

COVID-19 Results Briefing

The United States of America

January 8, 2022

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 January 7, 2022, with data through January 3, 2022.

Two weeks' more data on Omicron since our last release confirm that Omicron has a much higher fraction of asymptomatic infections, a lower fraction of diagnosed cases requiring hospitalization, and a dramatically lower death rate among those who have been hospitalized compared to Delta. The extraordinarily rapid transmission and extremely high community prevalence of infection have also been well documented. Our models for the United States suggest that infections may be currently peaking at 6 million a day, with varied peaks by state. We expect more than 50% of the US population will be infected with Omicron in the next 6 weeks. The infection-detection rate (IDR) is declining, although shortages of testing may lead to more rapid decreases in the IDR than we currently model. Nevertheless, we expect reported cases to exceed 1 million a day, peak by the third week of January, and then decline sharply. Hospitalizations will increase to a peak that may be twice as high as last winter. These figures, however, include incidental admissions. Because the prevalence of Omicron infection is so high, many individuals hospitalized for other conditions will have asymptomatic infections. Incidental admissions may exceed 50% of total COVID-19 admissions in some states. Daily deaths will increase but remain below 2,000 a day, peaking by the end of the month. This means the peak of deaths will remain below the summer Delta surge and well below the peak last winter.

Our alternative policy scenarios, including more rapid scale-up of boosters to all who have been previously vaccinated, increasing mask use to 80%, and vaccinating the partially hesitant, have only a small impact on the trajectory over the next 4 months. The speed of the epidemic is so fast that policy interventions will have little impact. In previous waves, the control strategy has been to control infection and thus reduce hospitalization and death. Given that there is little prospect of controlling infection, strategies need to focus on reducing harm in the vulnerable and minimizing disruption. The number that will be admitted with COVID-19 to hospital is expected to increase substantially, but a substantial fraction of this increase is due to incidental COVID-19. HHS data on hospital occupancy do not yet show increases in occupancy, even in states such as Connecticut with early Omicron surges. But hospitals are clearly under stress due to health care workers who have tested positive and need to quarantine. Given the massive numbers of infections in the community, testing and quarantining asymptomatic individuals may not be helpful. There appears to be no prospect for controlling transmission and considerable prospect for disruption of schools and essential services due to screening. States may need to consider revisions to their testing and quarantine strategies.

Considerable uncertainty remains about the future course of the Omicron wave. First, the infection-detection rate may decline even more than we have estimated if testing capacity in states is overwhelmed. This would reduce the reported case rates below the 1.2 million that we have forecasted per day. Second, hospital admission screening will substantially impact the reported COVID-19 admissions. If some hospitals run out of testing capacity and do not screen all admissions, then the incidental COVID-19 admission rate may also decline. Third, a critical factor in understanding the trajectory of Omicron is the fraction of infections that are asymptomatic. Based on data from South Africa and the UK, we currently estimate this to be 80%–90%. Increases or decreases in this fraction asymptomatic have an important impact on the trajectory and severity of the Omicron wave.

For individuals at risk of bad outcomes, particularly the unvaccinated and never infected, the strategies to reduce risk remain: vaccination, including a third dose where appropriate, high-quality mask use, and avoiding crowded indoor settings.

Current situation

- Daily infections in the last week increased to 5.7 million per day on average compared to 4.0 million the week before (Figure 1.1).
- Daily hospital census in the last week (through January 3) increased to 99,600 per day on average compared to 76,800 the week before.
- Daily reported cases in the last week increased to 477,600 per day on average compared to 238,700 the week before (Figure 2.1).
- Reported deaths due to COVID-19 in the last week stayed level at 1,200 per day on average compared to 1,200 the week before (Figure 3.1).
- Total deaths due to COVID-19 in the last week stayed level at 1,400 per day on average compared to 1,400 the week before (Figure 3.1). This makes COVID-19 the number 2 cause of death in the US this week (Table 1). Estimated total daily deaths due to COVID-19 in the past week were 1.2 times larger than the reported number of deaths.
- The daily rate of reported deaths due to COVID-19 is greater than 4 per million in 23 states (Figure 4.1).
- The daily rate of total COVID-19 deaths is greater than 4 per million in 27 states (Figure 4.2).
- We estimate that 57% of people in the US have been infected at least once as of January 3 (Figure 6.1).
- Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in all states (Figure 7.1).
- The infection-detection rate in the US had declined to 22% on January 3 (Figure 8.1).

- Based on the GISAID and various national databases, combined with our variant spread model, we estimate the current prevalence of variants of concern (Figures 9.1–9.5). Omicron is now the dominant variant in all states.

Trends in drivers of transmission

- Eight states have mask mandates (Table 2). Four states have some form of gathering restrictions.
- Mobility last week was 7% lower than the pre-COVID-19 baseline (Figure 11.1). Mobility was lower than 30% of baseline in no locations.
- As of January 3, in the COVID-19 Trends and Impact Survey, 39% of people self-report that they always wore a mask when leaving their home (Figure 13.1). Mask use is over 50% on the West Coast and in New Mexico, Illinois, New York, Vermont, and Hawaii.
- There were 460 diagnostic tests per 100,000 people on January 3 (Figure 15.1).
- As of January 3, 74% of people in the US have received at least one vaccine dose and 62% are fully vaccinated. 24 states have reached 70% or more of the population who have received at least one vaccine dose and 11 states have reached 70% or more of the population who are fully vaccinated (Figure 17.1).
- In the US, 85% of the population that is 12 years and older say they would accept or would probably accept a vaccine for COVID-19. Note that vaccine acceptance is calculated using survey data from the 18+ population. This is up by 1.3 percentage points from last week. (Figure 19.1).
- In our current reference scenario, we expect that 243 million people will be vaccinated with at least one dose by May 1 (Figure 20.1). We expect that 70% of the population will be fully vaccinated by May 1.

Projections

Infections

- Daily estimated infections in the **reference scenario**, which represents what we think is most likely to happen, will rise to 6.2 million by January 6, 2022 (Figure 21.1).
- Daily estimated infections in the **high severity of Omicron scenario** will rise to 5.7 million by January 10, 2022 (Figure 21.1).
- Daily estimated infections in the **80% mask coverage scenario** reach a peak of 5.8 million in early January (Figure 21.1).
- Daily estimated infections in the **third dose scenario** will rise to 6.2 million by January 6, 2022 (Figure 21.1).
- Daily estimated infections in the **reduced vaccine hesitancy scenario** will rise to 6.2 million by January 6, 2022 (Figure 21.1).

Cases

- Daily cases in the **reference scenario** will rise to nearly 1.2 million by January 19, 2022 (Figure 21.2).
- Daily cases in the **high severity of Omicron scenario** will rise to 1.1 million by January 21, 2022 (Figure 21.2).
- Daily cases in the **80% mask coverage scenario** will rise to 1.1 million by January 16, 2022 (Figure 21.2).
- Daily cases in the **third dose scenario** will rise to nearly 1.2 million by January 19, 2022 (Figure 21.2).
- Daily cases in the **reduced vaccine hesitancy scenario** will rise to nearly 1.2 million by January 19, 2022 (Figure 21.2).

Hospitalizations

- Daily hospital census in the **reference scenario**, including incidental admissions with COVID-19, will rise to 273,000 by January 25, 2022 (Figure 21.3).
- Daily hospital census in the **high severity of Omicron scenario** will rise to 441,000 by February 1, 2022 (Figure 21.3).
- Daily hospital census in the **80% mask coverage scenario** will rise to 251,000 by January 21, 2022 (Figure 21.3).
- Daily hospital census in the **third dose scenario** will rise to 273,000 by January 25, 2022 (Figure 21.3).
- Daily hospital census in the **reduced vaccine hesitancy scenario** will rise to 272,000 by January 26, 2022 (Figure 21.3).

Deaths

- In our **reference scenario**, our model projects 905,000 cumulative reported deaths due to COVID-19 on May 1. This represents 79,000 additional deaths from January 3 to May 1. Daily reported COVID-19 deaths in the **reference scenario** will rise to 1,930 by January 24, 2022 (Figure 21.4).
- Under our **reference scenario**, our model projects 1,051,000 cumulative total deaths due to COVID-19 on May 1. This represents 92,000 additional deaths from January 3 to May 1 (Figure 24.2).
- In our **high severity of Omicron scenario**, our model projects 925,000 cumulative reported deaths due to COVID-19 on May 1. This represents 98,000 additional deaths from January 3 to May 1. Daily reported COVID-19 deaths in the **high severity of Omicron scenario** will rise to 2,080 by January 28, 2022 (Figure 21.4).

- In our **80% mask coverage scenario**, our model projects 898,000 cumulative reported deaths due to COVID-19 on May 1. This represents 72,000 additional deaths from January 3 to May 1. Daily reported COVID-19 deaths in the **80% mask coverage scenario** will rise to 1,930 by January 24, 2022 (Figure 21.4).
- In our **third dose scenario**, our model projects 905,000 cumulative reported deaths due to COVID-19 on May 1. This represents 78,000 additional deaths from January 3 to May 1. Daily reported COVID-19 deaths in the **third dose scenario** will rise to 1,930 by January 24, 2022 (Figure 21.4).
- In our **reduced vaccine hesitancy scenario**, our model projects 905,000 cumulative reported deaths due to COVID-19 on May 1. This represents 78,000 additional deaths from January 3 to May 1. Daily reported COVID-19 deaths in the **reduced vaccine hesitancy scenario** will rise to 1,910 by January 24, 2022 (Figure 21.4).
- Figure 22.1 compares our reference scenario forecasts to other publicly archived models. The USC model suggests over 7,000 a day by late February. The MIT Delphi model suggests daily deaths will steadily decline.
- At some point from January through May 1, 51 states will have high or extreme stress on hospital beds (Figure 23.1). At some point from January through May 1, 50 states will have high or extreme stress on intensive care unit (ICU) capacity (Figure 24.1).

Model updates

In this week's update, we have made changes to key Omicron parameters based on data from South Africa, the United Kingdom, and the US. First, based on an analysis of the UK Office of National Statistics prevalence of infection surveys, we have revised the range of asymptomatic infection from 90% to 80%–90%. Second, the degree of transmissibility of Omicron compared to ancestral variants was increased from 1.5–2.5 to 2–3. This adjustment was based on matching the scale-up curves for Omicron from the analysis of the GISAID database. Third, the infection-hospitalization rate for Omicron relative to Delta has been increased from a mean of 0.07 to a mean of 0.125 (range 0.0625–0.1875) based on data from the UK, US, and South Africa. Fourth, the infection-hospitalization rate has been decreased from a mean of 0.02 to 0.01875 (range 0.009375–0.028125) based on published studies of the hospital-fatality rate, the case-hospitalization rate, and the fraction asymptomatic. Fifth, based on the timing of Omicron surges, we have adjusted the date of Omicron arrival for a number of countries to match the timing of increases in reported cases, taking into account the lag from introduction to the exponential rise in reported cases. Sixth, in the high-severity scenario, we have used IFR and IHR values that are double the ranges used in the reference scenario.

Figure 1.1. Daily COVID-19 hospital census and estimated infections

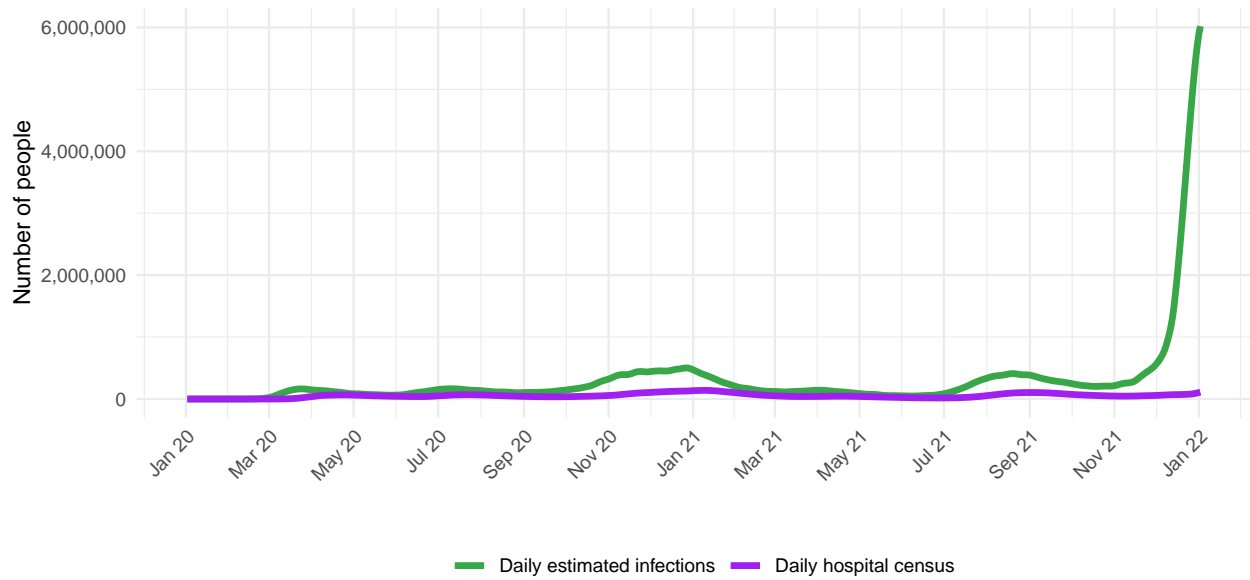


Figure 2.1. Reported daily COVID-19 cases, moving average

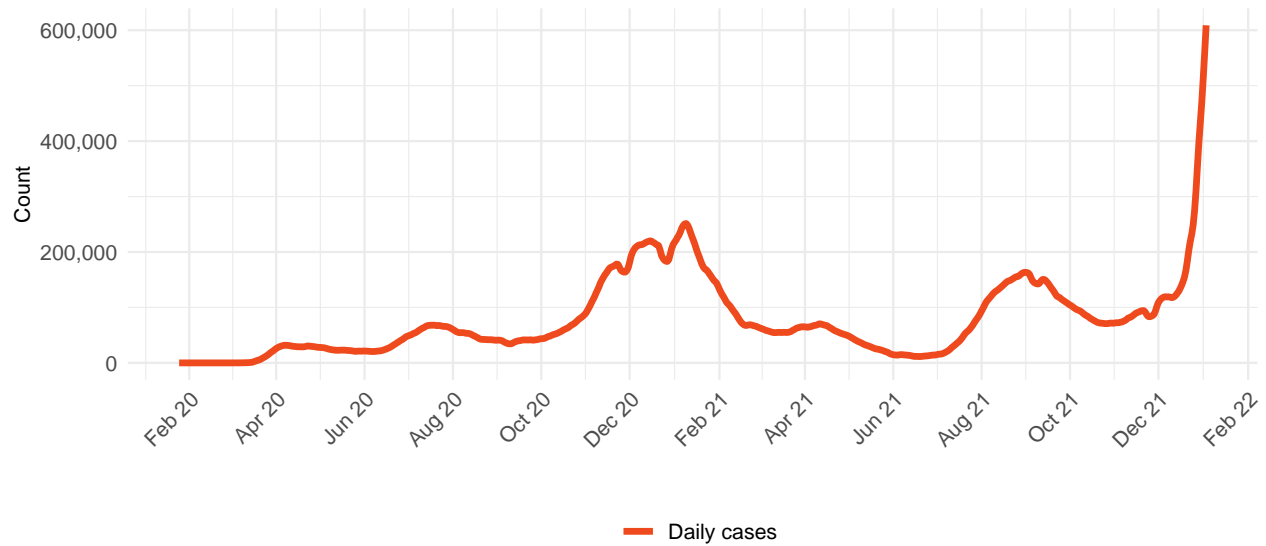
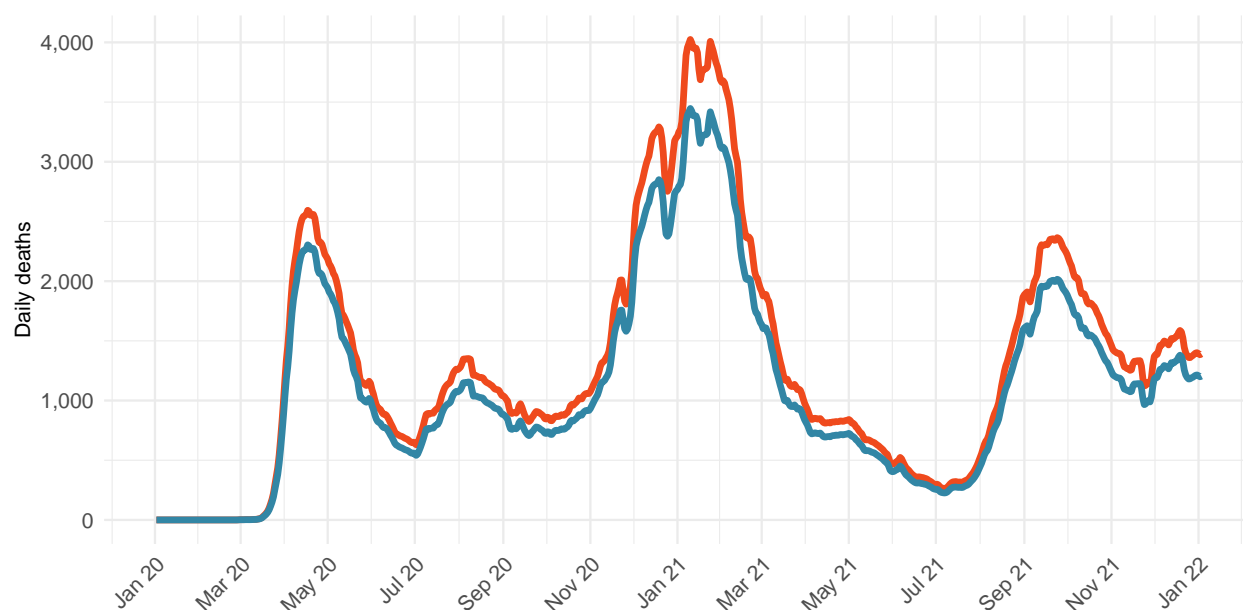


Table 1. Ranking of total deaths due to COVID-19 among the leading causes of mortality this week, assuming uniform deaths of non-COVID causes throughout the year

Cause name	Weekly deaths	Ranking
Ischemic heart disease	10,724	1
COVID-19	9,731	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 3.1. Smoothed trend estimate of reported daily COVID-19 deaths (blue) and total daily deaths due to COVID-19 (orange)



Daily COVID-19 death rate per 1 million on January 3, 2022

Figure 4.1 Daily reported COVID-19 death rate per 1 million

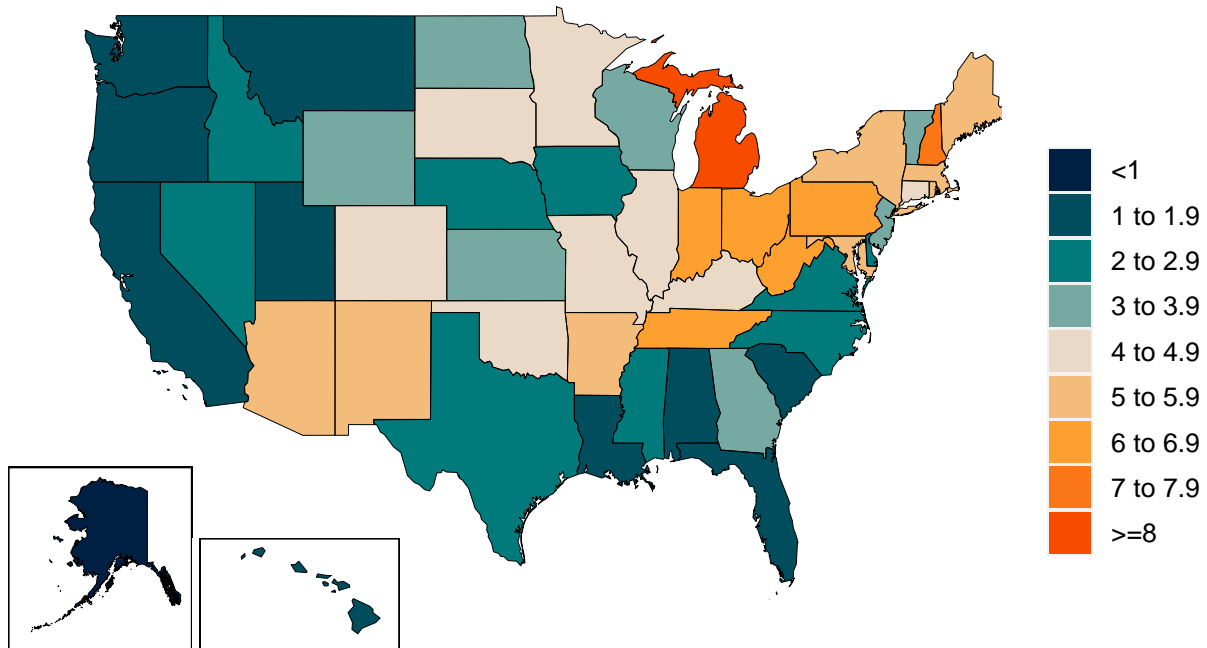
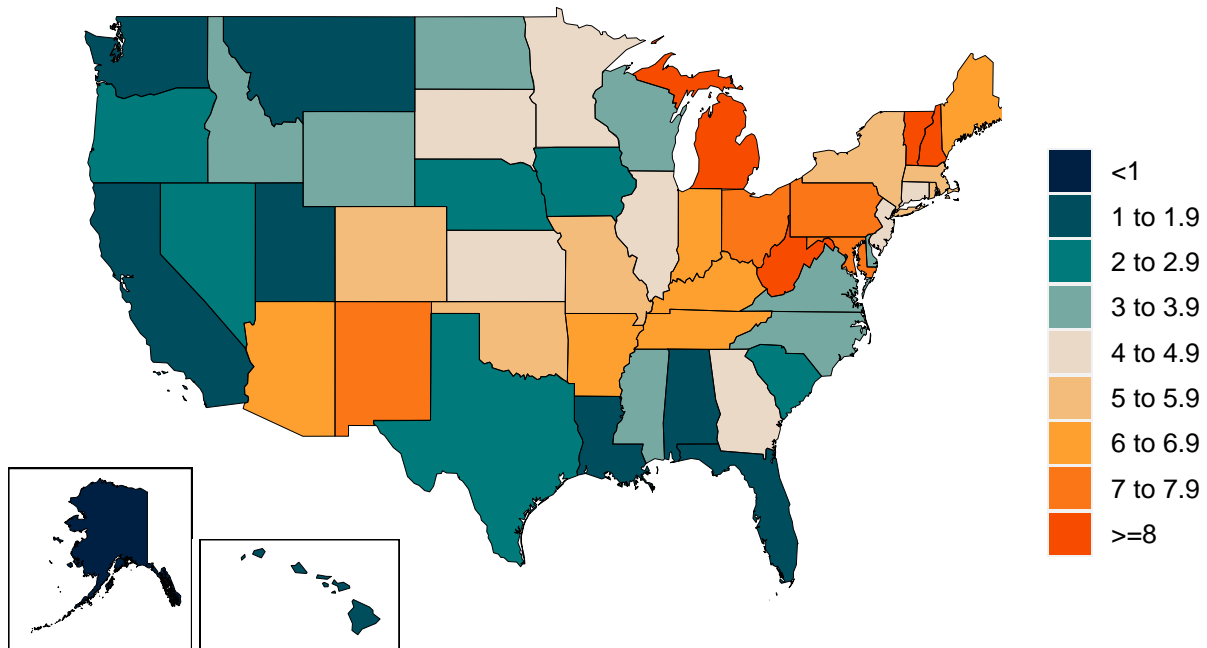


Figure 4.2 Daily total COVID-19 death rate per 1 million



Cumulative COVID-19 deaths per 100,000 on January 3, 2022

Figure 5.1 Reported cumulative COVID-19 deaths per 100,000

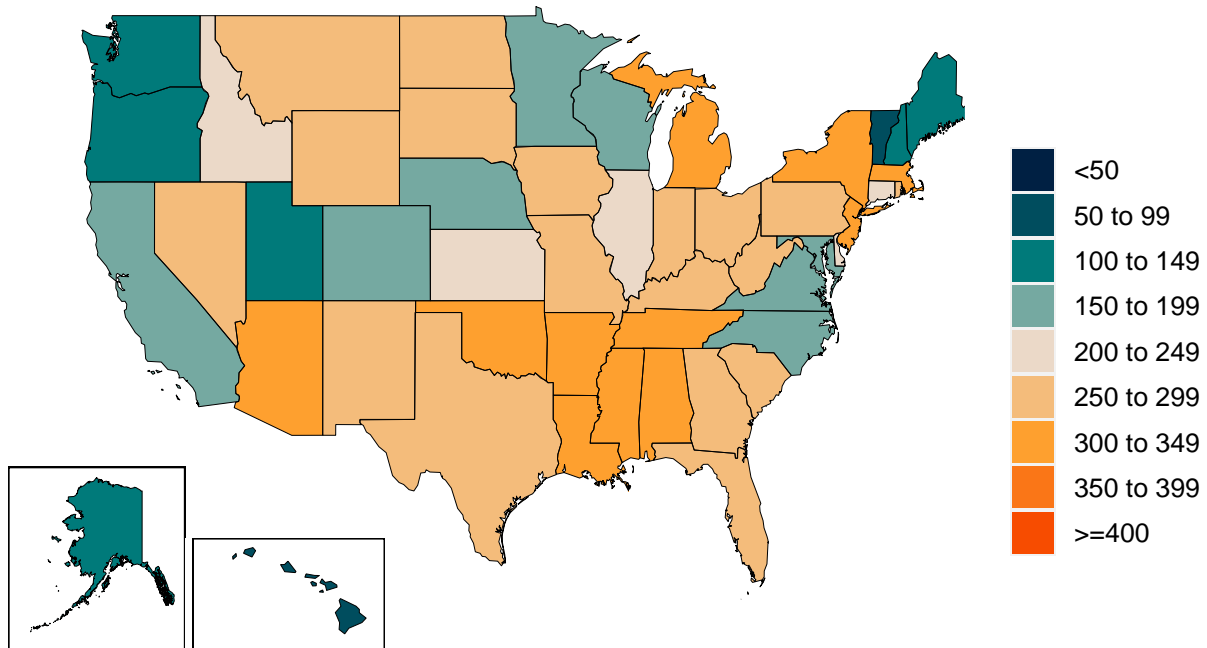


Figure 5.2 Total cumulative COVID-19 deaths per 100,000

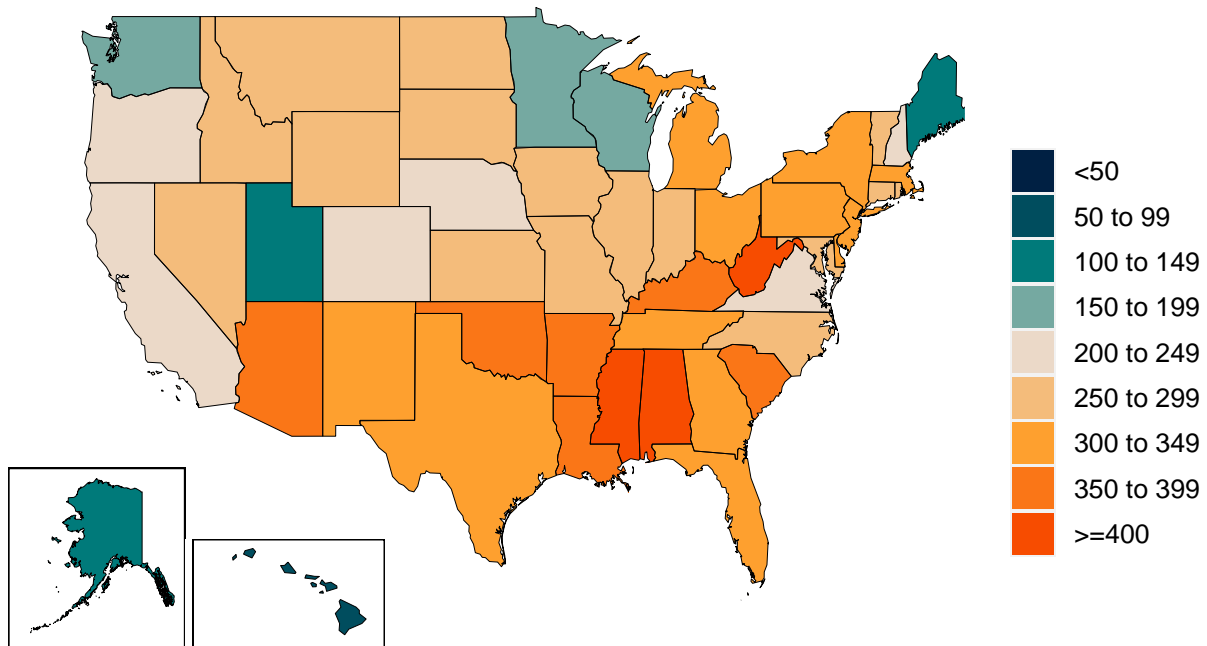


Figure 6.1. Estimated percent of the population infected with COVID-19 on January 3, 2022

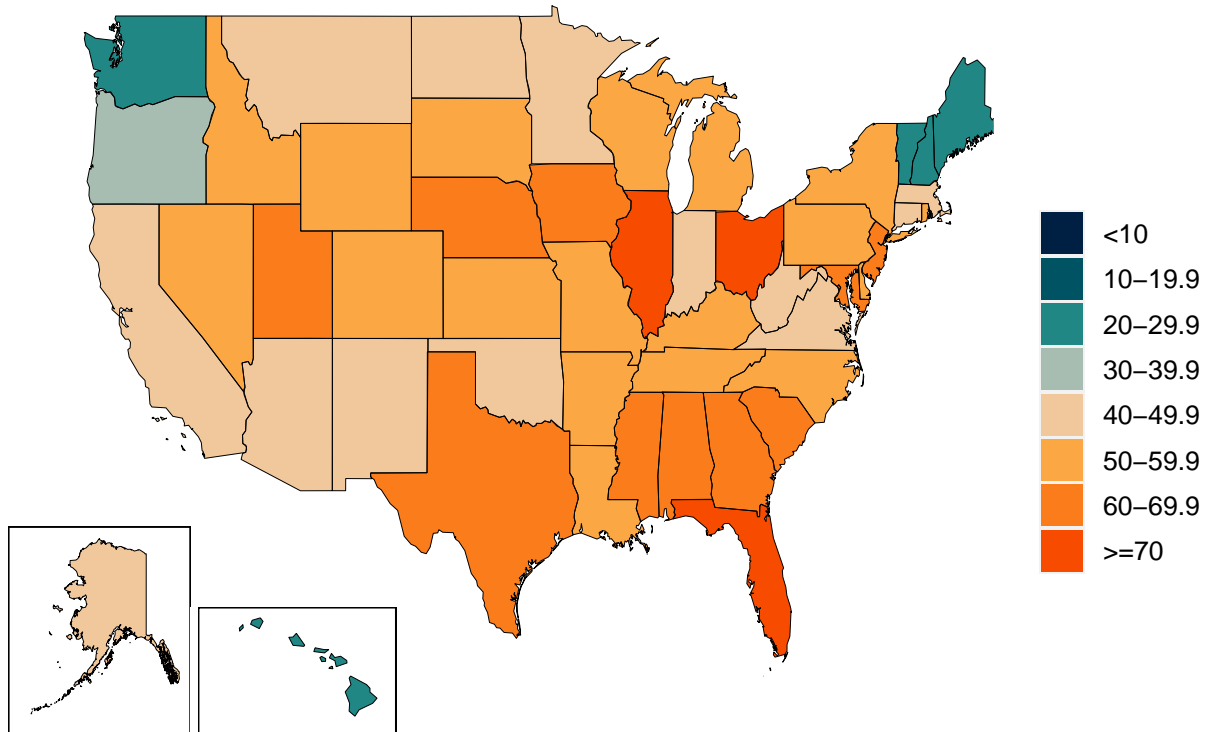


Figure 7.1. Mean effective R on December 23, 2021. Effective R less than 1 means that transmission should decline, all other things being held the same. The estimate of effective R is based on the combined analysis of deaths, case reporting, and hospitalizations where available. Current reported cases reflect infections 11–13 days prior, so estimates of effective R can only be made for the recent past.

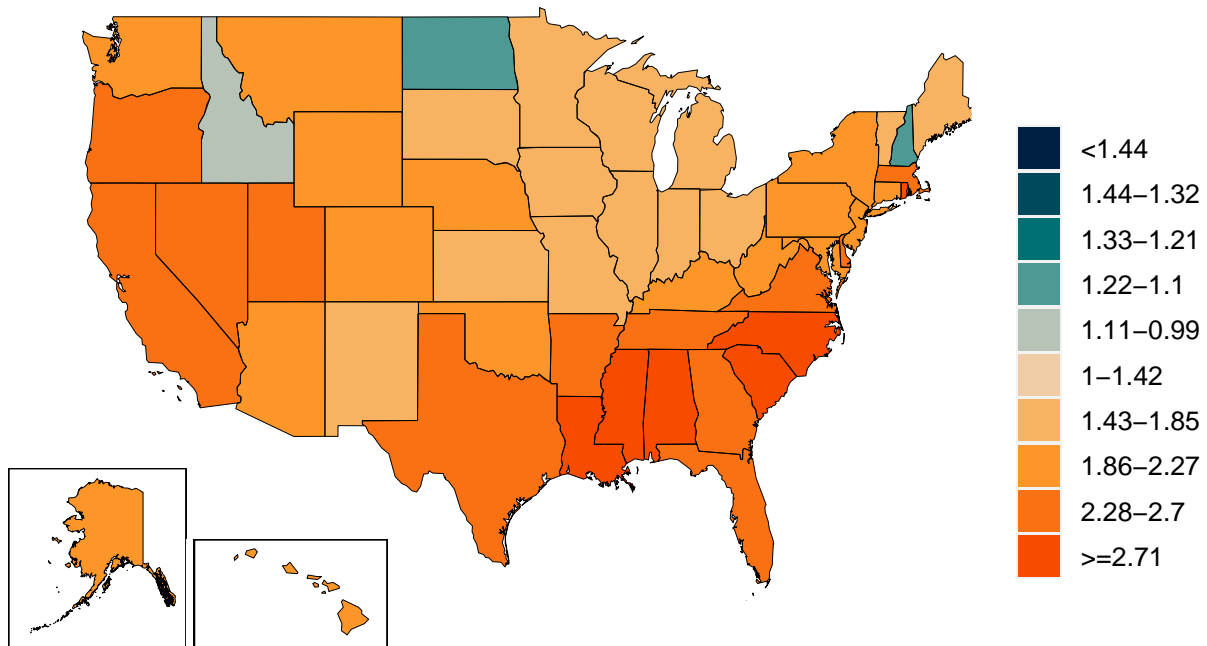
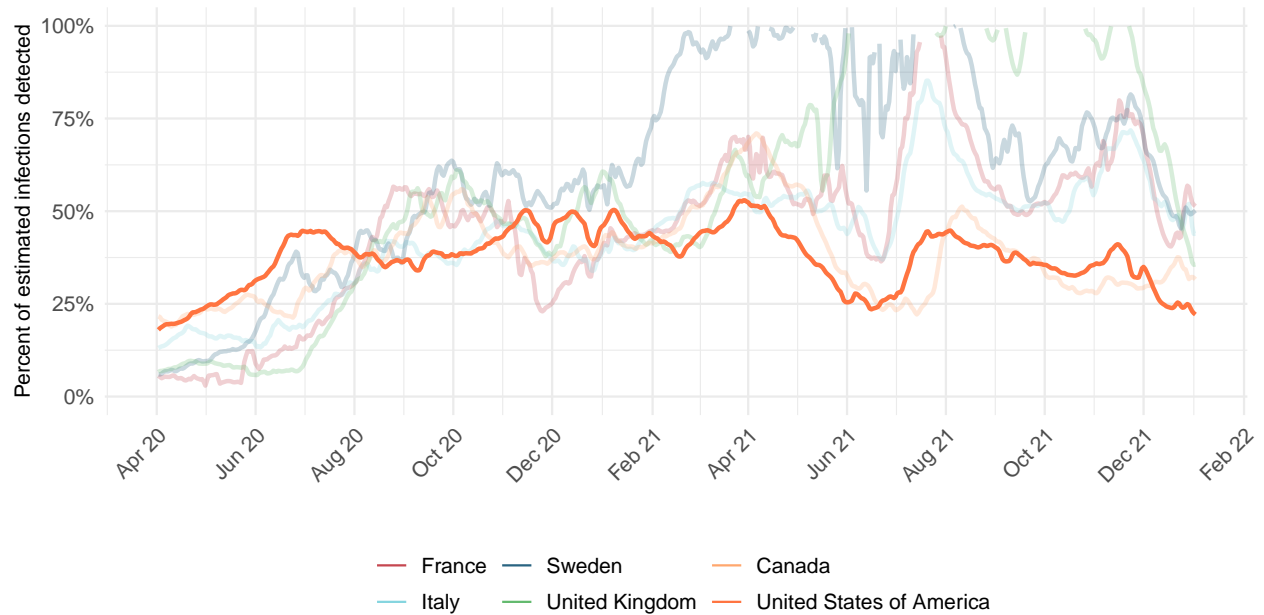


Figure 8.1. Percent of estimated COVID-19 infections detected. This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model. Due to measurement errors in cases and testing rates, the infection-detection rate can exceed 100% at particular points in time.



Estimated percent of circulating SARS-CoV-2 for primary variant families on January 3, 2022

Figure 9.1 Estimated percent of new infections that are Alpha variant

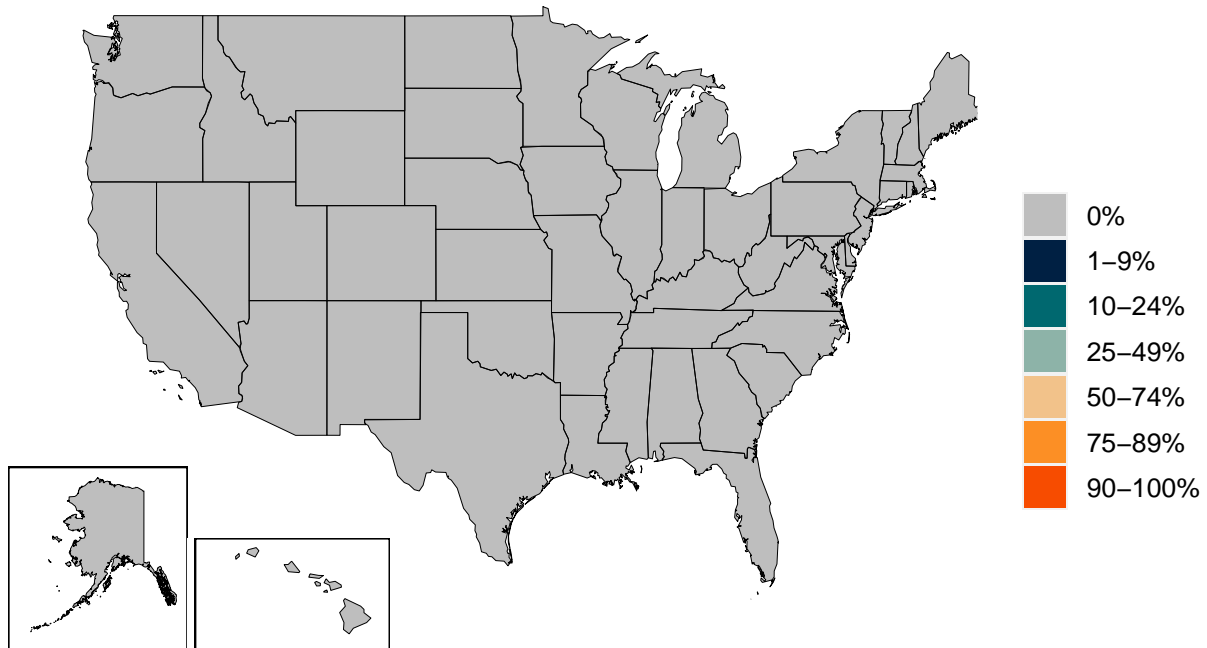


Figure 9.2 Estimated percent of new infections that are Beta variant

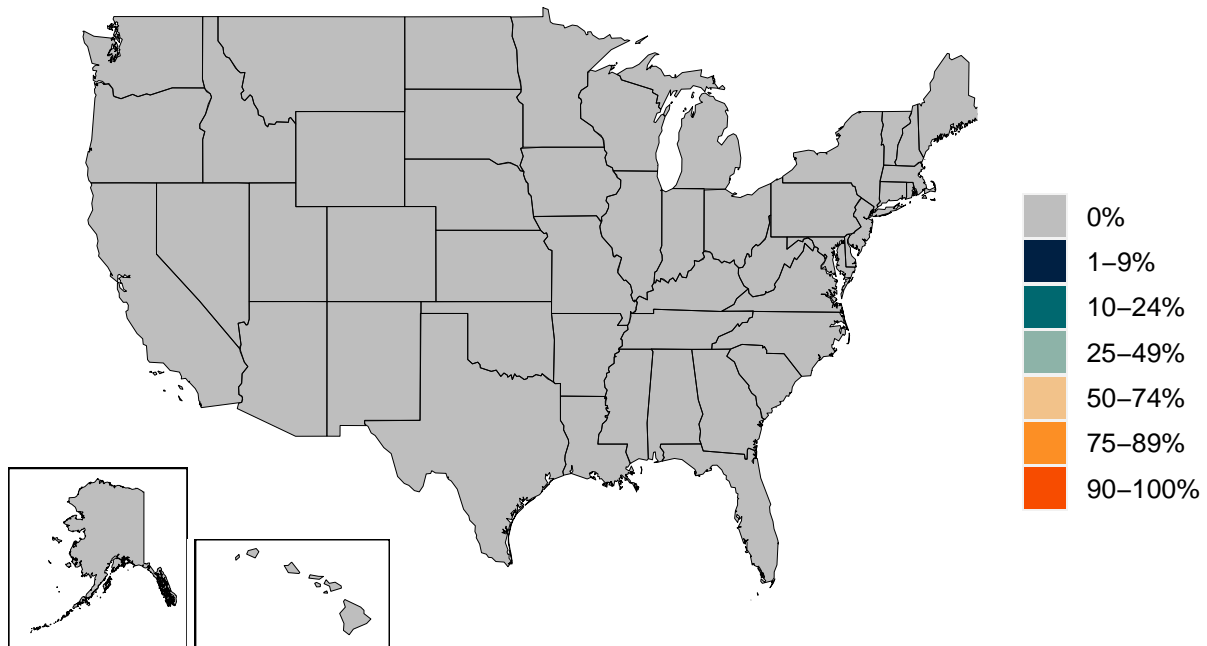


Figure 9.3 Estimated percent of new infections that are Delta variant

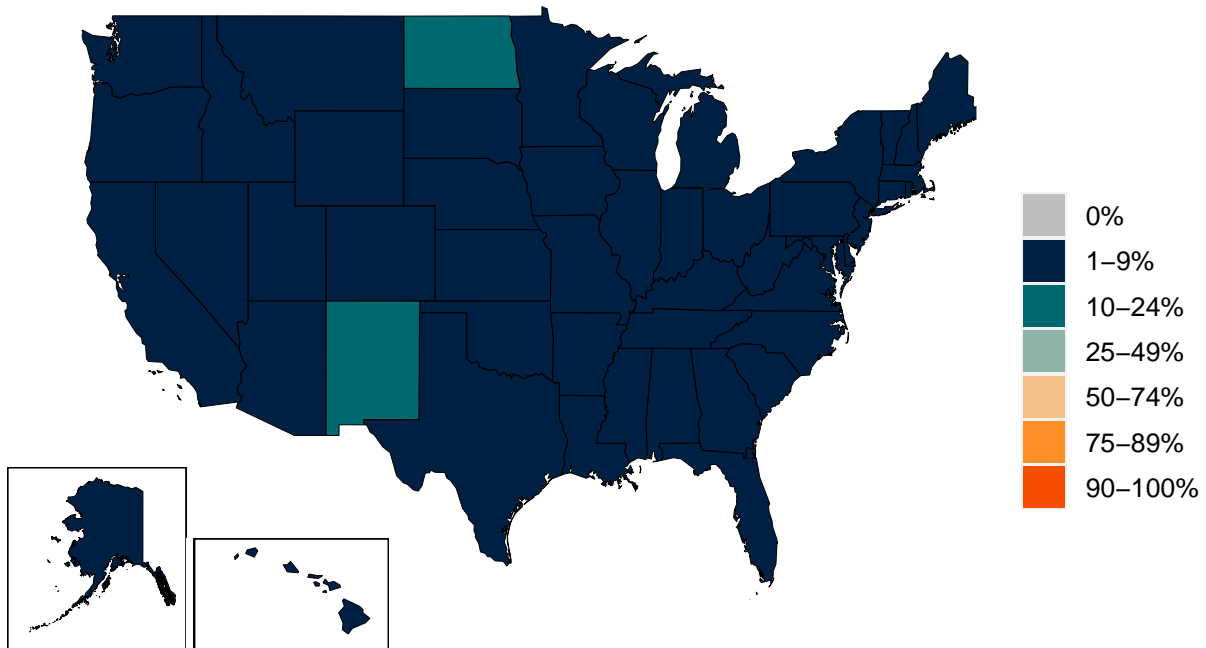


Figure 9.4 Estimated percent of new infections that are Gamma variant

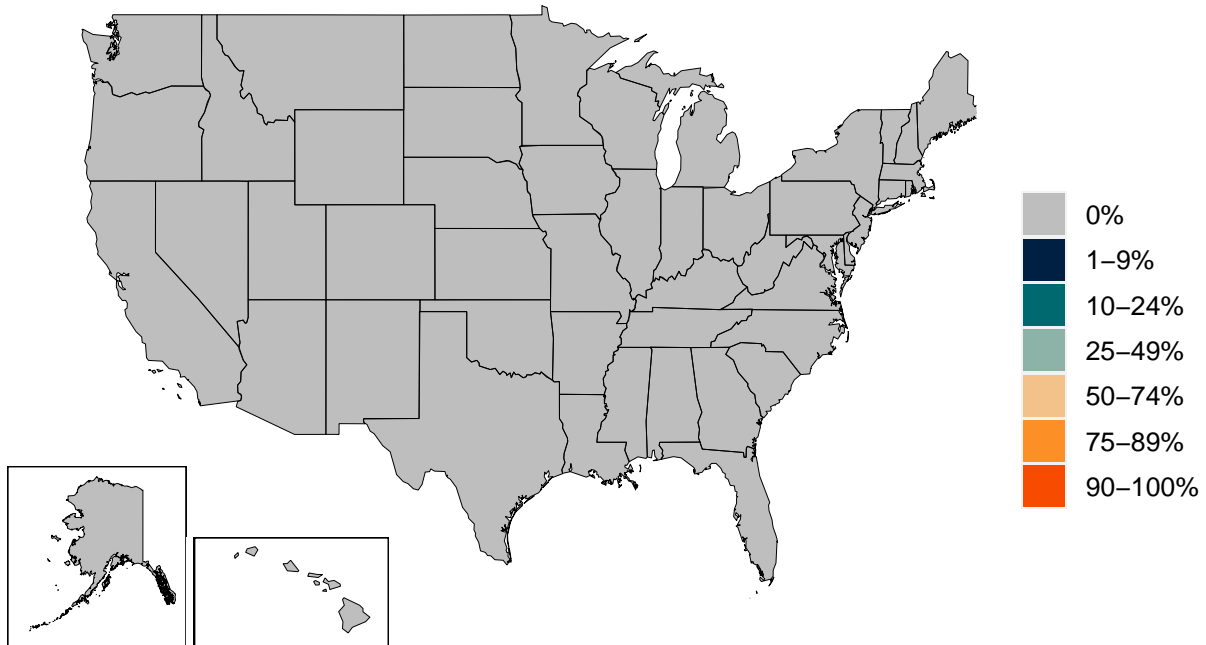


Figure 9.5 Estimated percent of new infections that are Omicron variant

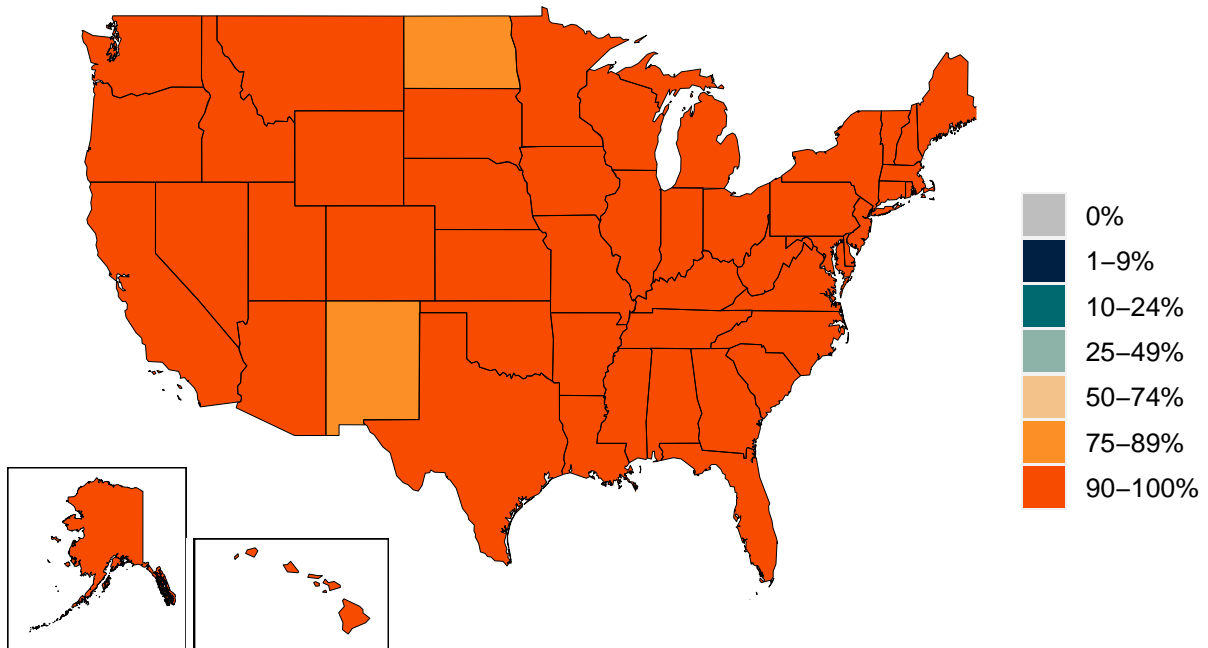


Figure 10.1. Infection-fatality rate on January 3, 2022. This is estimated as the ratio of COVID-19 deaths to estimated daily COVID-19 infections.

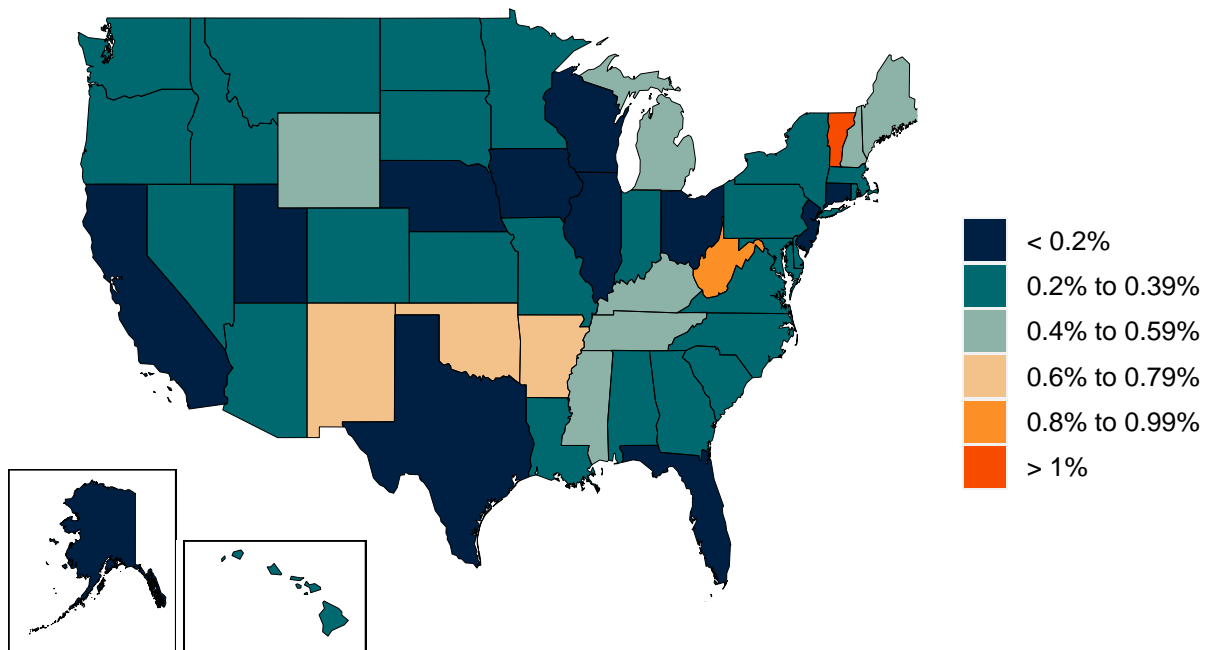


Table 2. Current mandate implementation

Figure 11.1. Trend in mobility as measured through smartphone app use, compared to January 2020 baseline

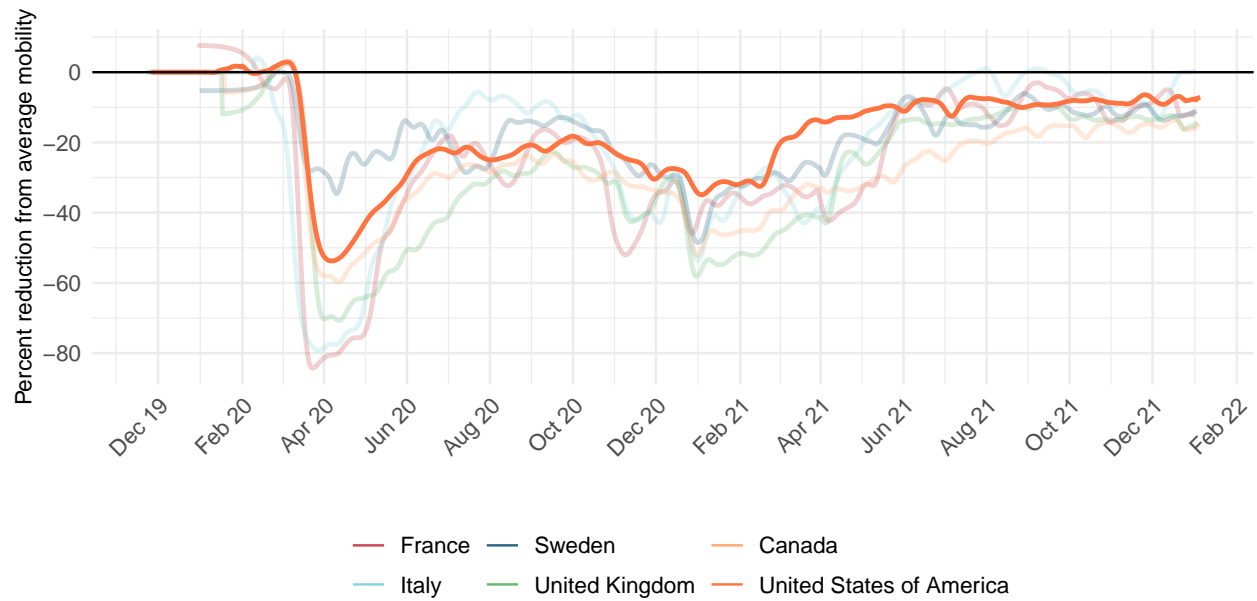


Figure 12.1. Mobility level as measured through smartphone app use, compared to January 2020 baseline (percent) on January 3, 2022

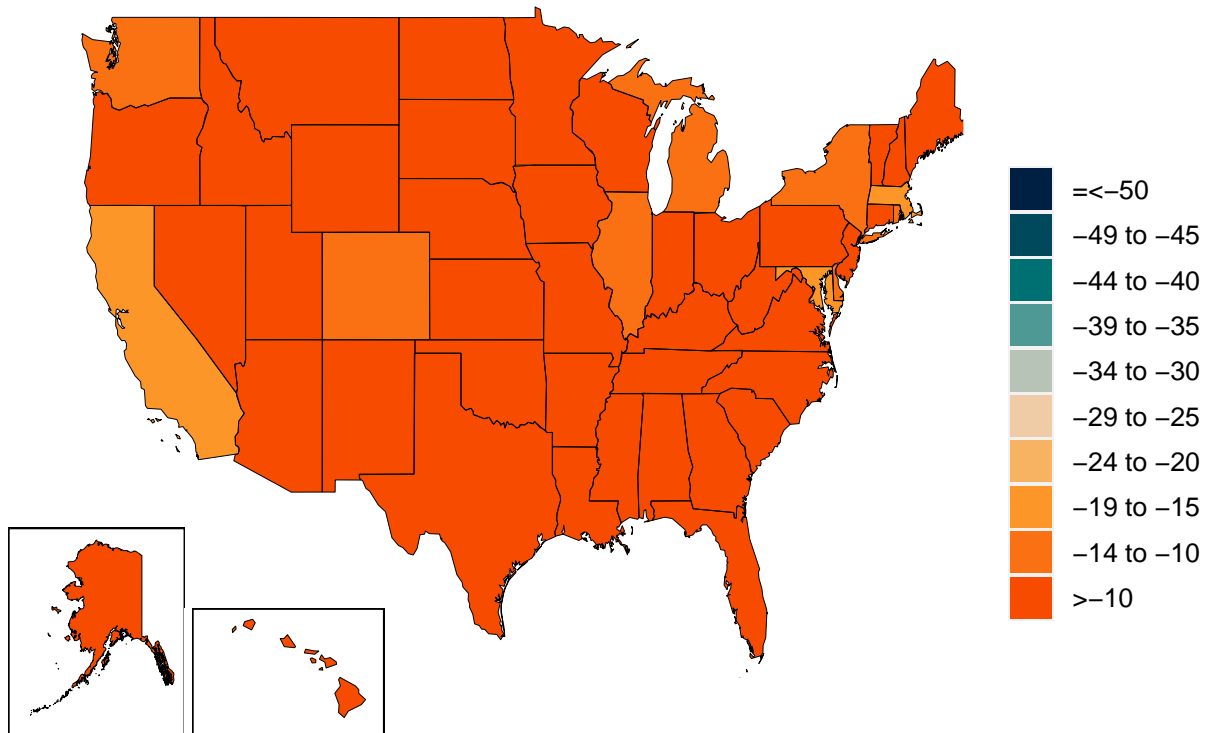


Figure 13.1. Trend in the proportion of the population reporting always wearing a mask when leaving home

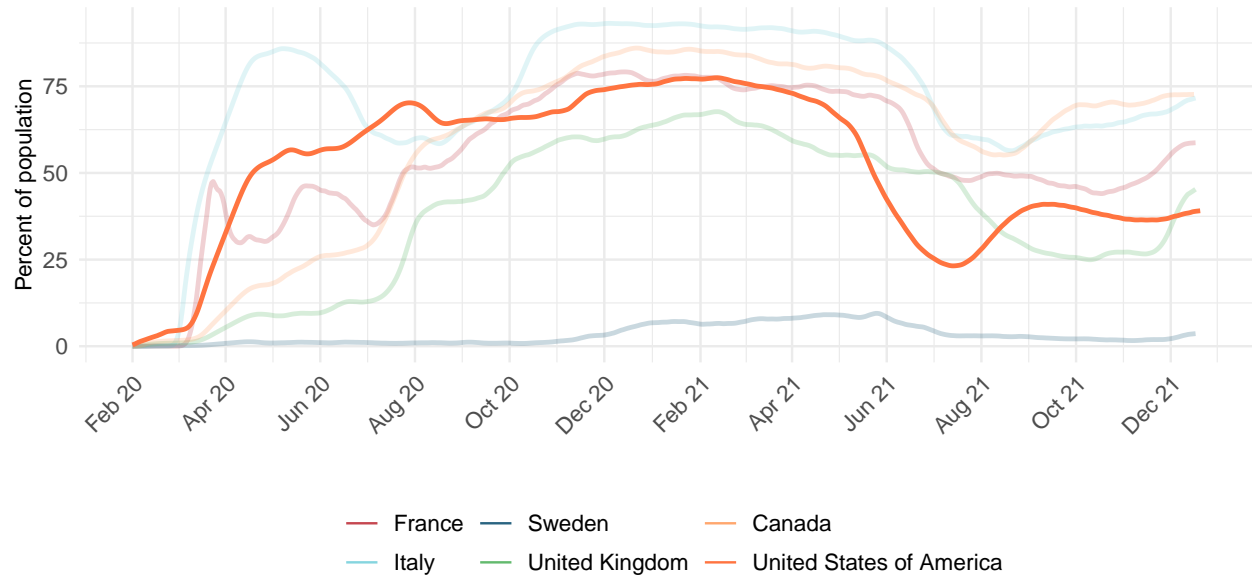


Figure 14.1. Proportion of the population reporting always wearing a mask when leaving home on January 3, 2022

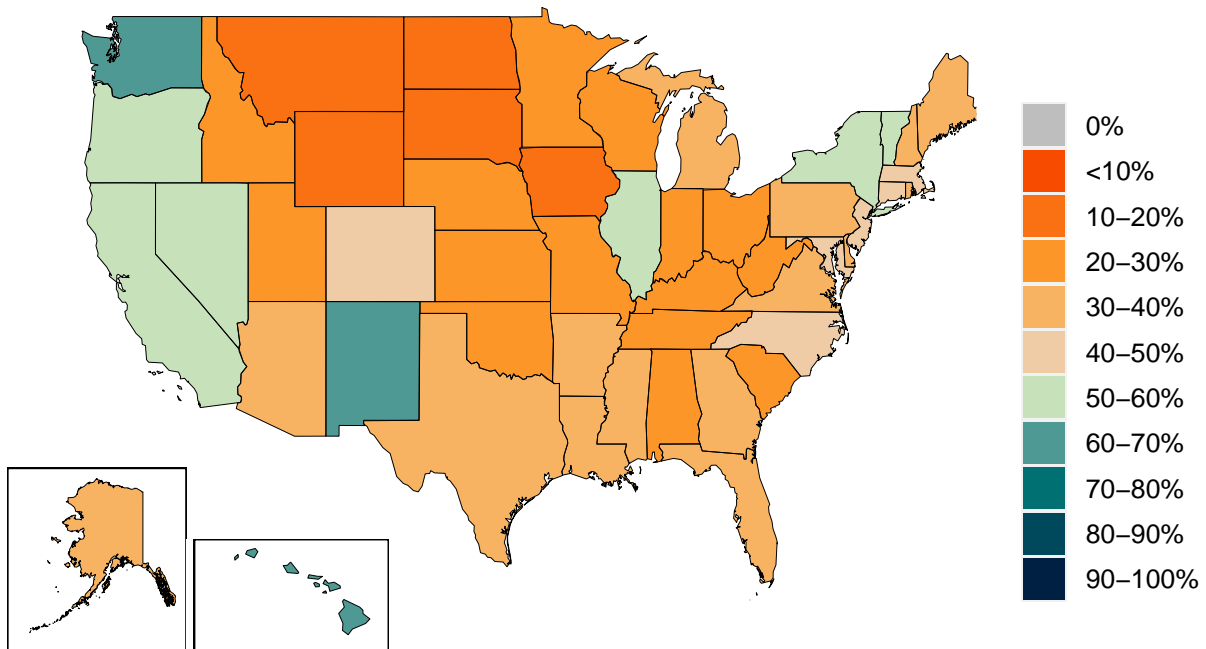


Figure 15.1. Trend in COVID-19 diagnostic tests per 100,000 people

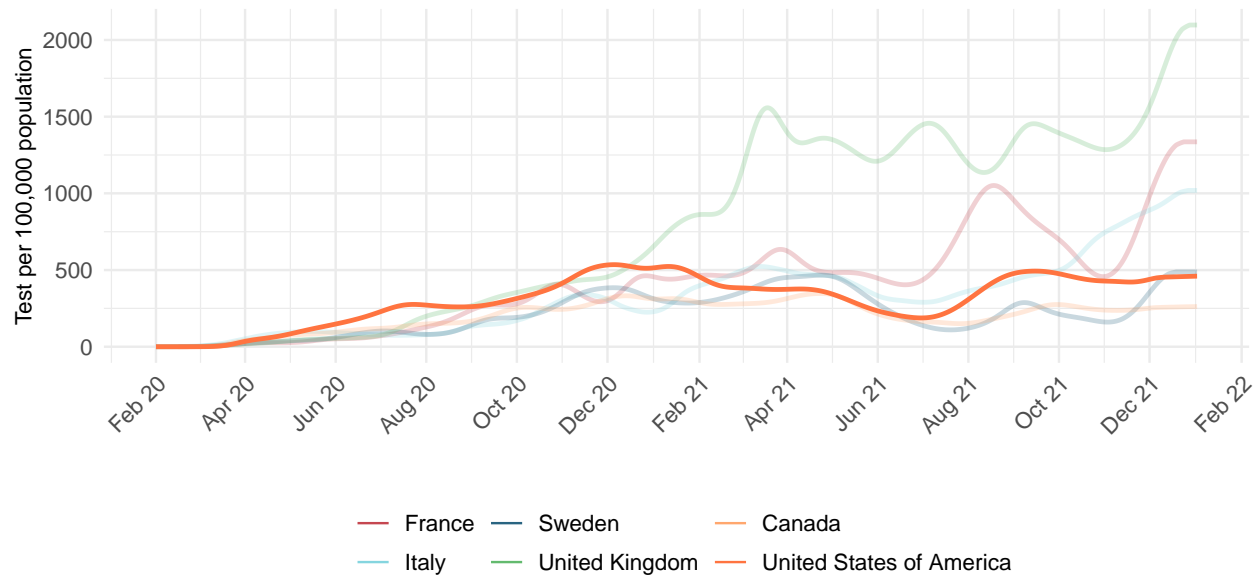


Figure 16.1. COVID-19 diagnostic tests per 100,000 people on January 3, 2022

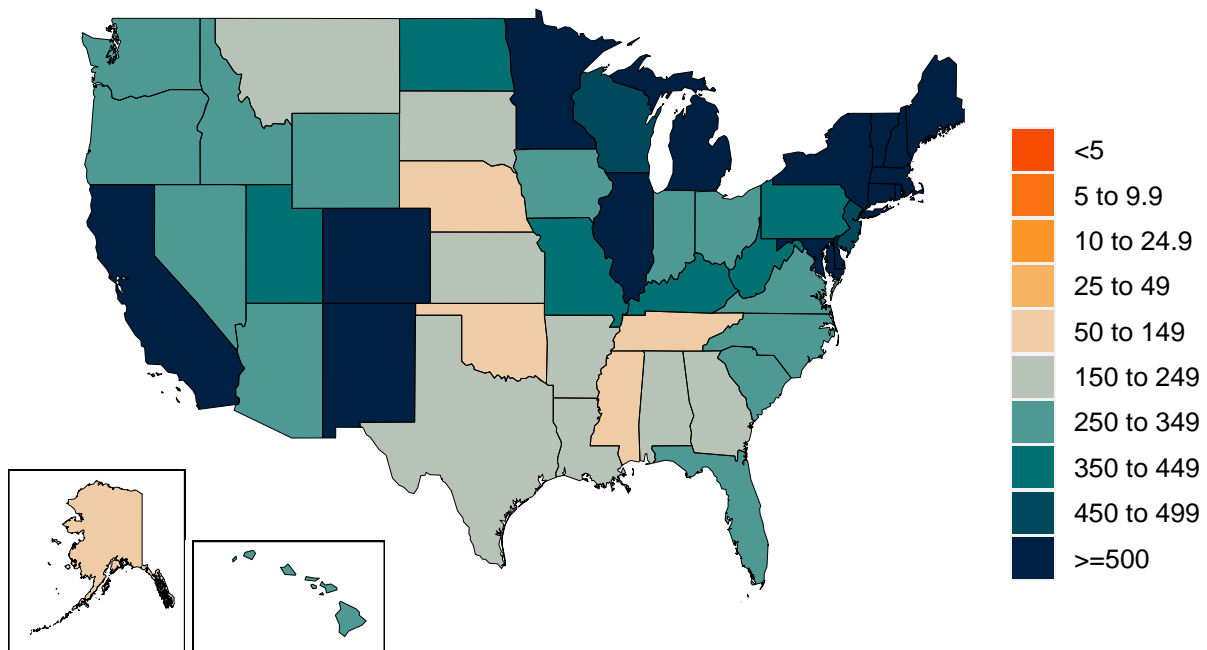


Table 3. Estimates of vaccine effectiveness for specific vaccines used in the model at preventing severe disease and infection. We use data from clinical trials directly, where available, and make estimates otherwise. More information can be found on our [website](#).

Vaccine	Effectiveness at preventing											
	Ancestral		Alpha		Beta		Gamma		Delta		Omicron	
	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection
AstraZeneca	94%	63%	94%	63%	94%	69%	94%	69%	94%	69%	71%	36%
CanSino	66%	62%	66%	62%	64%	61%	64%	61%	64%	61%	48%	32%
CoronaVac	50%	47%	50%	47%	49%	46%	49%	46%	49%	46%	37%	24%
Covaxin	78%	73%	78%	73%	76%	72%	76%	72%	76%	72%	57%	38%
Johnson & Johnson	86%	72%	86%	72%	76%	64%	76%	64%	76%	64%	57%	33%
Moderna	97%	92%	97%	92%	97%	91%	97%	91%	97%	91%	73%	48%
Novavax	89%	83%	89%	83%	86%	82%	86%	82%	86%	82%	65%	43%
Pfizer/BioNTech	95%	86%	95%	86%	95%	84%	95%	84%	95%	84%	72%	44%
Sinopharm	73%	68%	73%	68%	71%	67%	71%	67%	71%	67%	53%	35%
Sputnik-V	92%	86%	92%	86%	89%	85%	89%	85%	89%	85%	67%	44%
Other vaccines	75%	70%	75%	70%	73%	69%	73%	69%	73%	69%	55%	36%
Other vaccines (mRNA)	91%	86%	91%	86%	88%	85%	88%	85%	88%	85%	67%	45%

Percent of the population having received at least one dose (17.1) and fully vaccinated against SARS-CoV-2 (17.2) by January 3, 2022

Figure 17.1 Percent of the population having received one dose of a COVID-19 vaccine

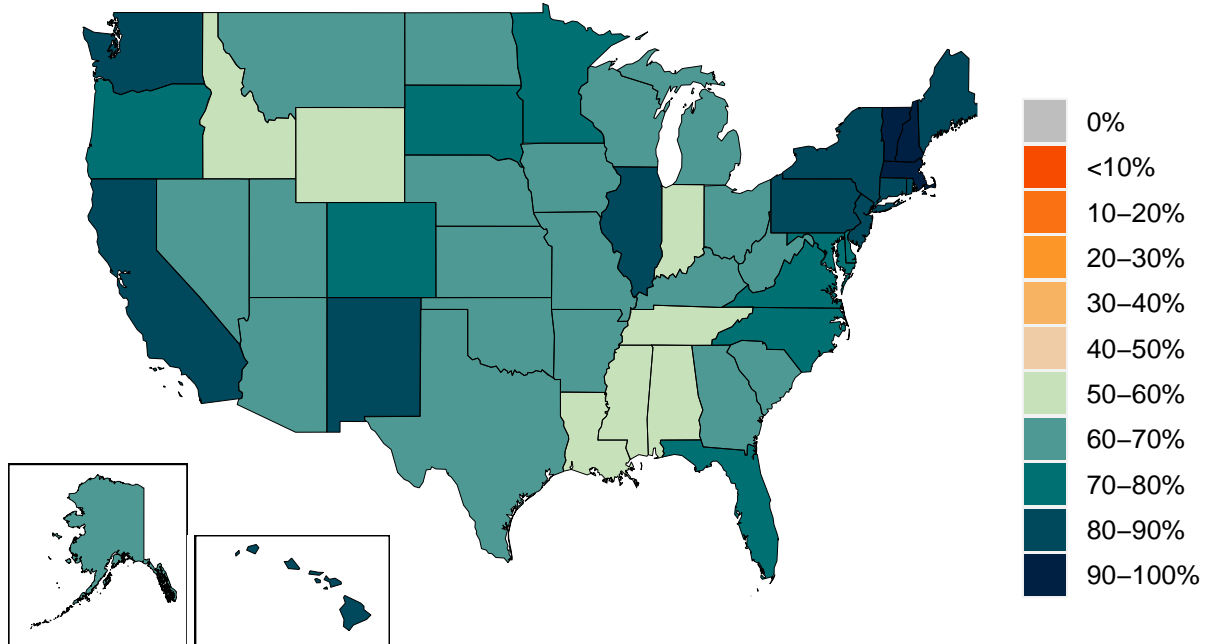


Figure 17.2 Percent of the population fully vaccinated against SARS-CoV-2

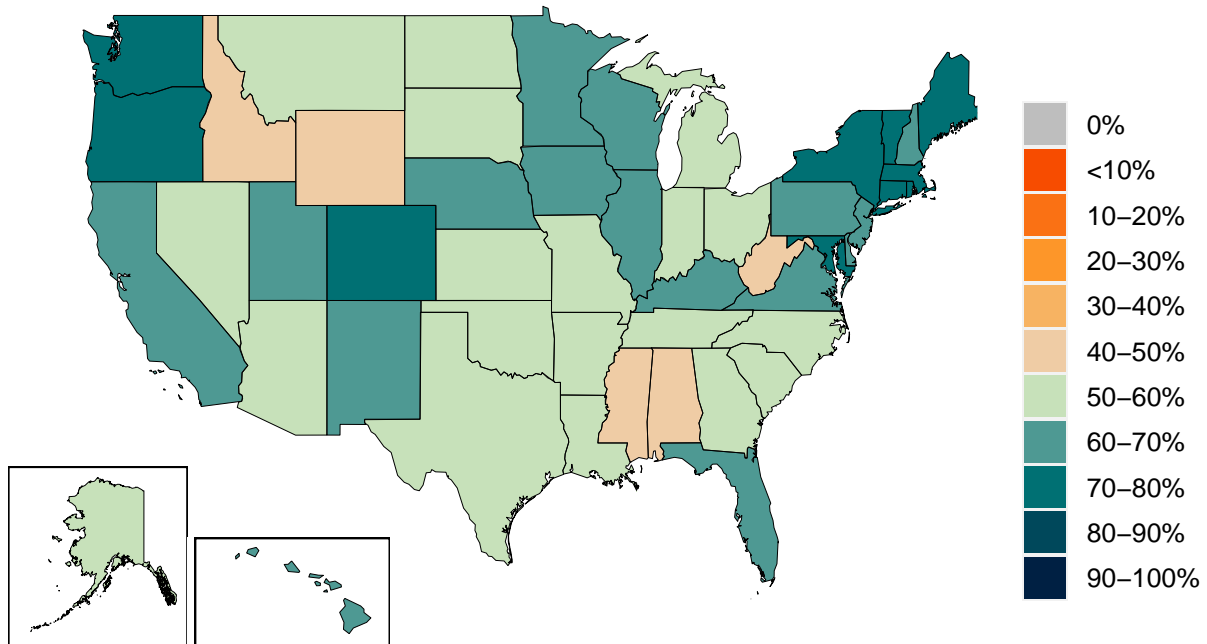


Figure 18.1. Trend in the estimated proportion of the population that is 12 years and older that has been vaccinated or would probably or definitely receive the COVID-19 vaccine if available. Note that vaccine acceptance is calculated using survey data from the 18+ population.

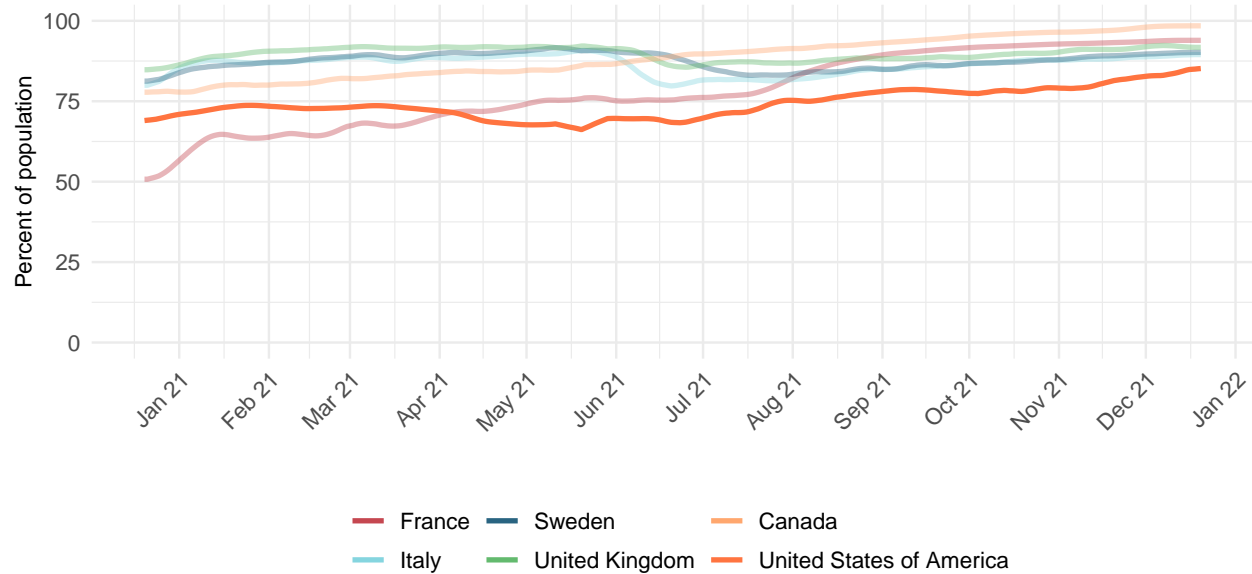


Figure 19.1. Estimated proportion of the population that is 12 years and older that has been vaccinated or would probably or definitely receive the COVID-19 vaccine if available. Note that vaccine acceptance is calculated using survey data from the 18+ population.

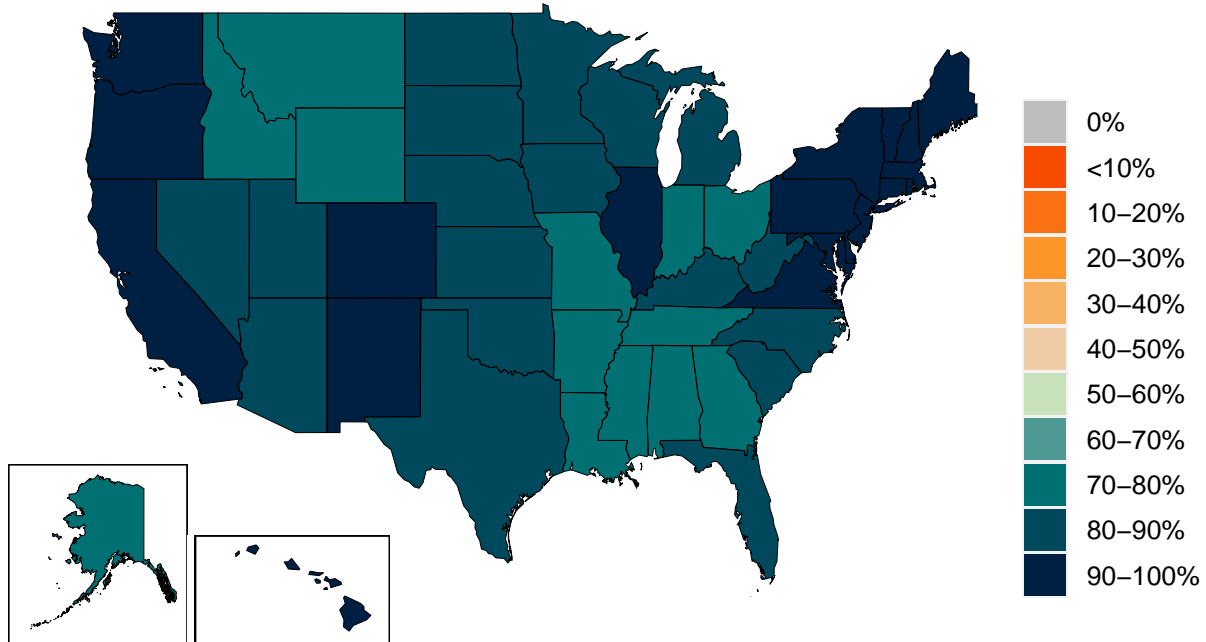
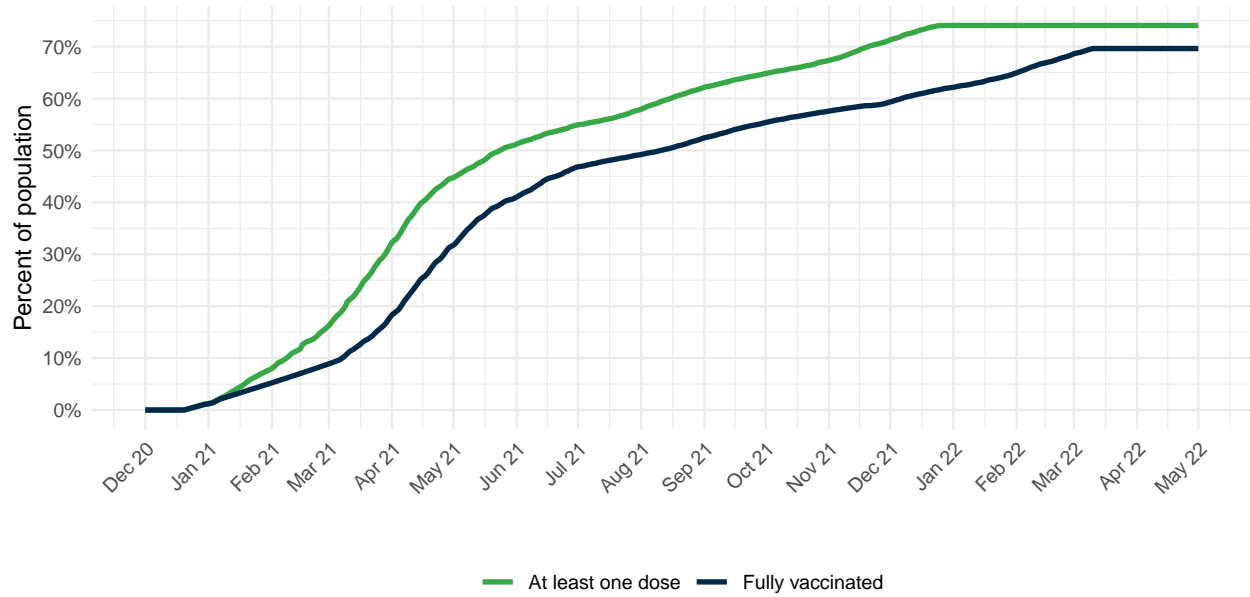


Figure 20.1. Percent of people who receive at least one dose of a COVID-19 vaccine and those who are fully vaccinated



Projections and scenarios

We produce five 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. Brand- and variant-specific vaccine efficacy is updated using the latest available information from peer-reviewed publications and other reports.
 - Future mask use is the mean of mask use over the last 7 days.
 - Mobility increases as vaccine coverage increases.
 - Omicron variant spreads according to our flight and local spread model.
-
- 80% of those who have had two doses of vaccine (or one dose for Johnson & Johnson) receive a third dose at 6 months after their second dose.

The **high severity of Omicron scenario** modifies the reference scenario assumption in two ways:

- The infection-hospitalization ratio for Omicron is 2.3 times as high as compared to the reference scenario.
- The infection-fatality rate is 4.6 times as high as compared to the reference scenario.

The **80% mask use scenario** makes all the same assumptions as the reference scenario but assumes all locations reach 80% mask use within 7 days. If a location currently has higher than 80% use, mask use remains at the current level.

The **third dose scenario** is the same as the reference scenario but assumes that 100% of those who have received two doses of vaccine will get a third dose at 6 months.

The **reduced vaccine hesitancy scenario** assumes that those in each location who respond on surveys that they probably will not receive a vaccine are persuaded or mandated to receive a vaccine.

Figure 21.1. Daily COVID-19 infections until May 01, 2022 for five scenarios

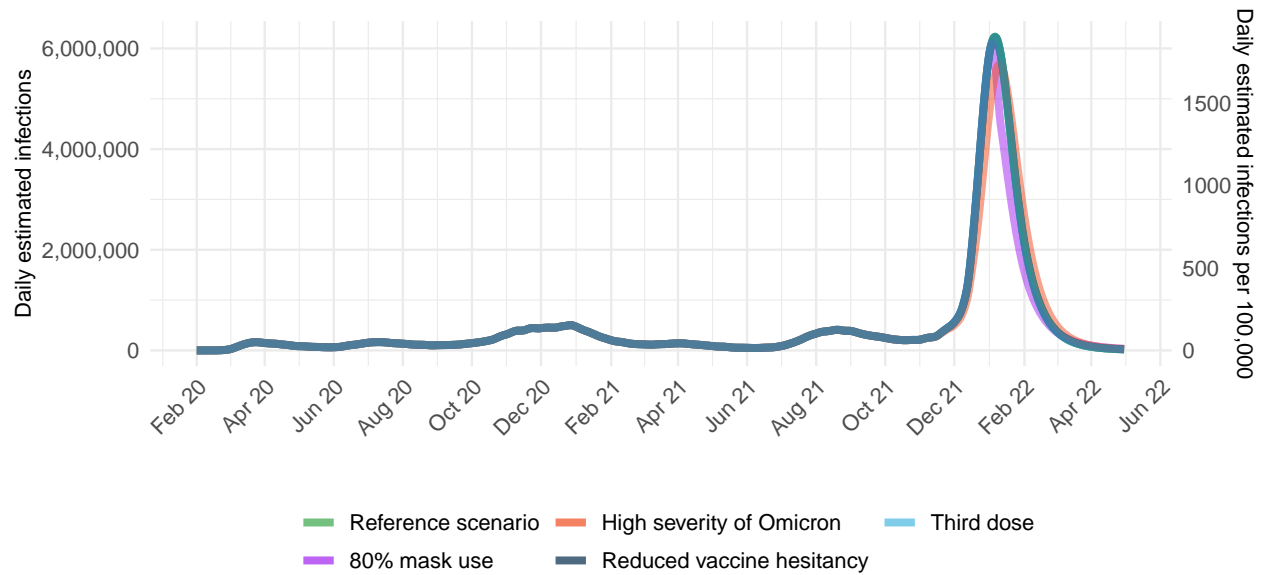


Figure 21.2. Daily COVID-19 reported cases until May 01, 2022 for five scenarios

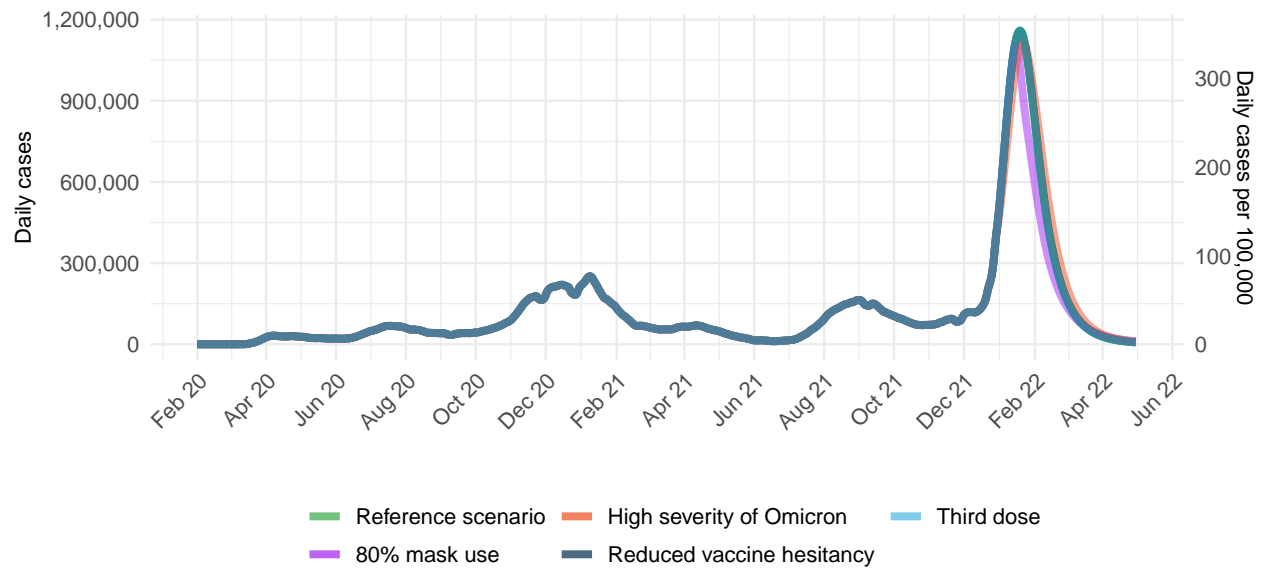


Figure 21.3. Daily COVID-19 hospital census until May 01, 2022 for five scenarios

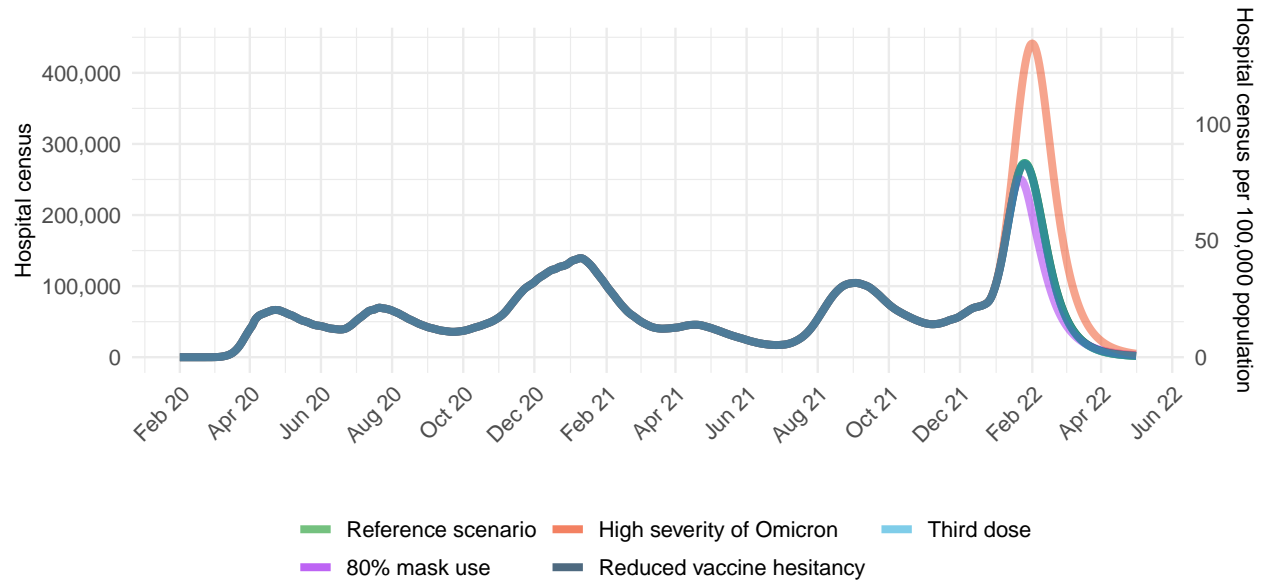


Figure 21.4 Reported daily COVID-19 deaths per 100,000

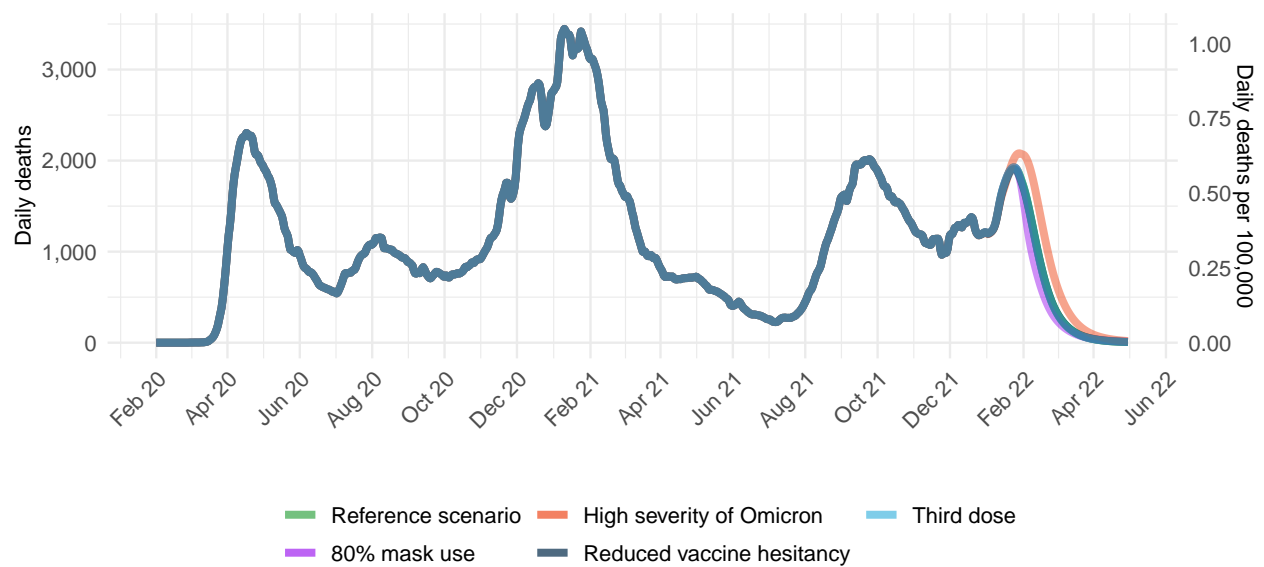


Figure 21.5 Total daily COVID-19 deaths per 100,000

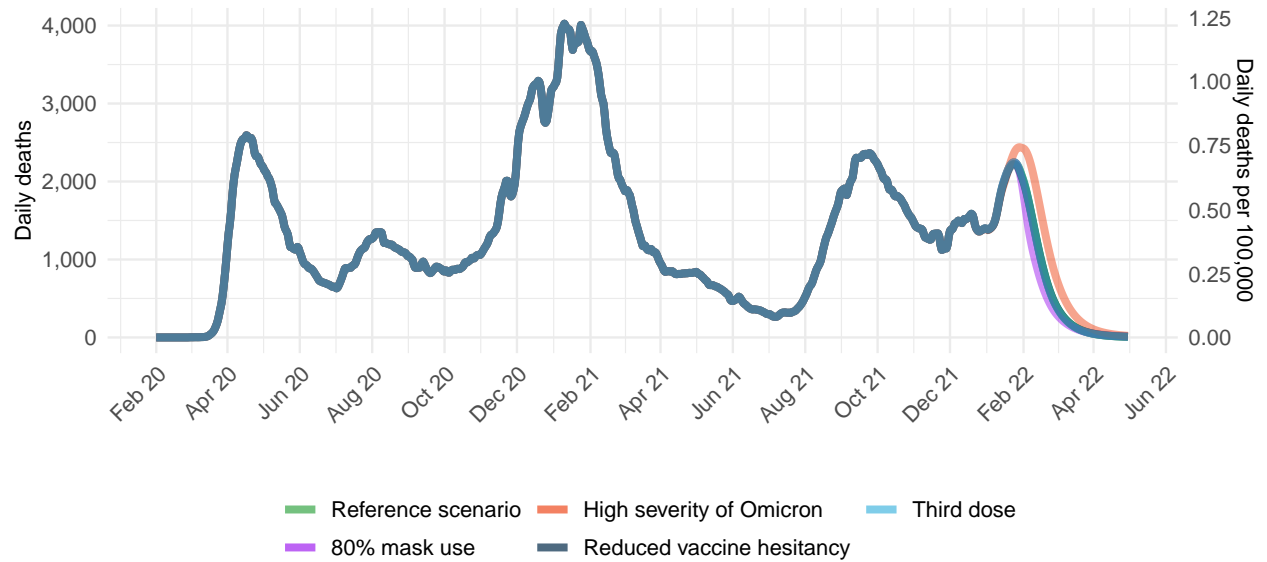


Figure 22.1. Comparison of reference model projections with other COVID modeling groups. For this comparison, we are including projections of daily COVID-19 deaths from other modeling groups when available, last model update in brackets: Delphi from the Massachusetts Institute of Technology ([Delphi](#)) [January 7, 2022], Imperial College London ([Imperial](#)) [December 13, 2021], the SI-KJalpha model from the University of Southern California ([SIKJalpha](#)) [January 4, 2022], and the CDC Ensemble Model ([CDC](#)) [January 3, 2022]. Daily deaths from other modeling groups are smoothed to remove inconsistencies with rounding. Regional values are aggregates from available locations in that region.

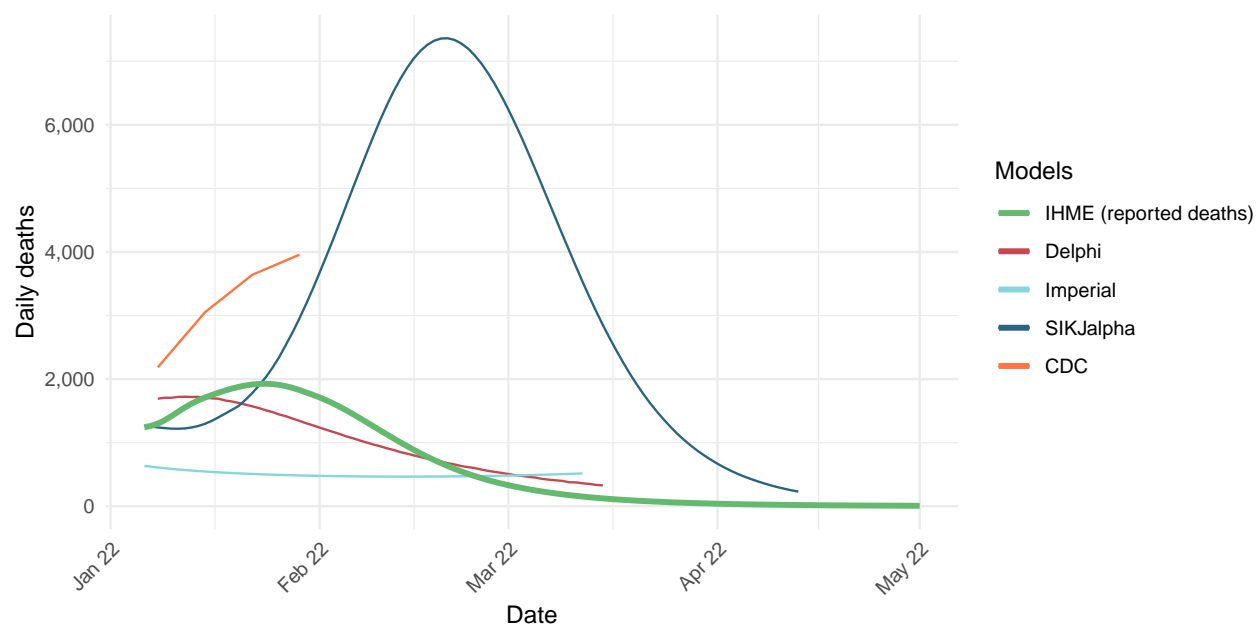


Figure 23.1. The estimated inpatient hospital usage is shown over time. The percent of hospital beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of beds occupied by COVID-19 patients. Less than 5% is considered *low stress*, 5-9% is considered *moderate stress*, 10-19% is considered *high stress*, and 20% or greater is considered *extreme stress*.

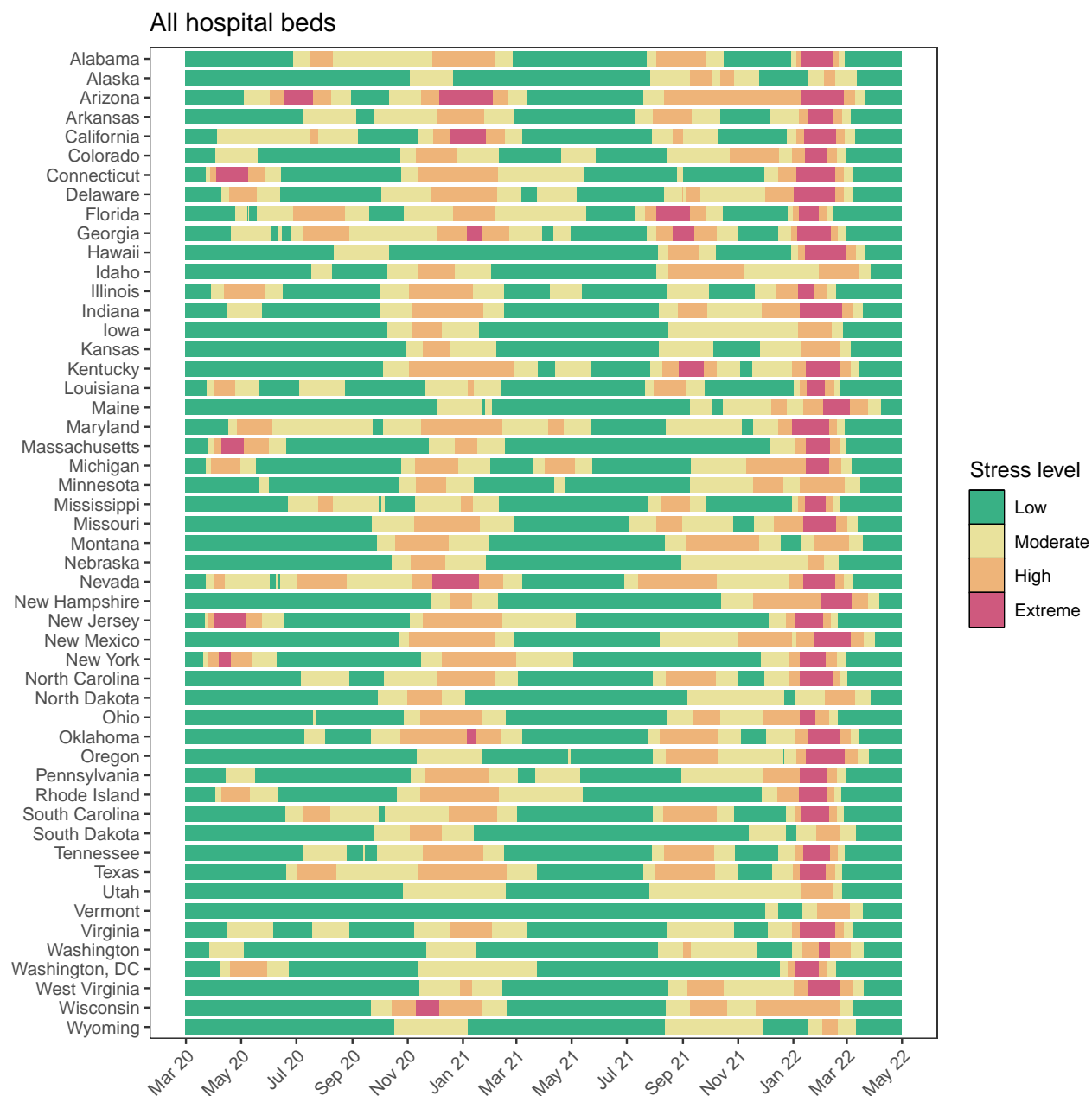
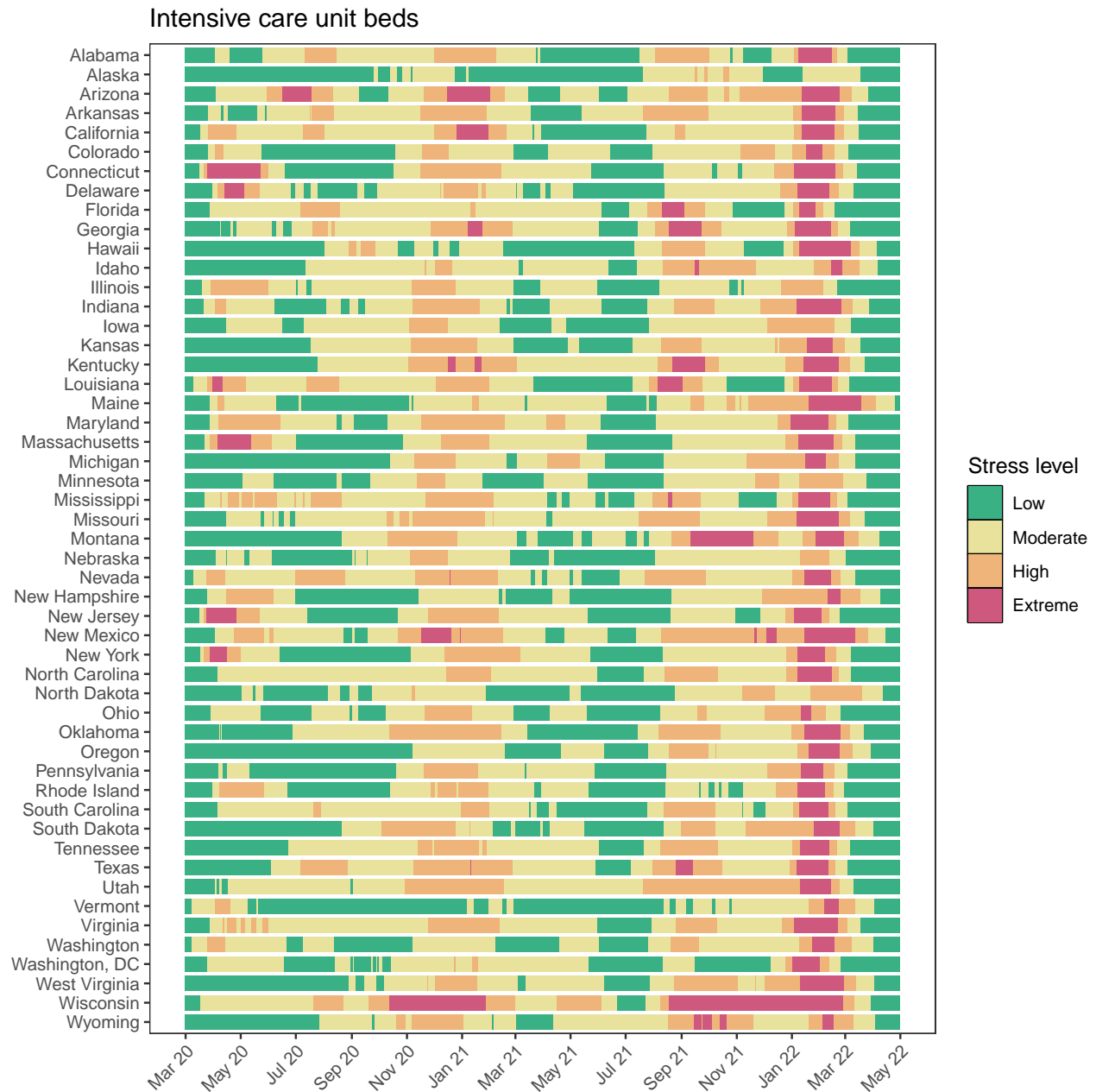


Figure 24.1. The estimated intensive care unit (ICU) usage is shown over time. The percent of ICU beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of ICU beds occupied by COVID-19 patients. Less than 10% is considered *low stress*, 10-29% is considered *moderate stress*, 30-59% is considered *high stress*, and 60% or greater is considered *extreme stress*.



More information

Data sources:

Mask use and vaccine confidence data are from the [The Delphi Group at Carnegie Mellon University and University of Maryland COVID-19 Trends and Impact Surveys](#), in partnership with Facebook. Mask use data are also from [Premise](#), the Kaiser Family Foundation, and the [YouGov COVID-19 Behaviour Tracker](#) survey.

Genetic sequence and metadata are primarily from the GISAID Initiative. Further details available on the COVID-19 model [FAQ page](#).

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>.

To download our most recent results, visit our [Data downloads page](#).

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