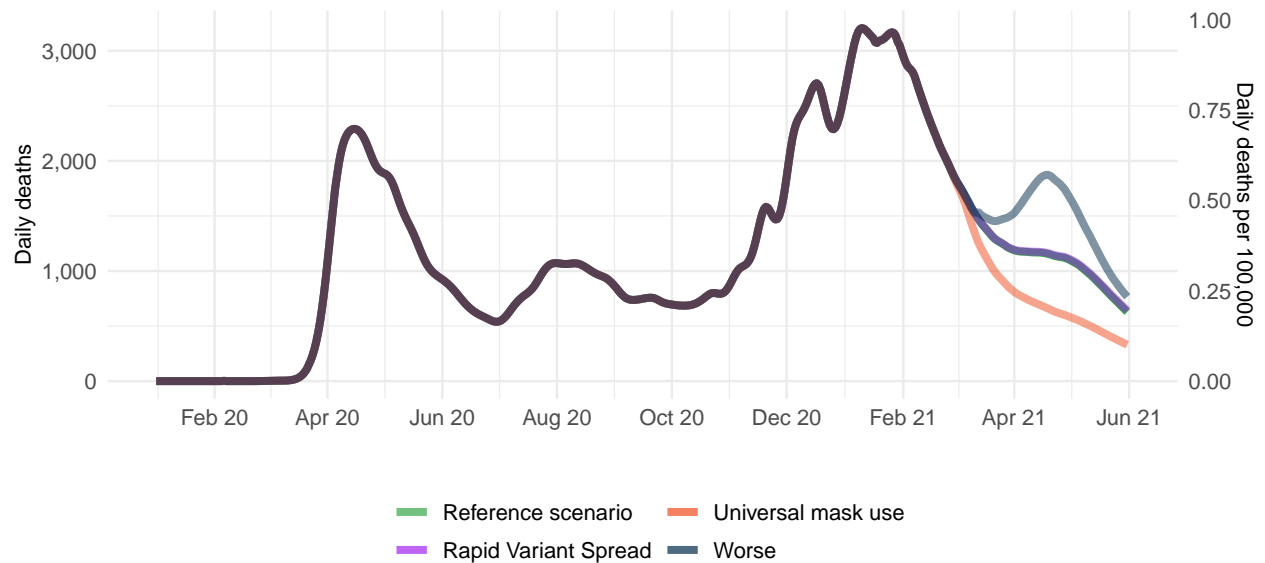


Figure 15. Daily COVID-19 infections until June 01, 2021 for four scenarios

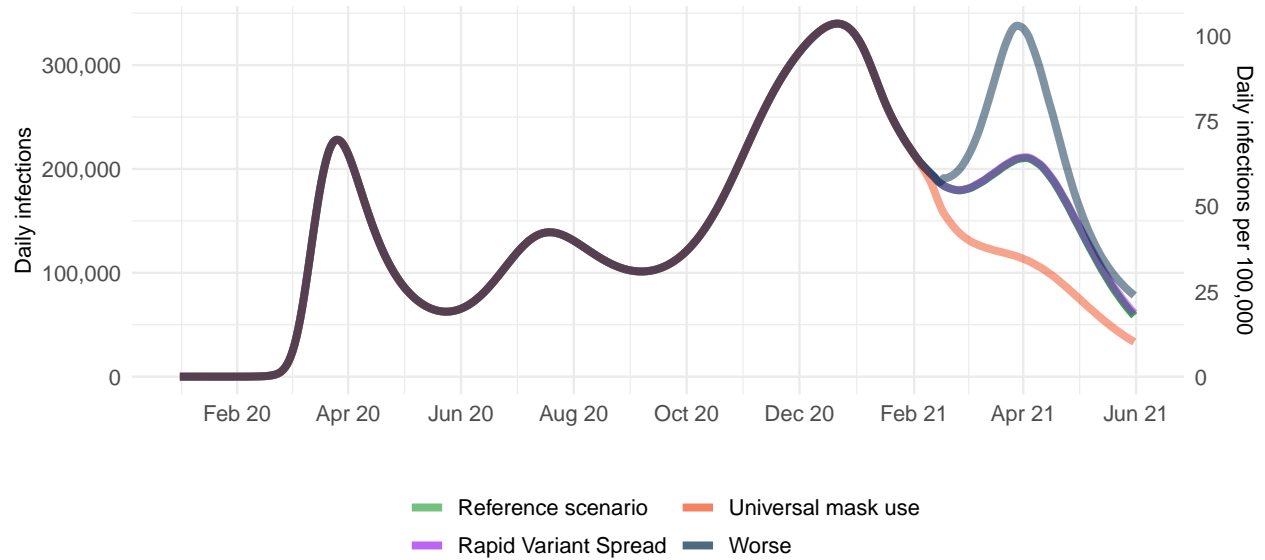


Figure 16. Forecasted percent infected with COVID-19 on June 01, 2021

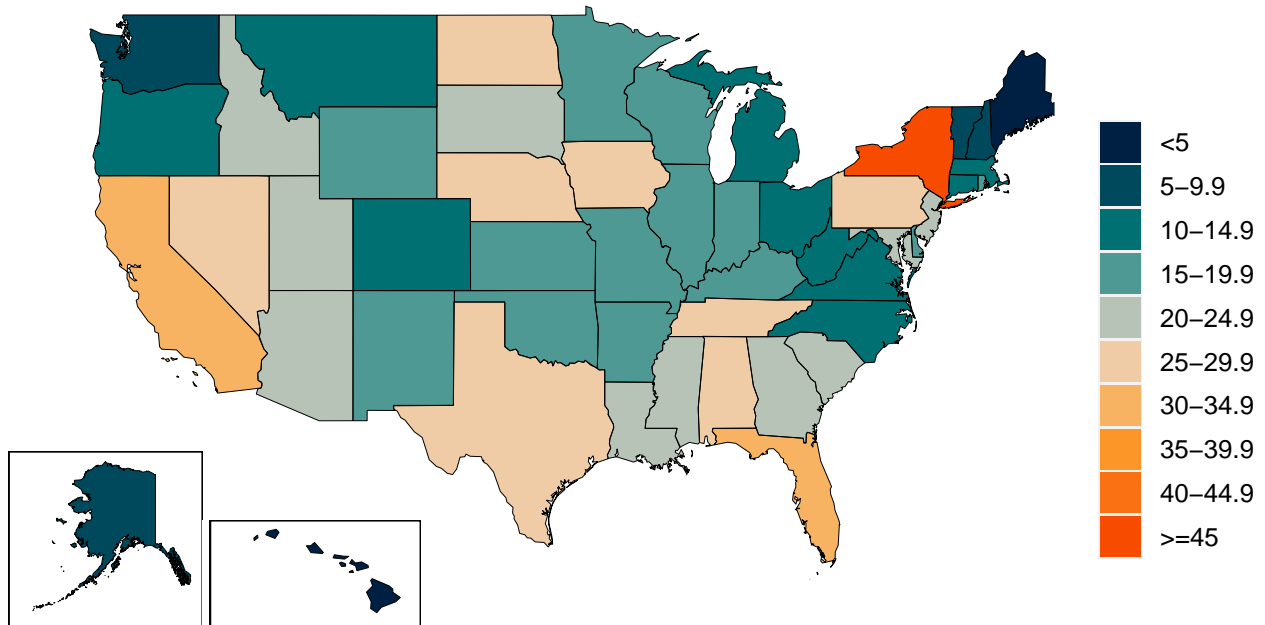


Figure 17. Comparison of reference model projections with other COVID modeling groups. For this comparison, we are including projections of daily COVID-19 deaths from other modeling groups when available: Delphi from the Massachusetts Institute of Technology (Delphi; <https://www.covidanalytics.io/home>), Imperial College London (Imperial; <https://www.covidsim.org>), The Los Alamos National Laboratory (LANL; <https://covid-19.bsvgateway.org/>), and the SI-KJalpha model from the University of Southern California (SIKJalpha; <https://github.com/scc-usc/ReCOVER-COVID-19>). Daily deaths from other modeling groups are smoothed to remove inconsistencies with rounding. Regional values are aggregates from available locations in that region.

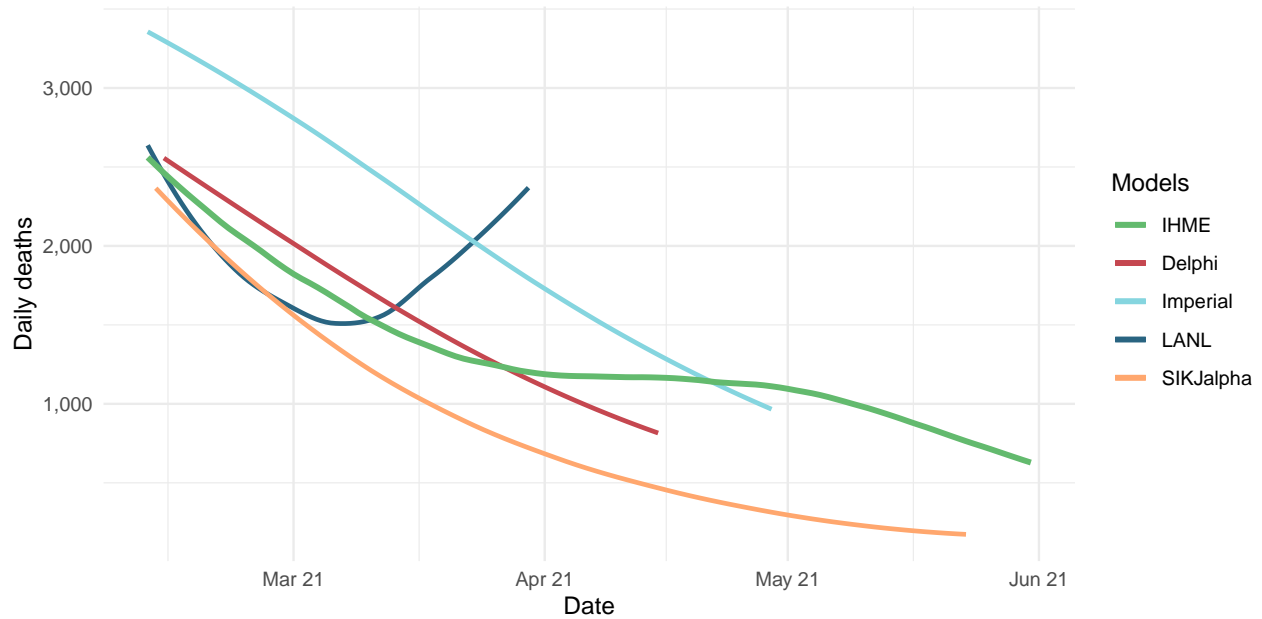


Figure 18. The estimated inpatient hospital usage is shown over time. The percent of hospital beds occupied by COVID-19 patients is color coded based on observed quantiles of the maximum proportion of beds occupied by COVID-19 patients. Less than 5% is considered *low stress*, 5-9% is considered *moderate stress*, 10-19% is considered *high stress*, and greater than 20% is considered *extreme stress*.

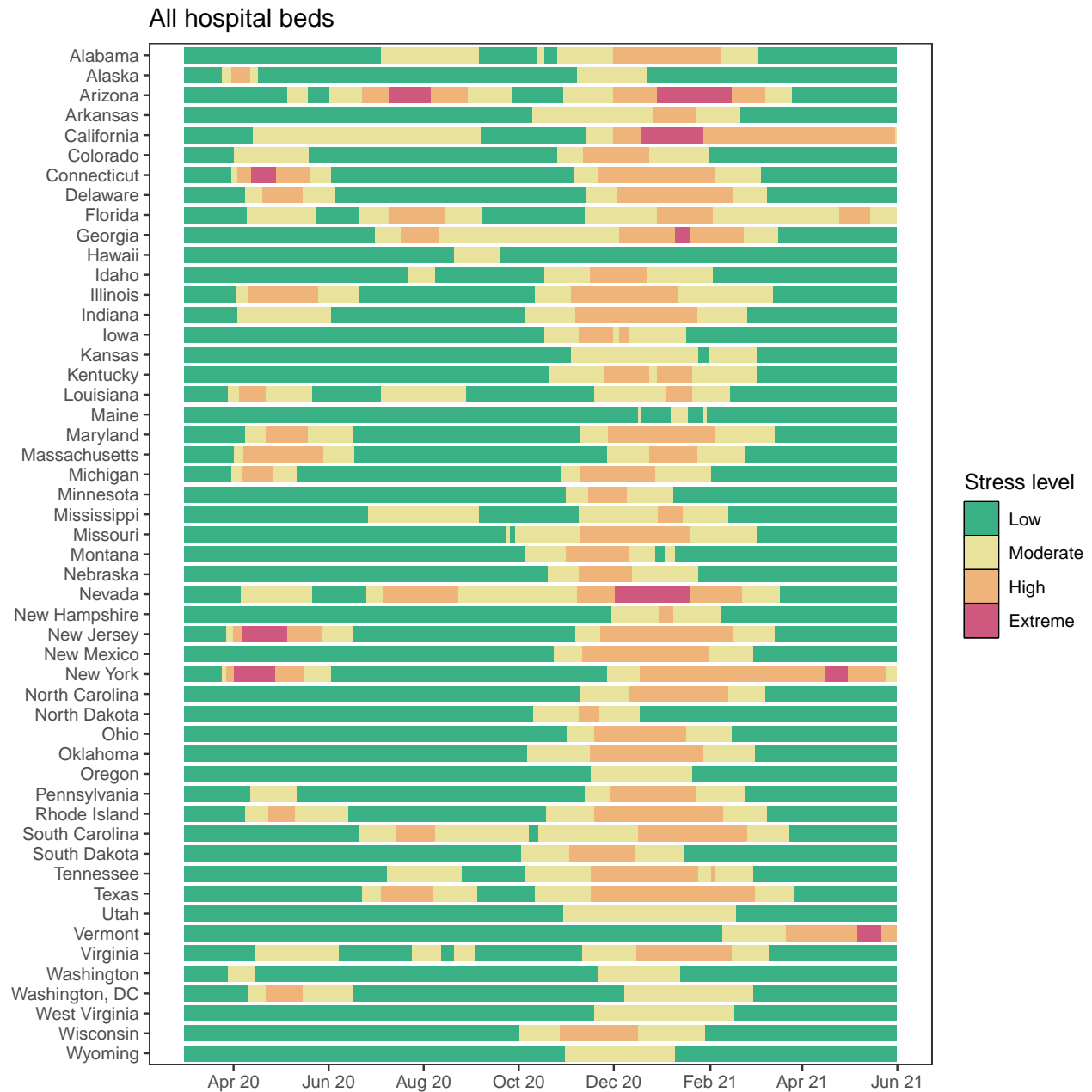
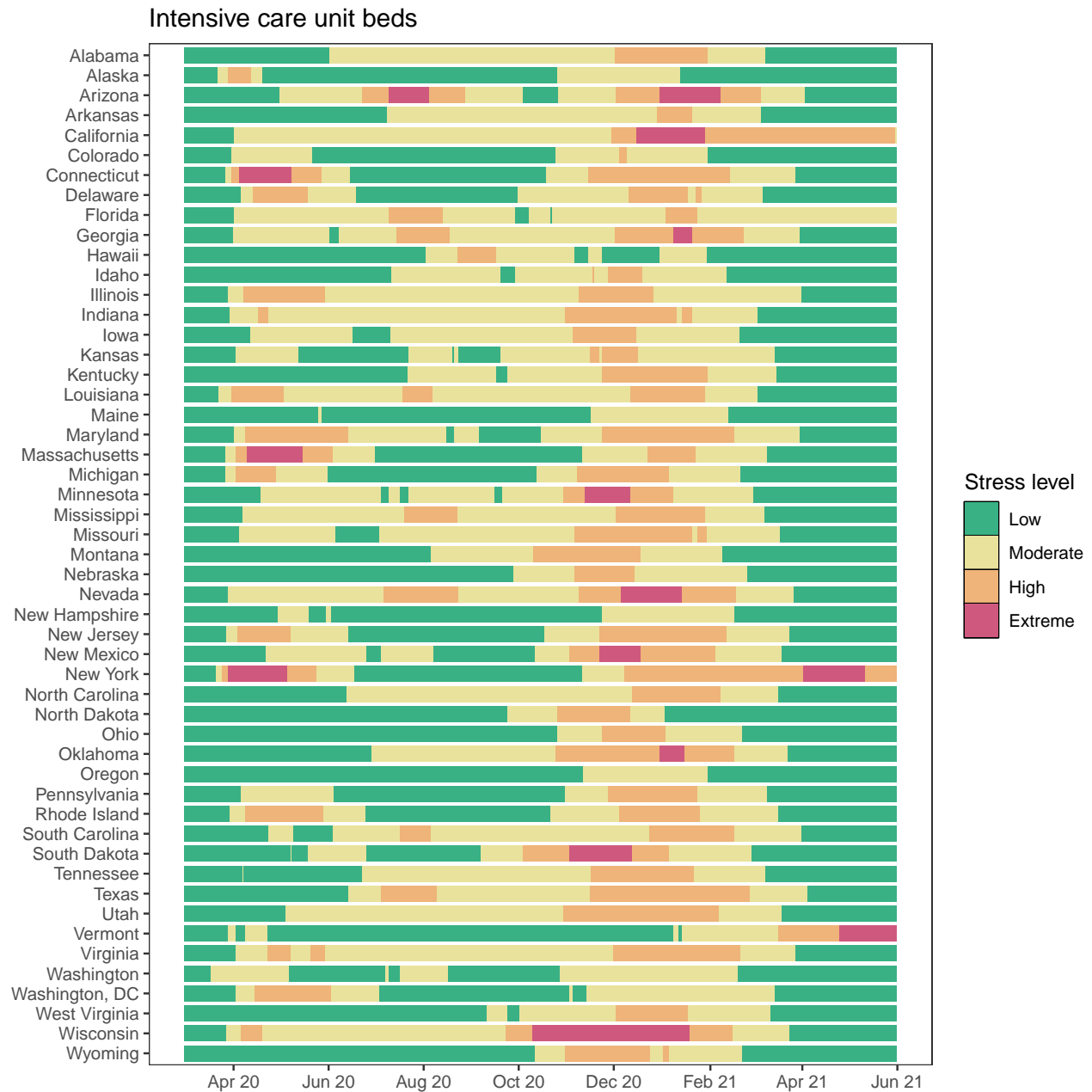


Figure 19. The estimated intensive care unit (ICU) usage is shown over time. The percent of ICU beds occupied by COVID-19 patients is color coded based on observed quantiles of the maximum proportion of ICU beds occupied by COVID-19 patients. Less than 10% is considered *low stress*, 10-29% is considered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



More information

Data sources:

Mask use data sources include 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.

Vaccine hesitancy data are from the COVID-19 Beliefs, Behaviors, and Norms Study, a survey conducted on Facebook by the Massachusetts Institute of Technology (<https://covidsurvey.mit.edu/>).

Data on vaccine candidates, stages of development, manufacturing capacity, and pre-purchasing agreements are primarily from Linksbridge and supplemented by Duke University.

A note of thanks:

We wish to warmly acknowledge the support of [these](#) and others who have made our covid-19 estimation efforts possible.

More information:

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>.