COVID-19 Results Briefing

The United States of America

January 13, 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 12, 2022, with data through January 10, 2022.

The Omicron wave in the US appears to have peaked in 19 states and continues to increase in the rest of the states. Given experience in other countries including Canada, we expect peaks in the next 1-2 weeks in nearly all states. The Omicron wave is leading to unprecedented levels of daily infection, estimated to have peaked at 6 million a day in the last week. Because the fraction of infections that are asymptomatic is much higher for Omicron than for Delta, the increase in reported cases considerably underestimates the increase in transmission in the community. Extremely high rates above 10% PCR-positive of pre-admission screening in hospitals of individuals without COVID symptoms in various parts of the country confirm the intense transmission in the community. Our models suggest that transmission is so intense, and the wave is cresting so fast, that policy interventions such as mask mandates, increased third-dose vaccination coverage, and increased vaccination of the hesitant will have no real impact on this wave. For all practical purposes, the Omicron wave should be over in the next 4 weeks.

The main effect of the Omicron wave is not on the death rate but on hospitals, schools, and essential businesses. We expect the hospital census to increase until the end of the month and in some states into February. The increase in hospitalizations includes a substantial share (perhaps half) of individuals who are being hospitalized for other reasons and have incidental COVID-19 infection. Hospitals are experiencing a double impact as large numbers of employees test positive and are required to quarantine for 5 days. Large numbers of students and teachers testing positive and being required to quarantine is also causing school disruption. This disruption will continue through the next 2-3 weeks. Similar challenges will be faced by businesses given the high rate of transmission.

Given that transmission cannot be controlled, the toolkit used during previous waves of the pandemic will not work. In our models, testing strategies will not curtail the rapid Omicron wave, nor will increased mask use. The main focus should be to support hospitals, schools, and other businesses to avoid major disruption.

Looking beyond mid-February, we expect Omicron to continue circulating and potentially to return later in the year as immunity wanes. We expect new variants will emerge in 2022 and that COVID-19 will continue to be a recurring health problem. However, the notion of a pandemic requiring extraordinary intervention and behavioral change is likely over by early March. Strategies to manage COVID-19 as an endemic disease in the future should include active surveillance, scaled up production and access to effective antivirals, and mask use by the vulnerable if and when another wave occurs.

Current situation

- Estimated daily infections in the last week stayed approximately constant at 6.1 million compared to 6.3 million the week before (Figure 1.1).
- Average daily hospital census in the last week (through January 10) increased to 146,600 per day on average compared to 100,700 the week before.
- Daily reported cases in the last week increased to 713,700 per day on average compared to 480,300 the week before (Figure 2.1).
- Reported deaths due to COVID-19 in the last week increased to 1,500 per day on average compared to 1,200 the week before (Figure 3.1).
- Total deaths due to COVID-19 in the last week increased to 1,700 per day on average compared to 1,400 the week before (Figure 3.1). This makes COVID-19 the number 1 cause of death in the US this week (Table 1). Estimated total daily deaths due to COVID-19 in the past week were 1.1 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 31 states. (Figure 4.1).
- The daily rate of total COVID-19 deaths is greater than 4 per million in 34 states. (Figure 4.2).
- We estimate that 69% of people in the US have been infected at least once as of January 10 (Figure 6.1).
- Effective R, computed using cases, hospitalizations, and deaths, was greater than 1 in 49 states on December 30 (Figure 7.1).
- The infection-detection rate in the US was close to 14% on January 10 (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 the dominant variant in all states.

Trends in drivers of transmission

- New state-level mandates have not been imposed in the last week. Eight states have mask mandates in place.
- Mobility last week was 6% lower than the pre-COVID-19 baseline (Figure 11.1). Mobility was lower than 30% of baseline in no locations.
- As of January 10, in the COVID-19 Trends and Impact Survey, 45% of people self-report that they always wore a mask when leaving their home, up from 37% at the beginning of December (Figure 13.1). Mask use is highest on the West Coast and states around New York.
- There were 462 diagnostic tests per 100,000 people on January 10 (Figure 15.1).

- As of January 10, 24 states have reached 70% or more of the population who have received at least one vaccine dose and 13 states have reached 70% or more of the population who are fully vaccinated (Figure 17.1). 74% of people in the US have received at least one vaccine dose and 63% are fully vaccinated.
- 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 (Figure 19.1).
- In our current reference scenario, we expect that 242.9 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, have peaked at over 6 million a day and will decline to 14,360 on May 1, 2022 (Figure 21.1).
- Daily estimated infections in the **80% mask coverage scenario** are at their peak and will decline quickly (Figure 21.1).
- Daily estimated infections in the **third dose scenario** are at their peak and will decline (Figure 21.1).
- Daily estimated infections in the **reduced vaccine hesitancy scenario** are also at their peak (Figure 21.1).

Cases

- Daily cases in the **reference scenario** will rise to 875,080 by January 17, 2022 (Figure 21.2).
- Daily cases in the **80% mask coverage scenario** will rise to 875,080 by January 17, 2022 (Figure 21.2).
- Daily cases in the **third dose scenario** will rise to 875,080 by January 17, 2022 (Figure 21.2).
- Daily cases in the **reduced vaccine hesitancy scenario** will rise to 873,970 by January 17, 2022 (Figure 21.2).

Hospitalizations

- Daily hospital census in the **reference scenario** will rise to 225,360 by January 24, 2022 (Figure 21.3).
- Daily hospital census in the **80% mask coverage scenario** will rise to 224,190 by January 23, 2022 (Figure 21.3).

- Daily hospital census in the **third dose scenario** will rise to 225,170 by January 24, 2022 (Figure 21.3).
- Daily hospital census in the **reduced vaccine hesitancy scenario** will rise to 224,750 by January 24, 2022 (Figure 21.3).

Deaths

- In our **reference scenario**, our model projects 887,000 cumulative reported deaths due to COVID-19 on May 1. This represents 49,000 additional deaths from January 10 to May 1. Daily reported COVID-19 deaths in the **reference scenario** will rise to 1,620 by January 14, 2022 (Figure 21.4).
- Under our **reference scenario**, our model projects 1,028,000 cumulative total deaths due to COVID-19 on May 1. This represents 57,000 additional deaths from January 10 to May 1 (Figure 24.2).
- In our **80% mask coverage scenario**, our model projects 885,000 cumulative reported deaths due to COVID-19 on May 1. This represents 47,000 additional deaths from January 10 to May 1. Daily reported COVID-19 deaths in the **80% mask coverage scenario** will rise to 1,620 by January 14, 2022 (Figure 21.4).
- In our **third dose scenario**, our model projects 887,000 cumulative reported deaths due to COVID-19 on May 1. This represents 49,000 additional deaths from January 10 to May 1. Daily reported COVID-19 deaths in the **third dose scenario** will rise to 1,620 by January 14, 2022 (Figure 21.4).
- In our **reduced vaccine hesitancy scenario**, our model projects 887,000 cumulative reported deaths due to COVID-19 on May 1. This represents 49,000 additional deaths from January 10 to May 1. Daily reported COVID-19 deaths in the **reduced vaccine hesitancy scenario** will rise to 1,620 by January 14, 2022 (Figure 21.4).
- Figure 22.1 compares our reference scenario forecasts to other publicly archived models. The CDC ensemble forecasts steadily rising deaths. The IHME and MIT models suggest declines from here forward.
- At some point from January through May 1, all 50 states and the District of Columbia will have high or extreme stress on hospital beds and intensive care unit (ICU) capacity (Figures 23.1 and 24.1).

Model updates

In this week's update, we have modified the model to allow the incubation time to vary by variant. For Omicron, we assume it is distributed between 1 and 4 days, skewed toward 1 day. For all other variants, we assume it is 3 to 5 days, skewed toward 3 days.

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

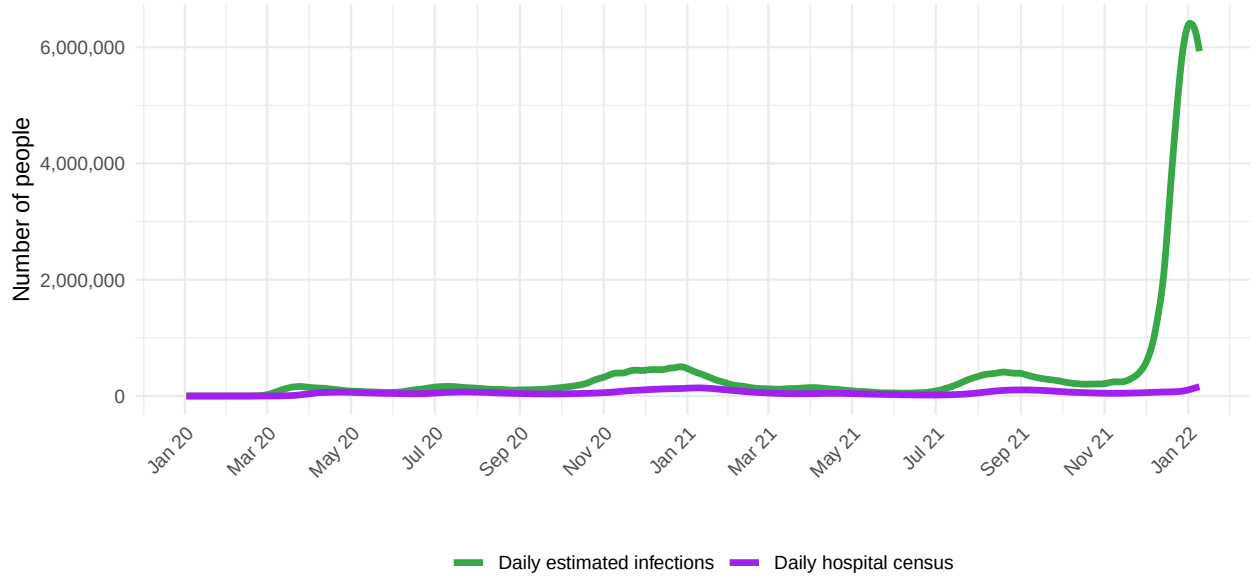


Figure 2.1. Reported daily COVID-19 cases, moving average

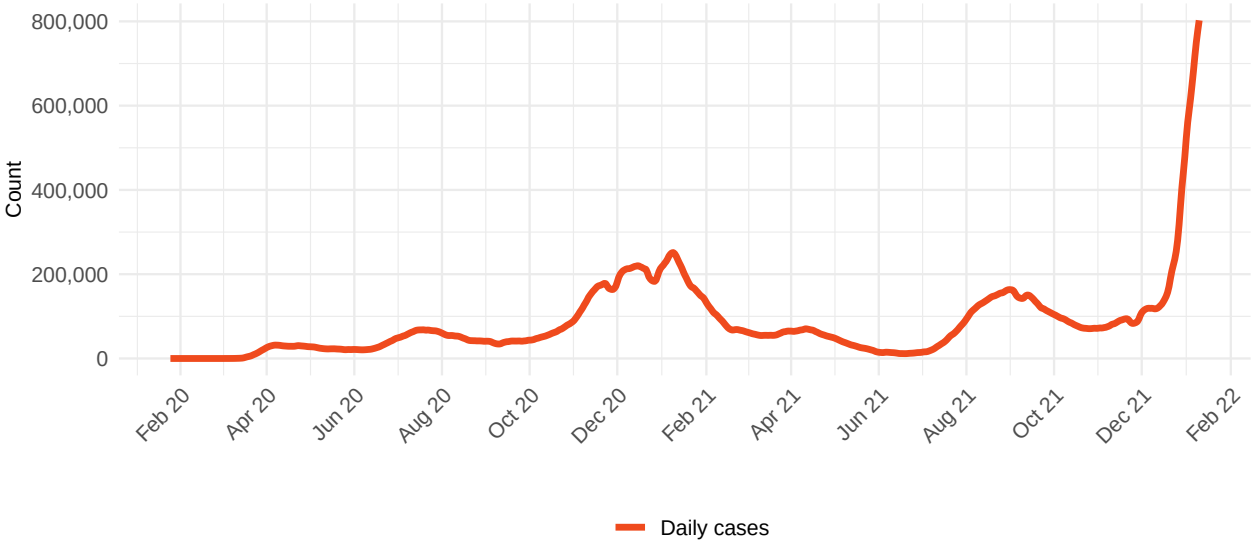
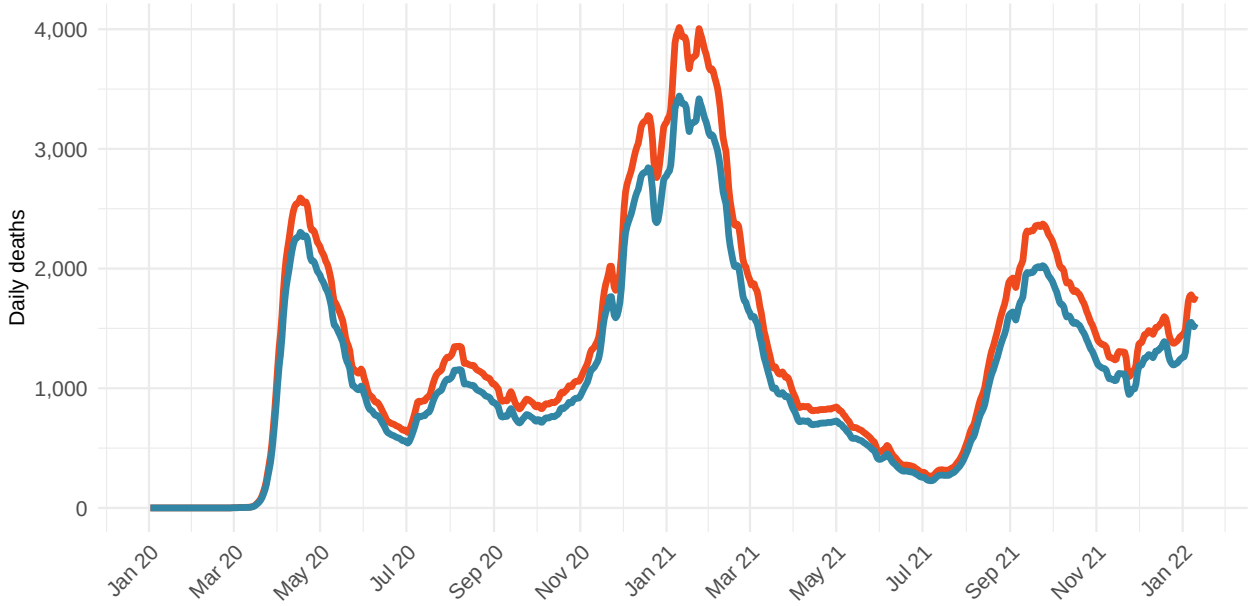


Table 1. Ranking of total deaths due to COVID-19 among the leading causes of mortality this week, assuming uniform deaths of non-COVID causes throughout the year

Cause name	Weekly deaths	Ranking
COVID-19	12,168	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 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 10, 2022

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

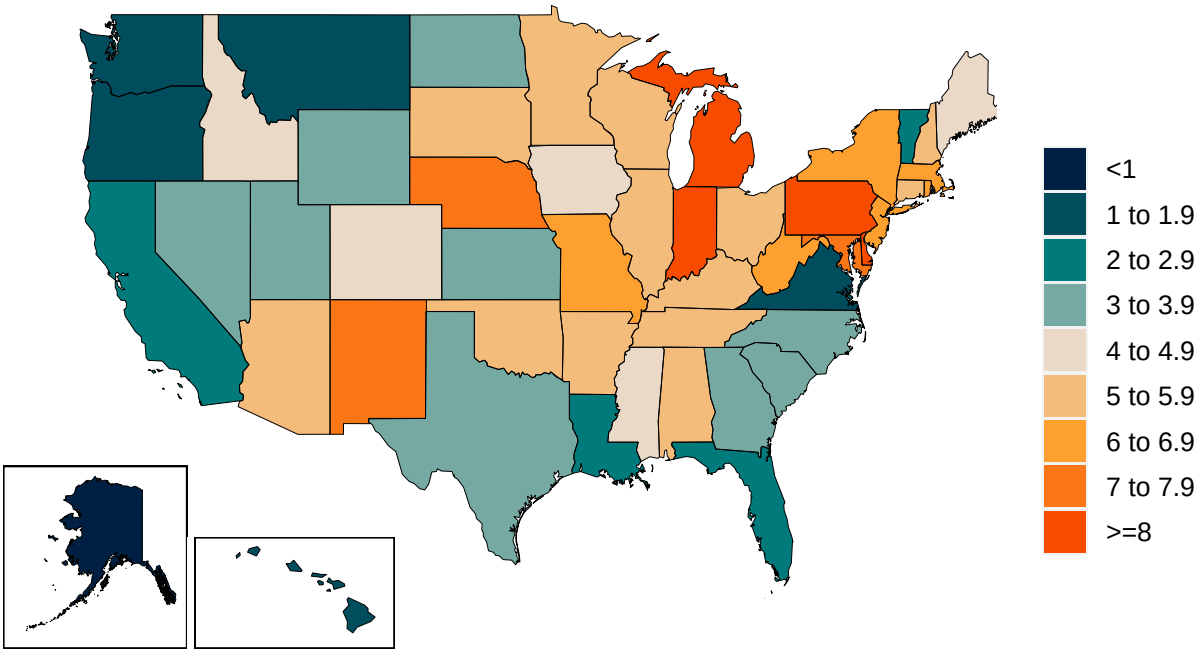
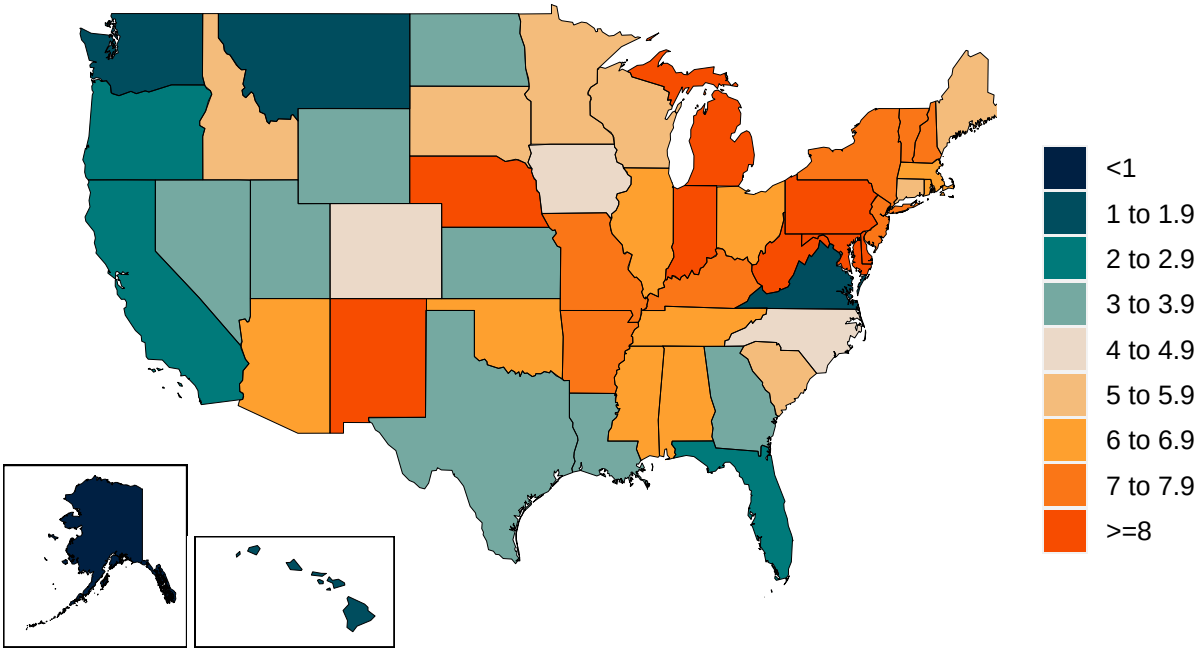


Figure 4.2 Daily total COVID-19 death rate per 1 million



Cumulative COVID-19 deaths per 100,000 on January 10, 2022

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

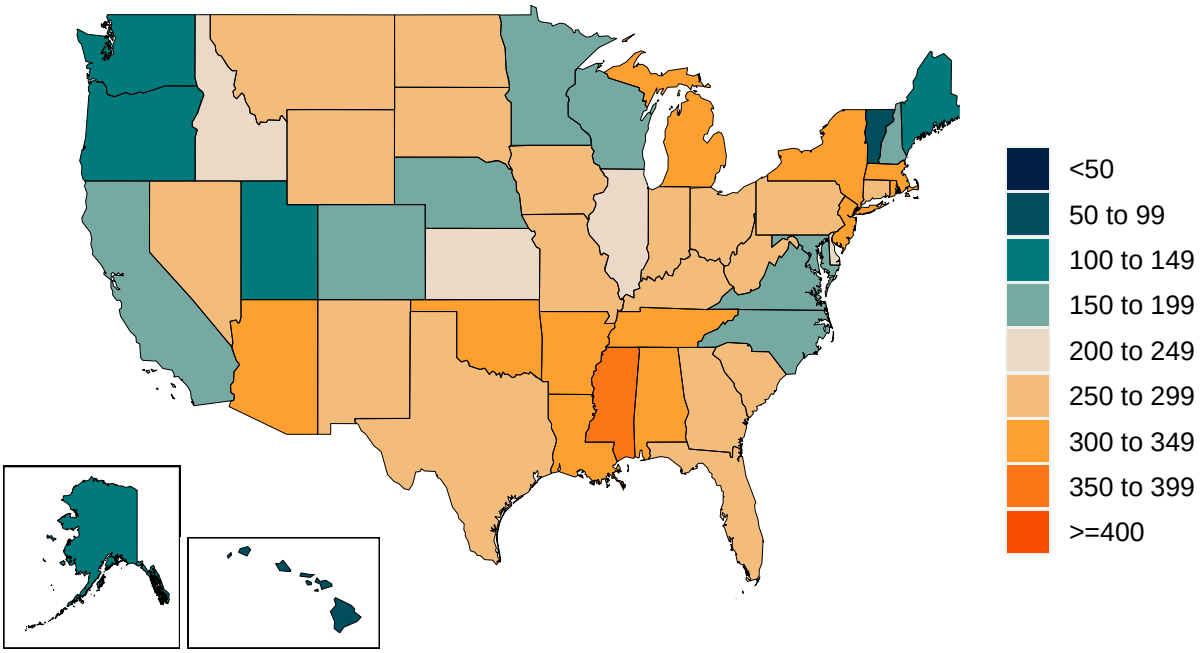


Figure 5.2 Total cumulative COVID-19 deaths per 100,000

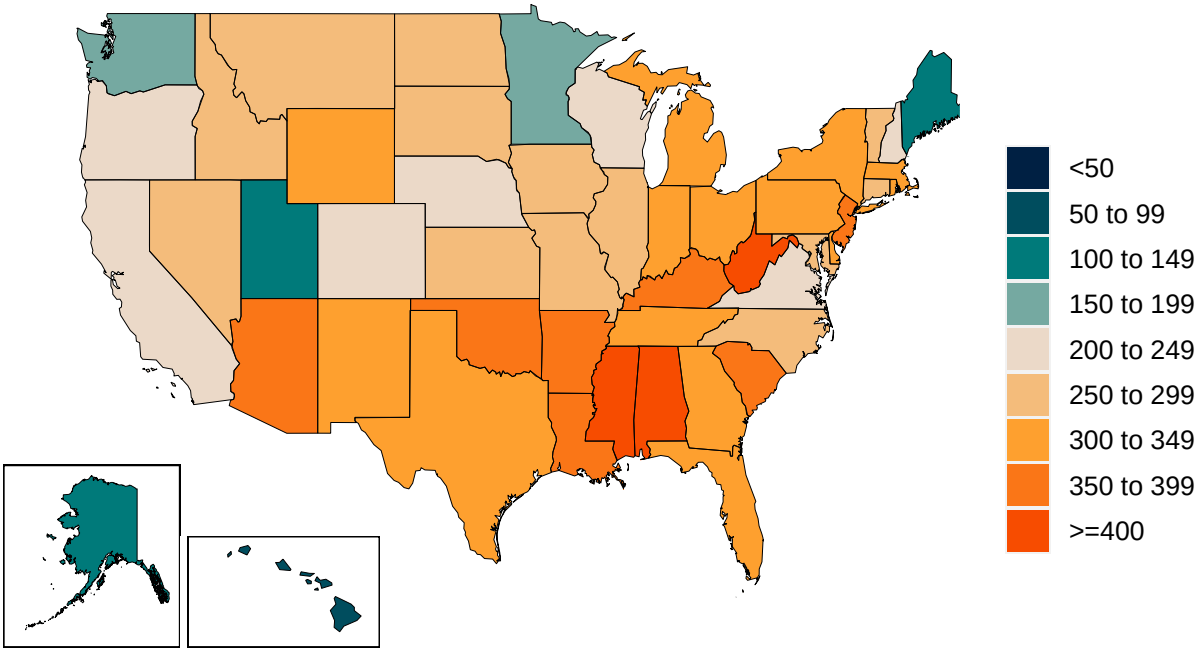


Figure 6.1. Estimated percent of the population infected with COVID-19 on January 10, 2022

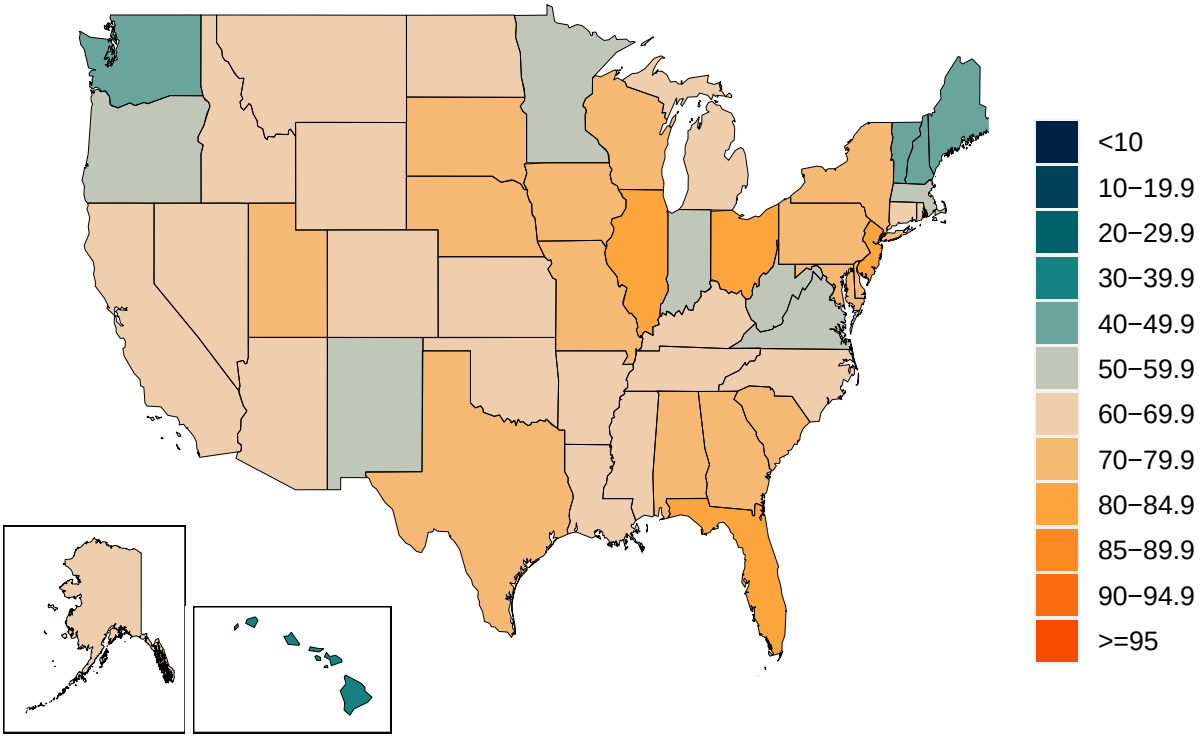


Figure 7.1. Mean effective R on December 30, 2021. Effective R less than 1 means that transmission should decline, all other things being held the same. The estimate of effective R is based on the combined analysis of deaths, case reporting, and hospitalizations where available. Current reported cases reflect infections 11-13 days prior, so estimates of effective R can only be made for the recent past.

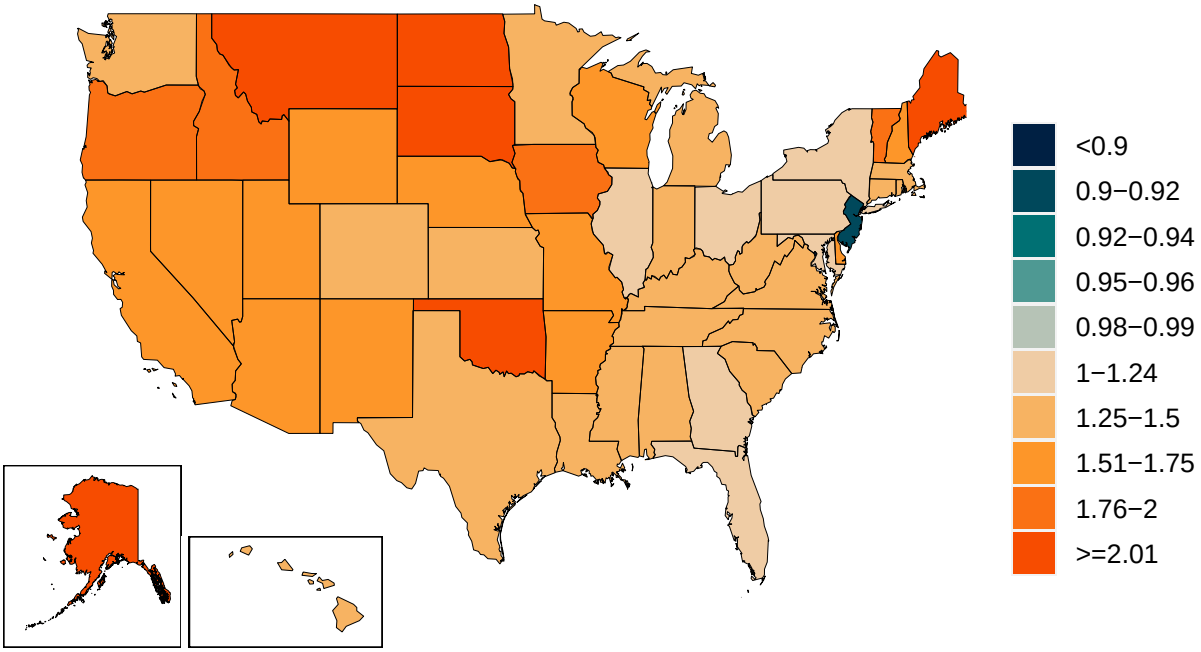
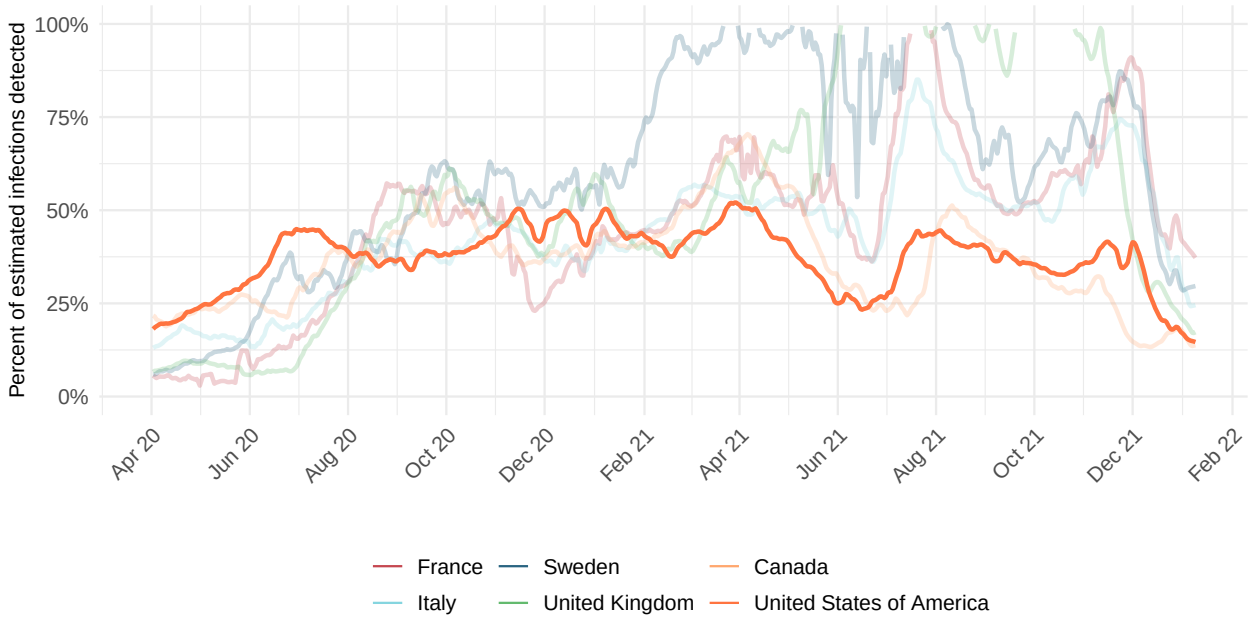


Figure 8.1. Percent of estimated COVID-19 infections detected. This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model. Due to measurement errors in cases and testing rates, the infection-detection rate can exceed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



Estimated percent of circulating SARS-CoV-2 for primary variant families on January 10, 2022

Figure 9.1 Estimated percent of new infections that are Alpha variant

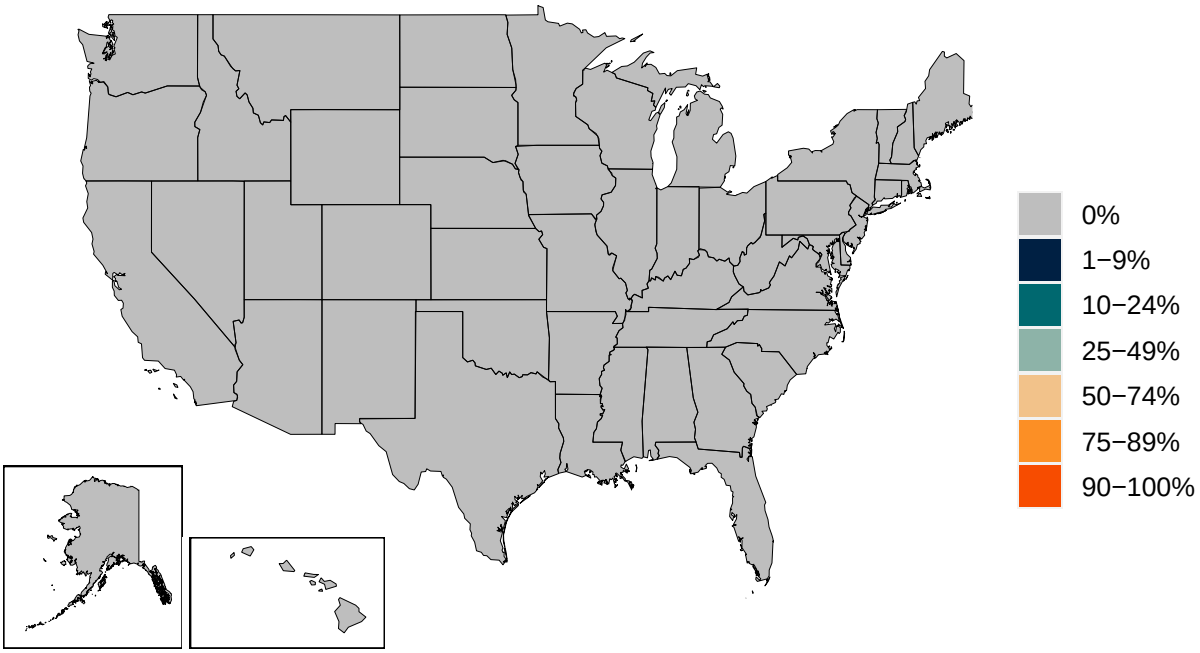


Figure 9.2 Estimated percent of new infections that are Beta variant

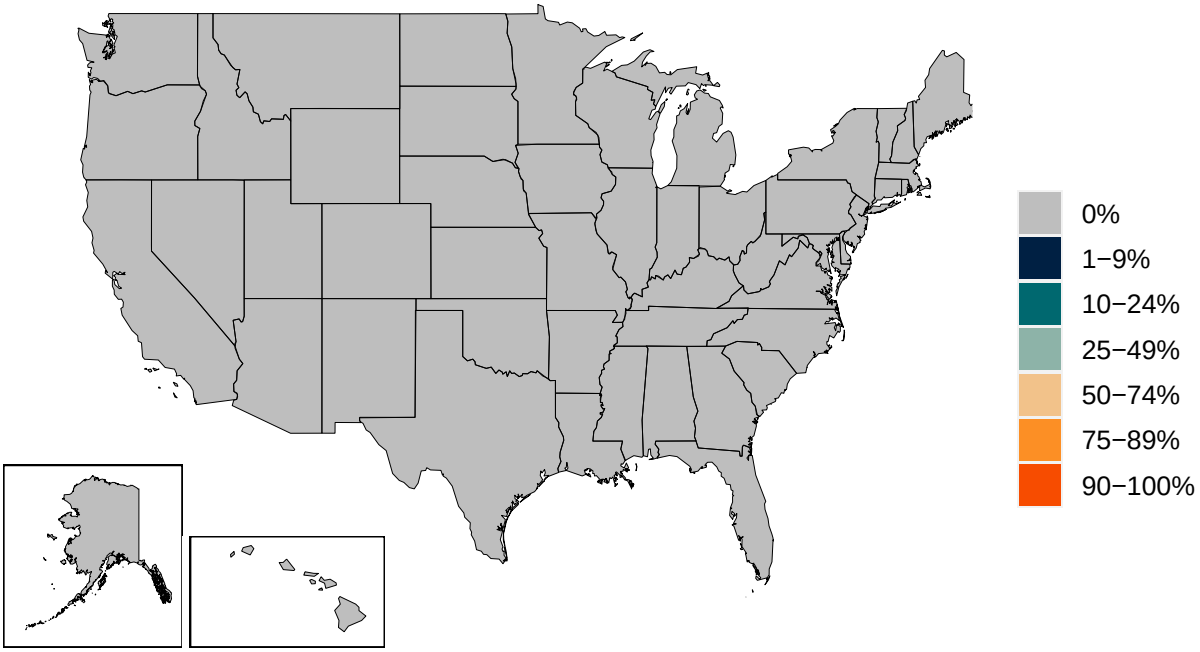


Figure 9.3 Estimated percent of new infections that are Delta variant

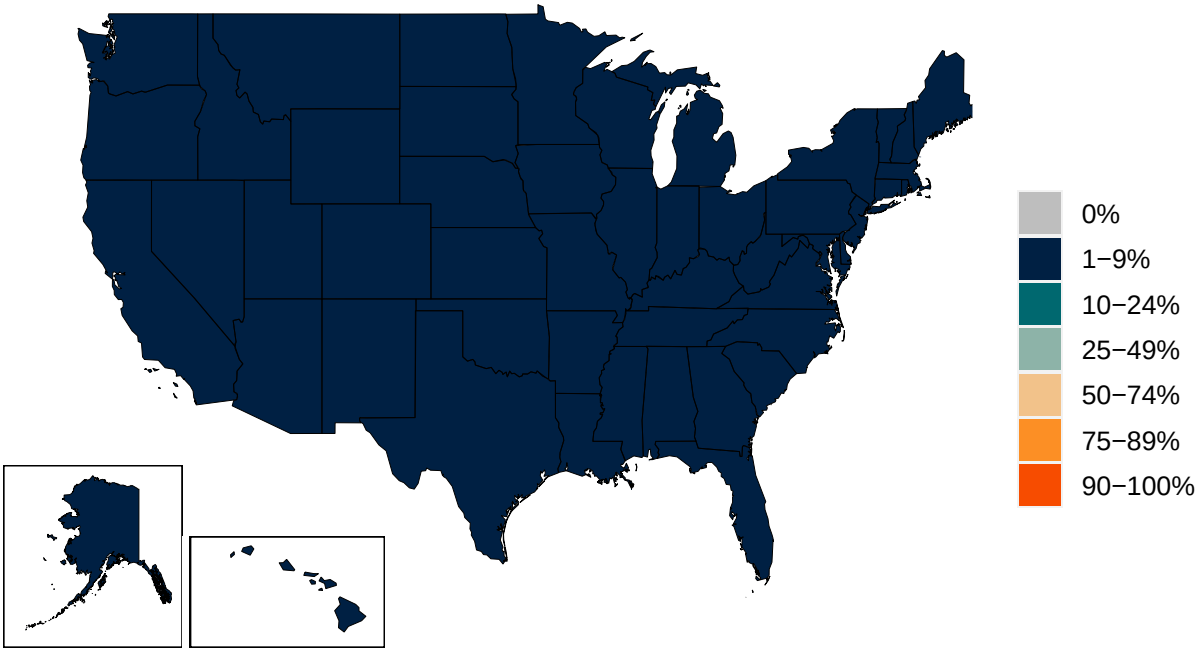


Figure 9.4 Estimated percent of new infections that are Gamma variant

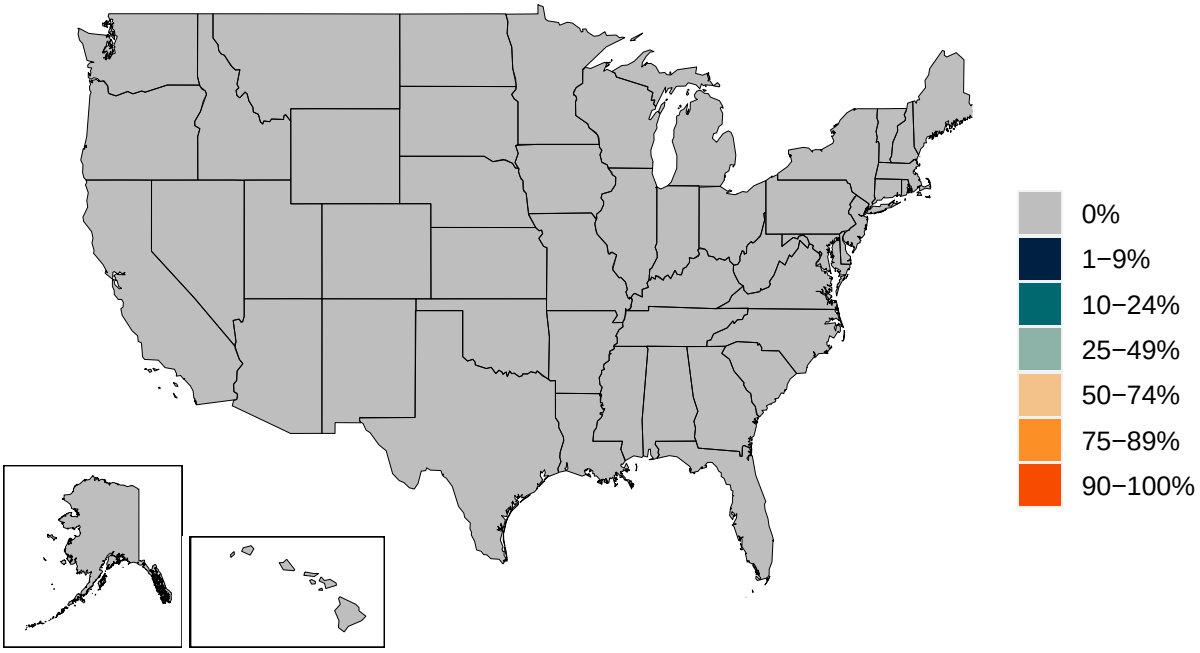


Figure 9.5 Estimated percent of new infections that are Omicron variant

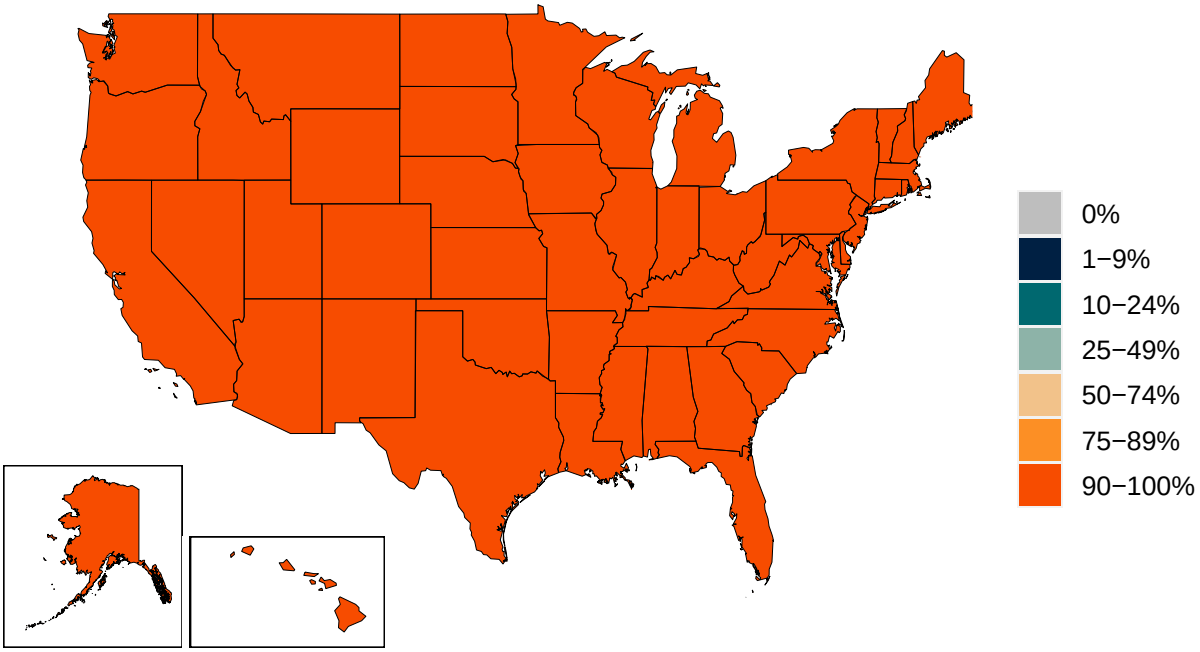
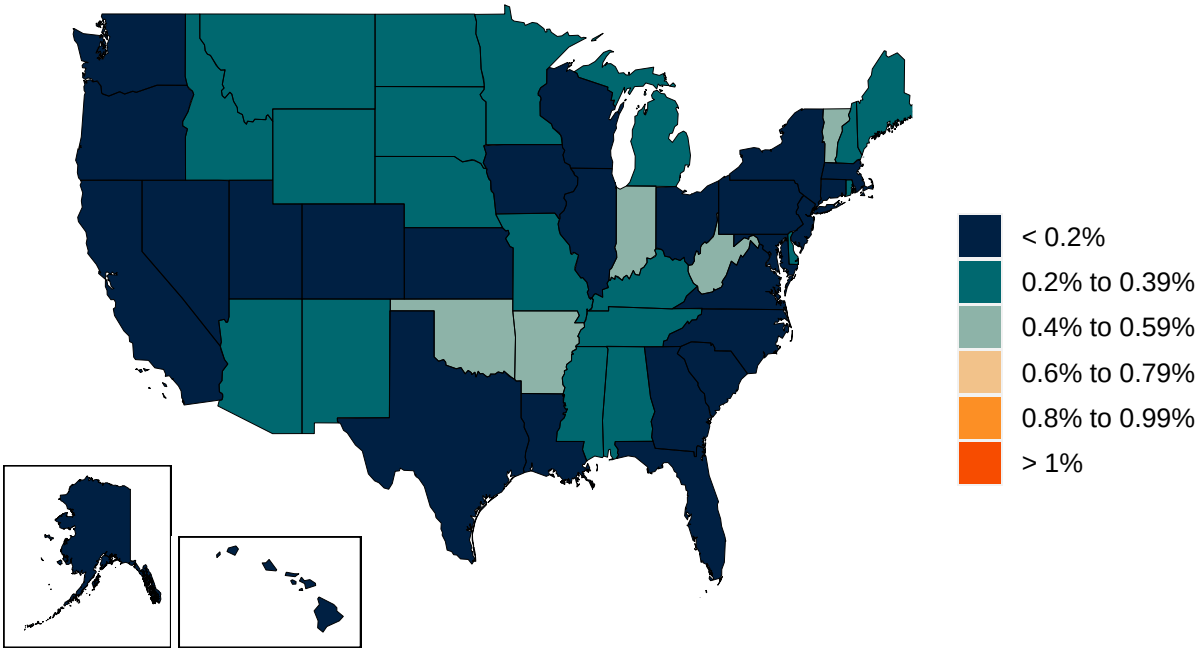


Figure 10.1. Infection-fatality rate on January 10, 2022. This is estimated as the ratio of COVID-19 deaths to estimated daily COVID-19 infections.



Critical drivers

Table 2. Current mandate implementation

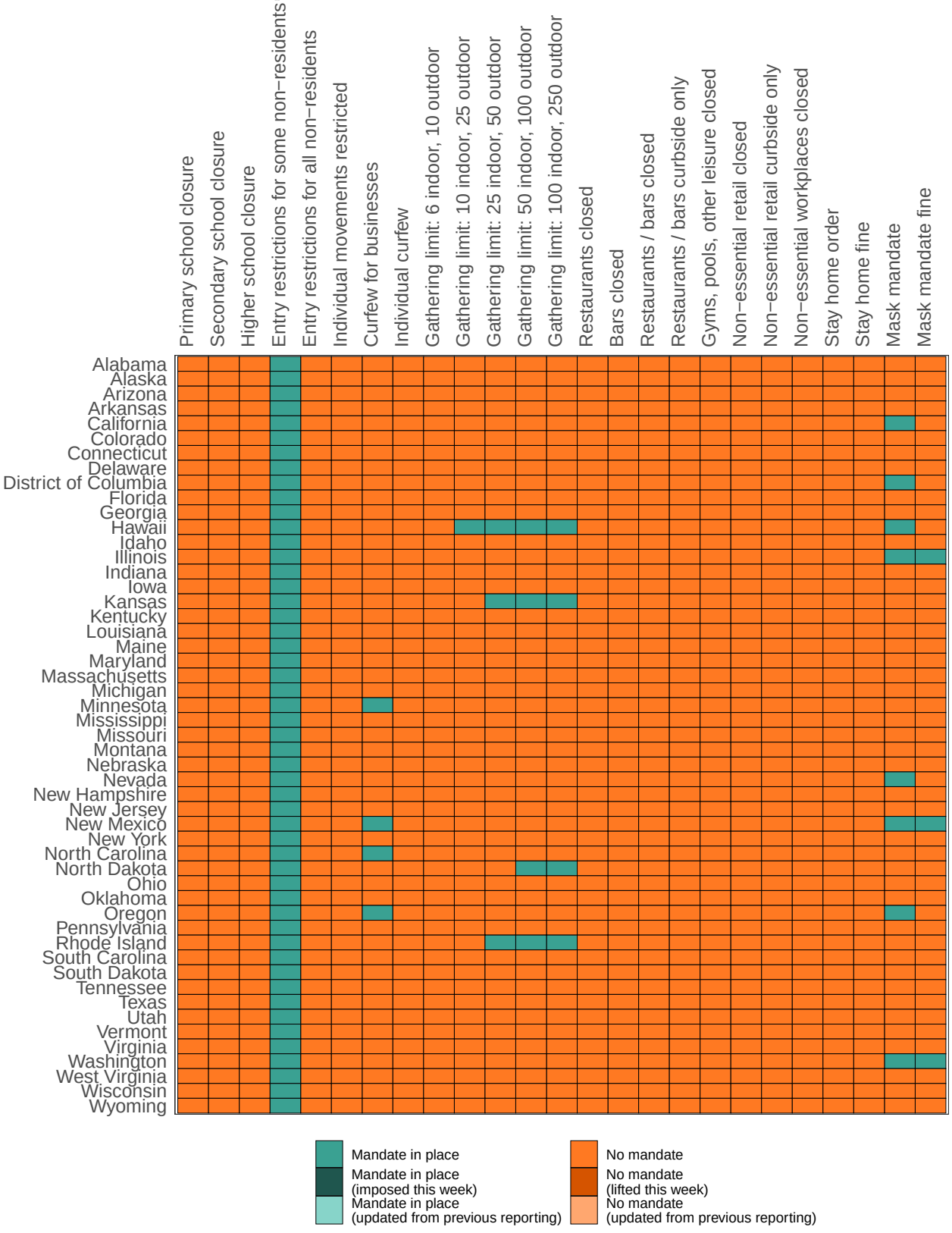


Figure 11.1. Trend in mobility as measured through smartphone app use, compared to January 2020 baseline

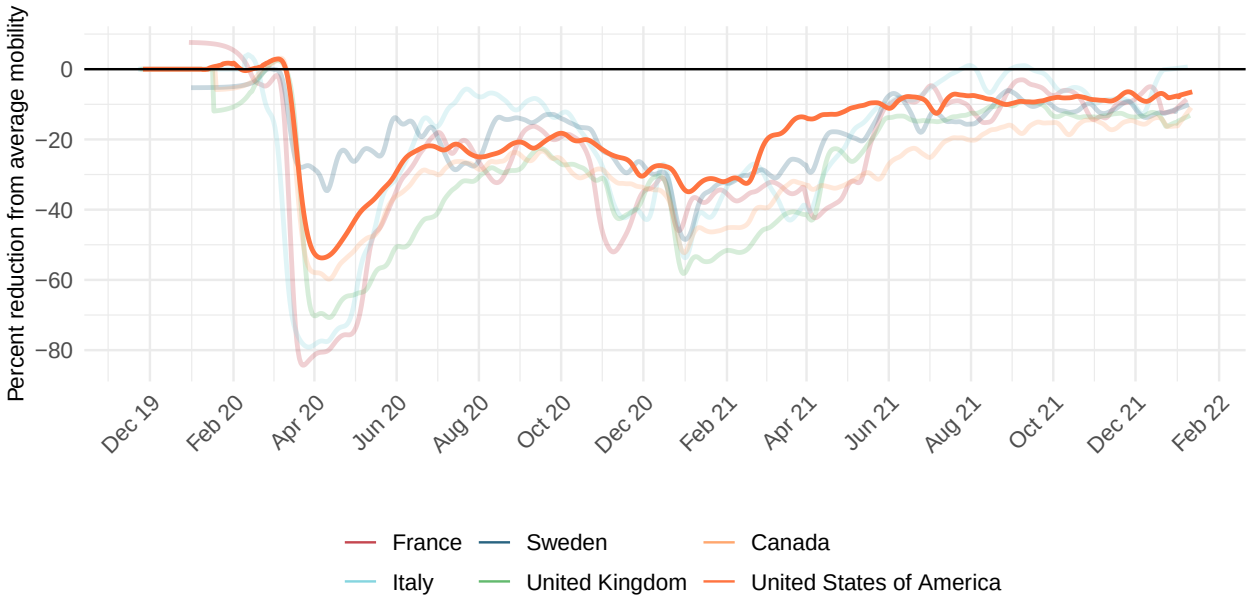


Figure 12.1. Mobility level as measured through smartphone app use, compared to January 2020 baseline (percent) on January 10, 2022

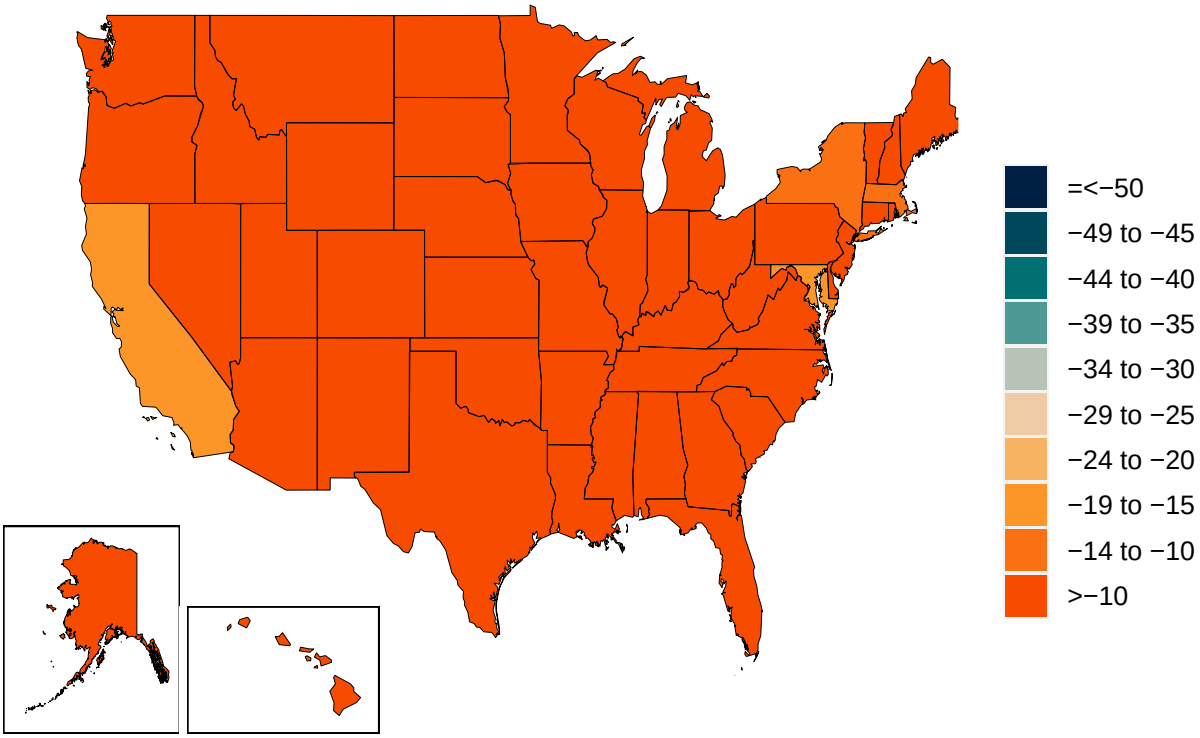


Figure 13.1. Trend in the proportion of the population reporting always wearing a mask when leaving home

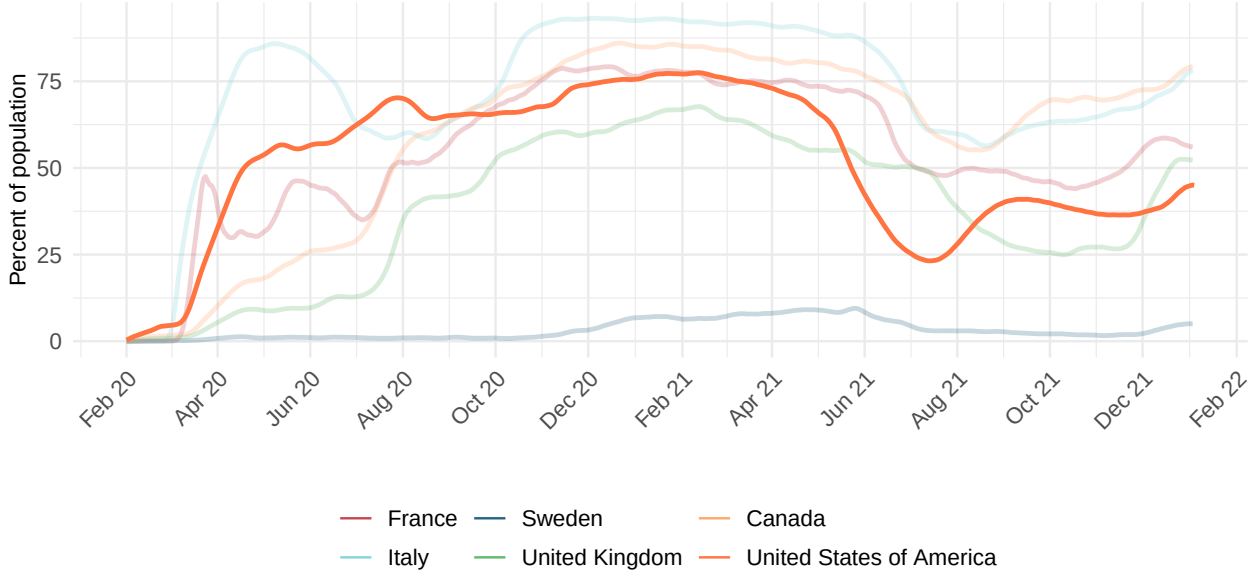


Figure 14.1. Proportion of the population reporting always wearing a mask when leaving home on January 10, 2022

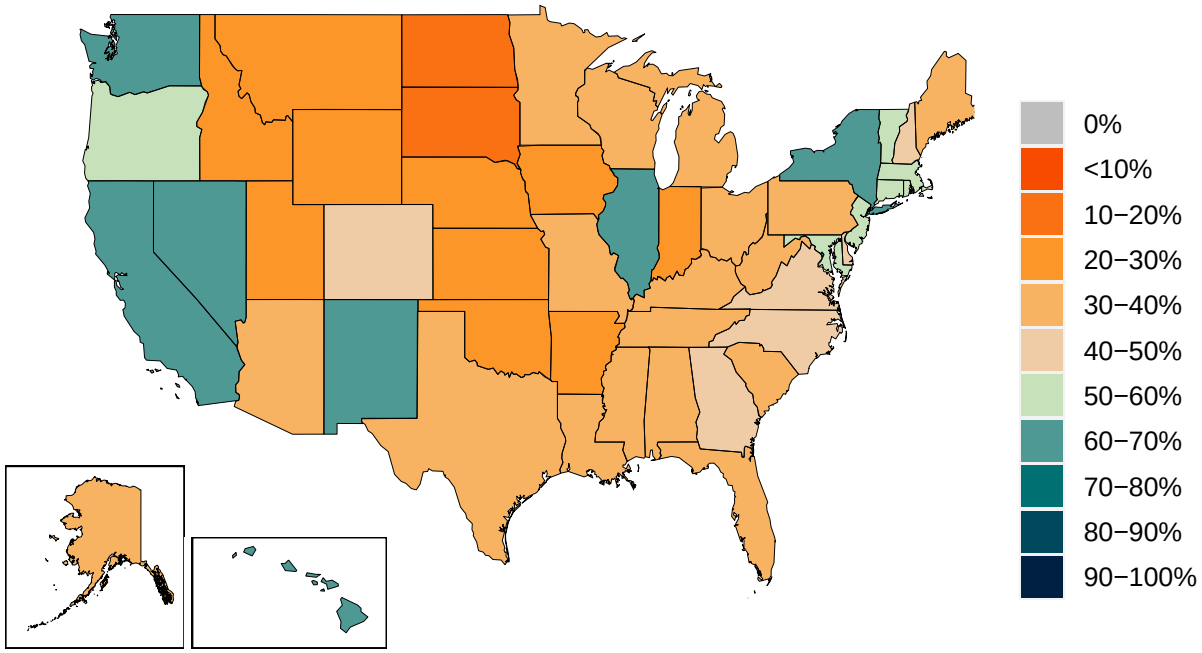


Figure 15.1. Trend in COVID-19 diagnostic tests per 100,000 people

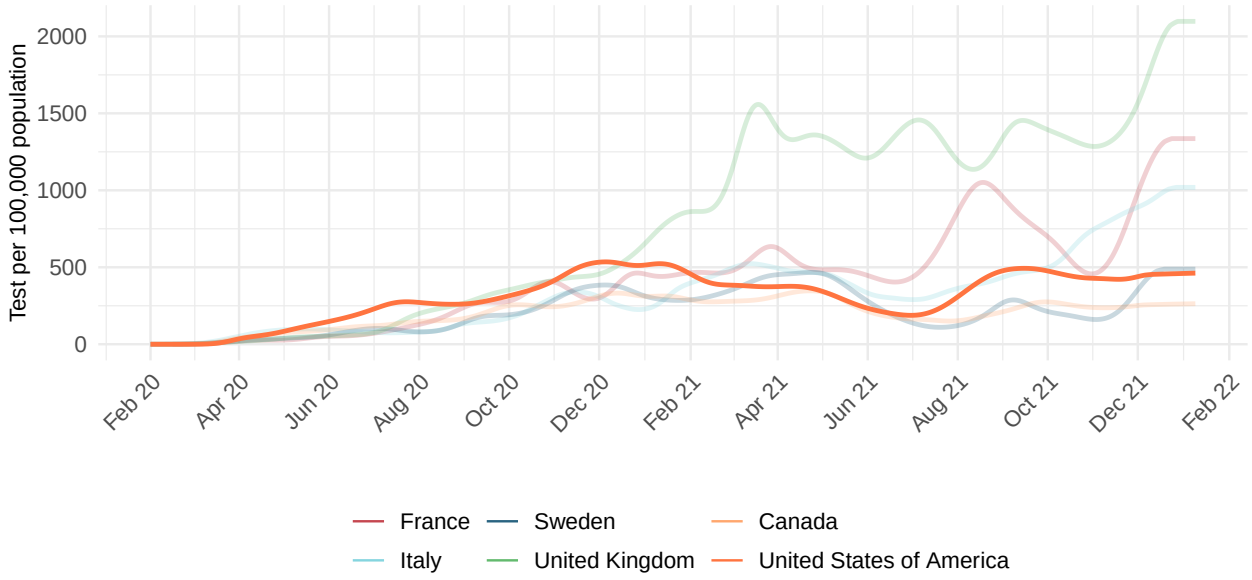


Figure 16.1. COVID-19 diagnostic tests per 100,000 people on January 10, 2022

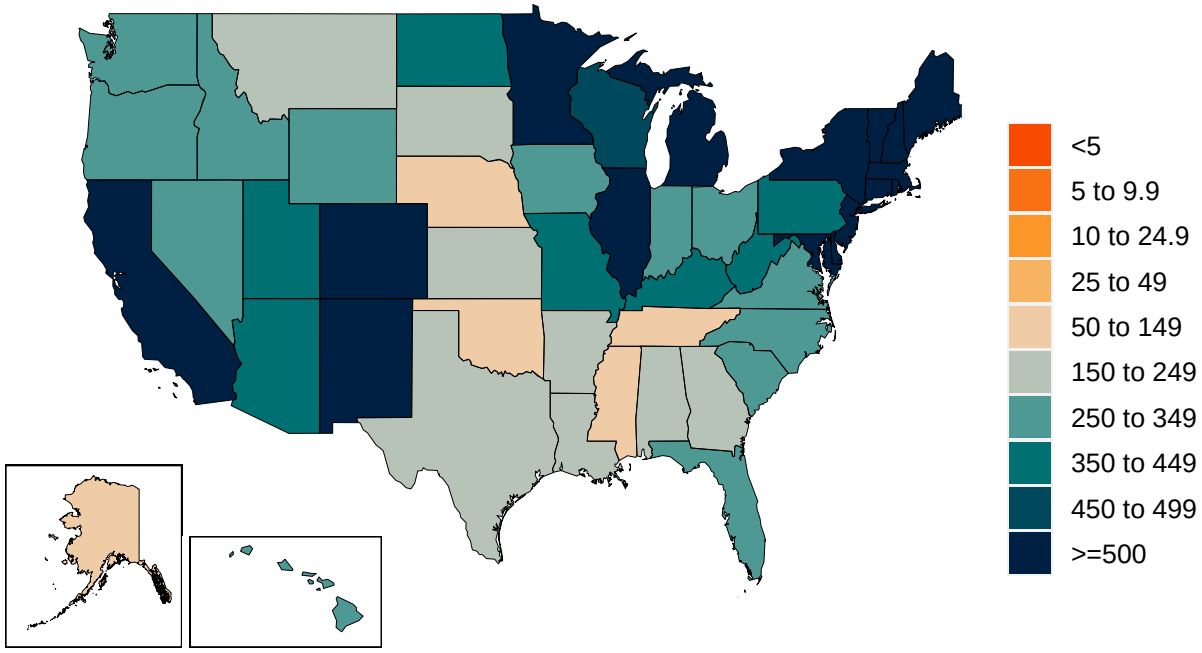


Table 3. Estimates of vaccine effectiveness for specific vaccines used in the model at preventing severe disease and infection. We use data from clinical trials directly, where available, and make estimates otherwise. More information can be found on our website.

	Effectiveness at preventing											
	Ancestral		Alpha		Beta		Gamma		Delta		Omicron	
Vaccine	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 10, 2022

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

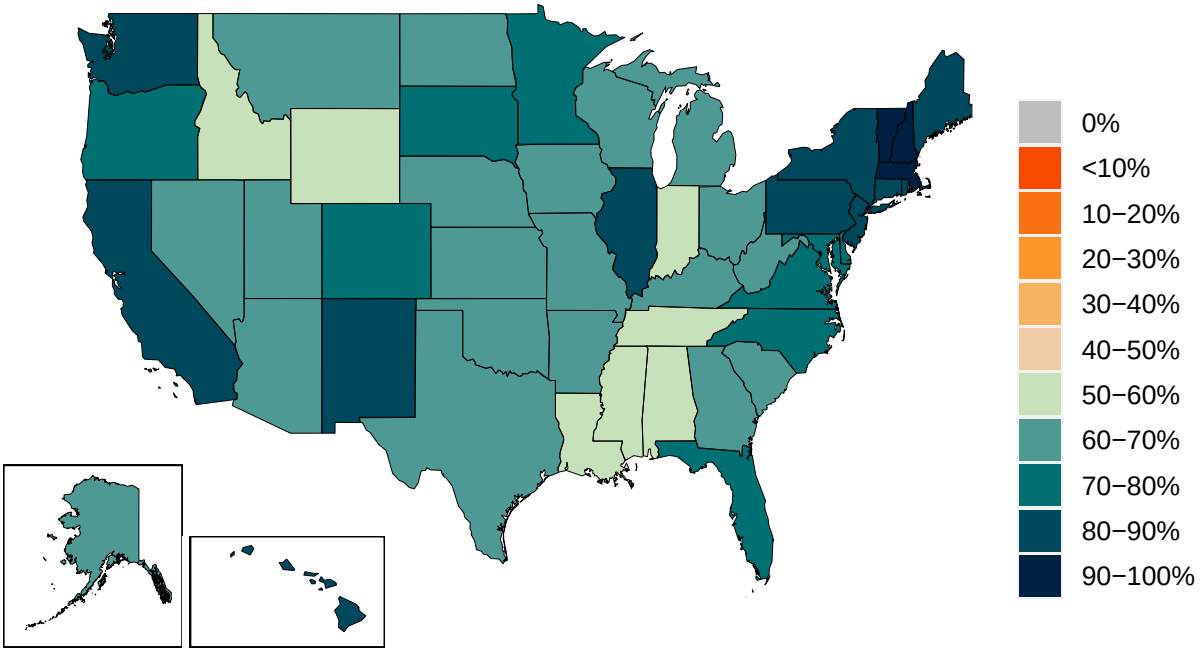


Figure 17.2 Percent of the population fully vaccinated against SARS-CoV-2

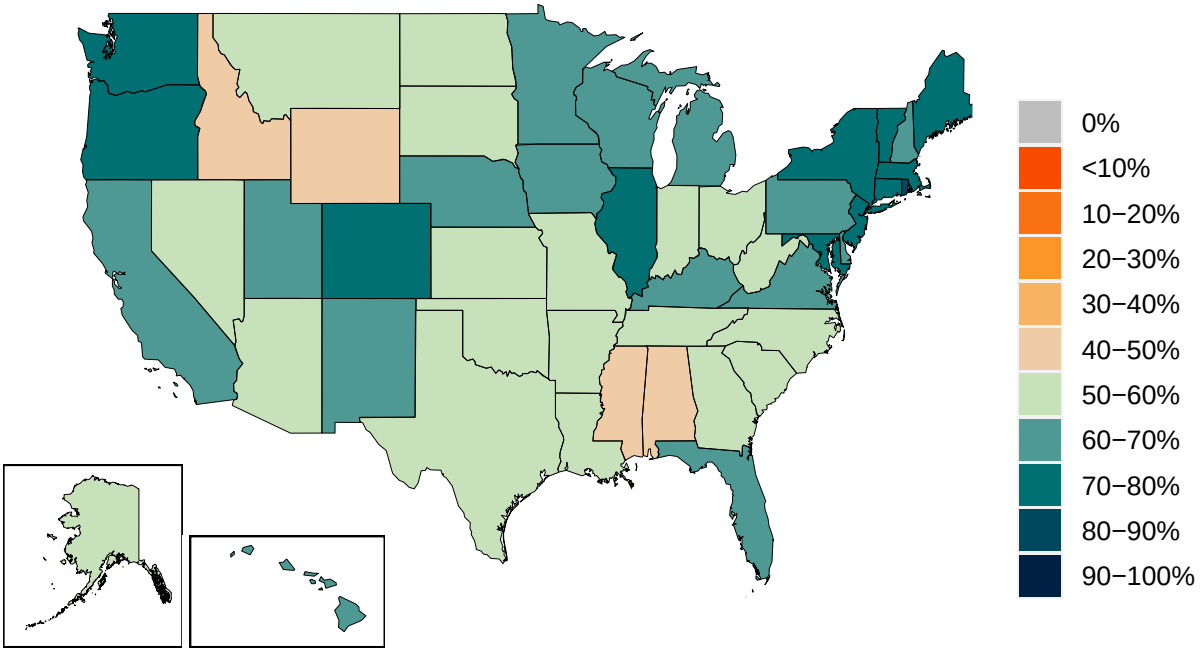


Figure 18.1. Trend in the estimated proportion of the population that is 12 years and older that has been vaccinated or would probably or definitely receive the COVID-19 vaccine if available. Note that vaccine acceptance is calculated using survey data from the 18+ population.

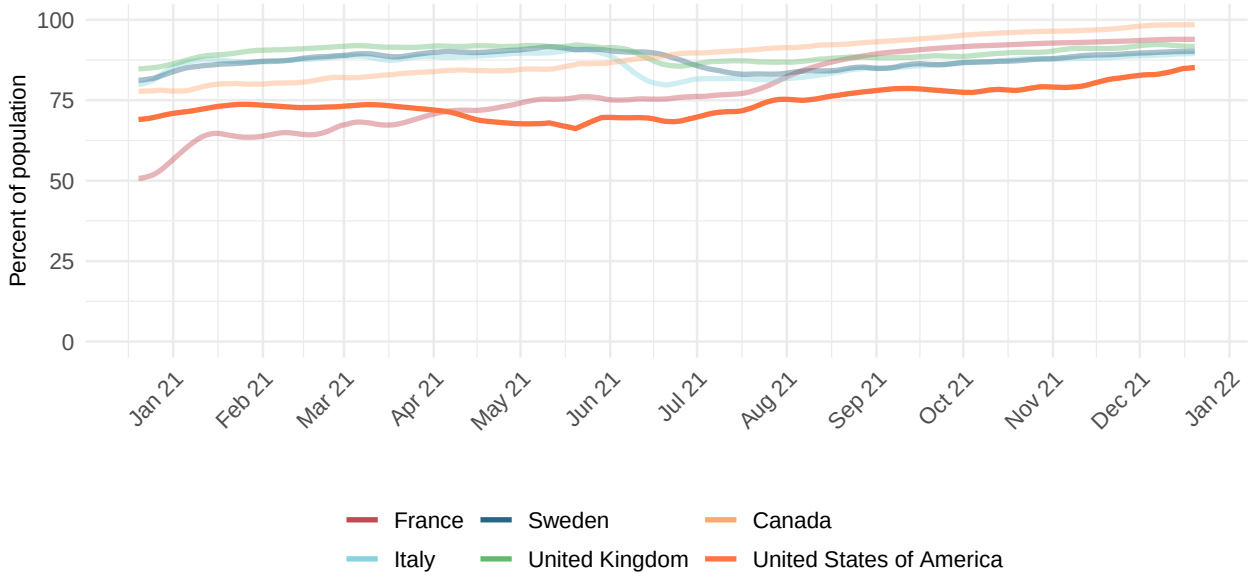


Figure 19.1. Estimated proportion of the population that is 12 years and older that has been vaccinated or would probably or definitely receive the COVID-19 vaccine if available. Note that vaccine acceptance is calculated using survey data from the 18+ population.

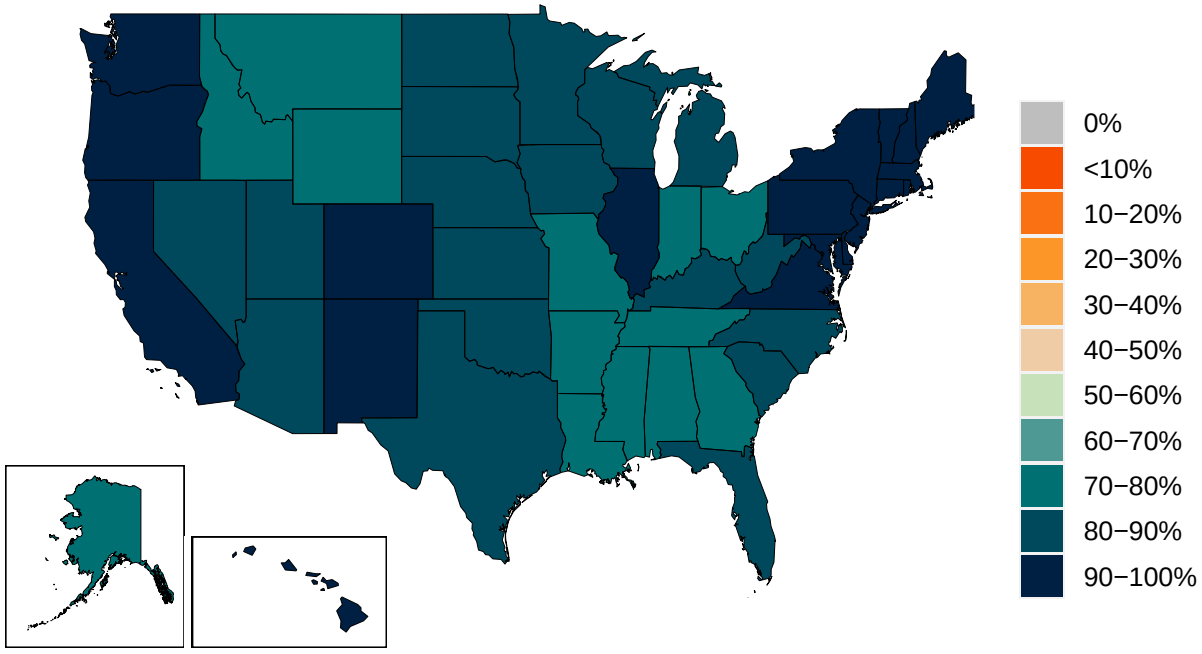
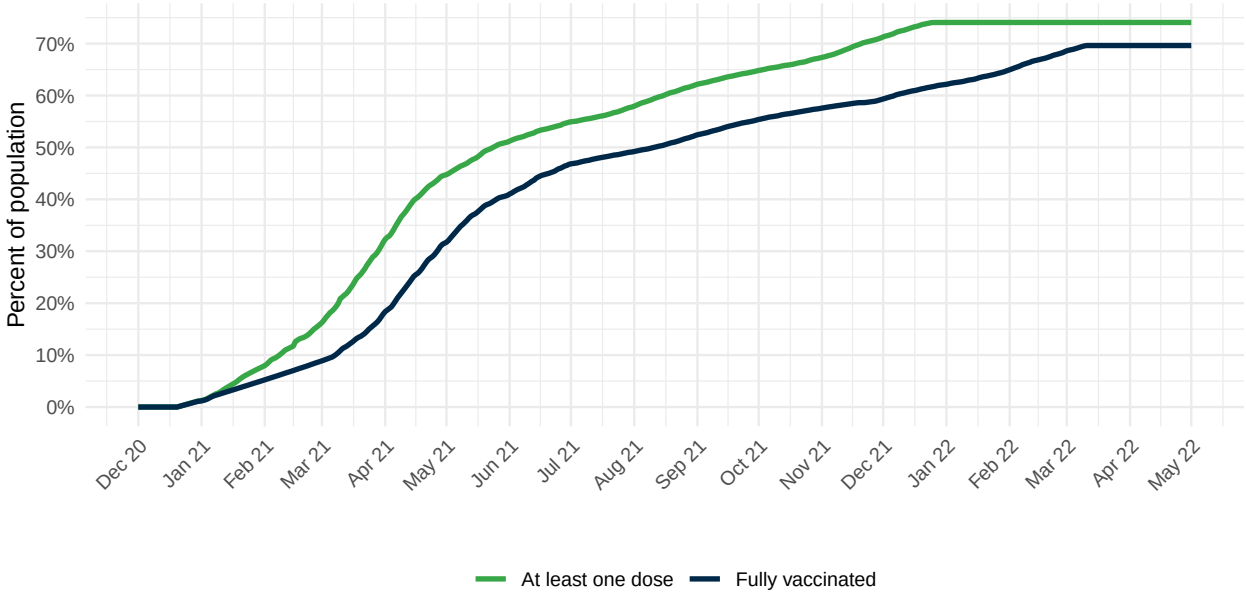


Figure 20.1. Percent of people who receive at least one dose of a COVID-19 vaccine and those who are fully vaccinated



Projections and scenarios

We produce 4 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 **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 4 scenarios

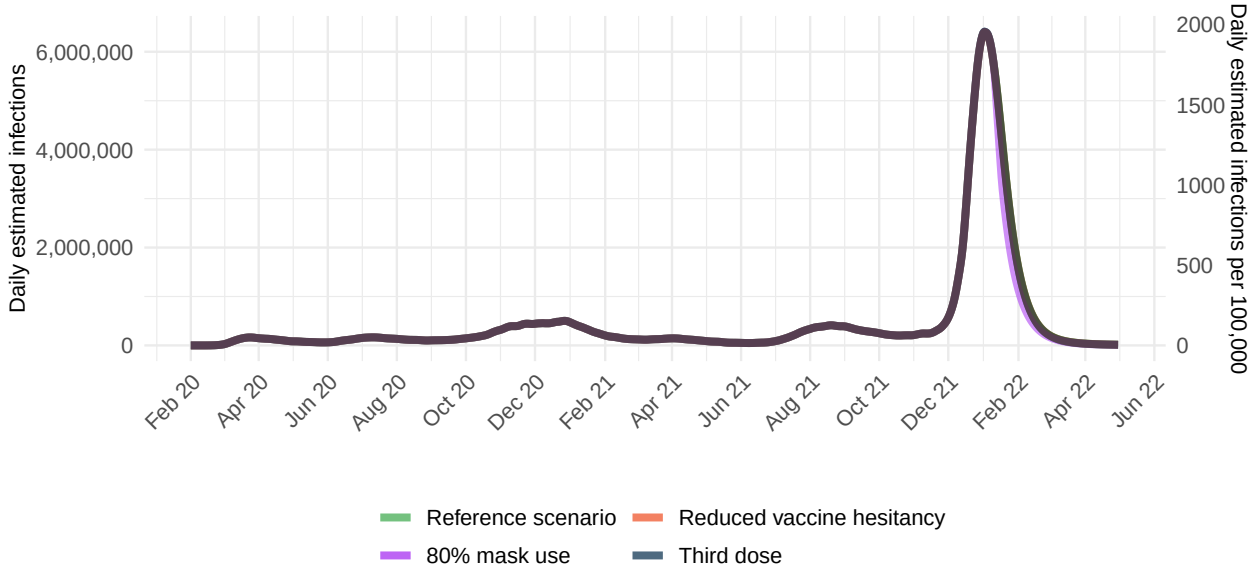


Figure 21.2. Daily COVID-19 reported cases until May 01, 2022 for 4 scenarios

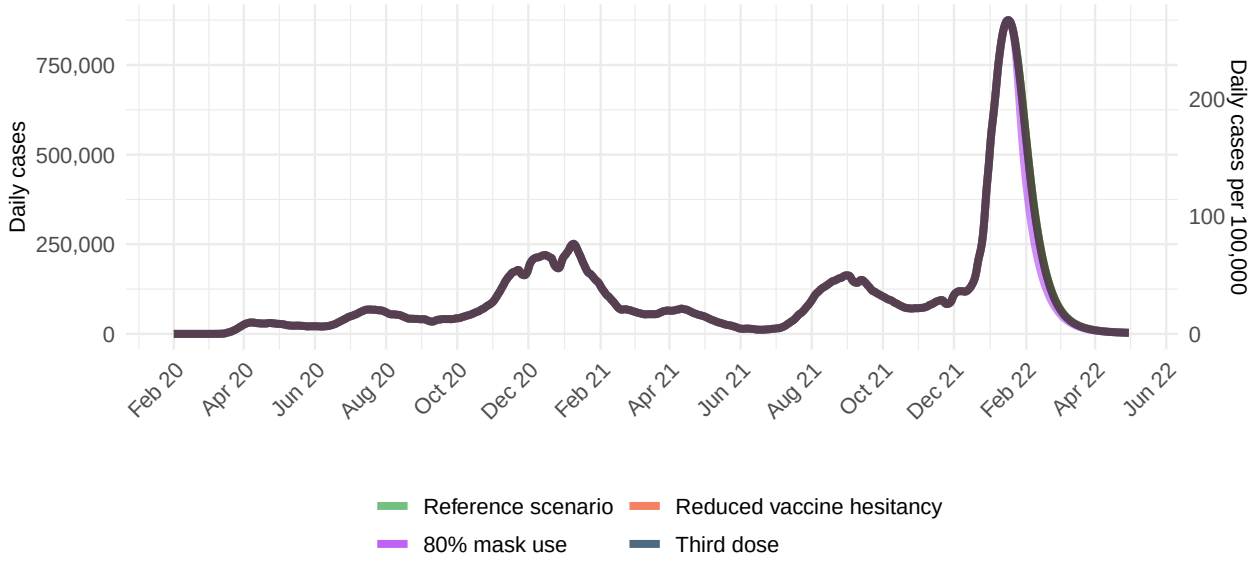


Figure 21.3. Daily COVID-19 hospital census until May 01, 2022 for 4 scenarios

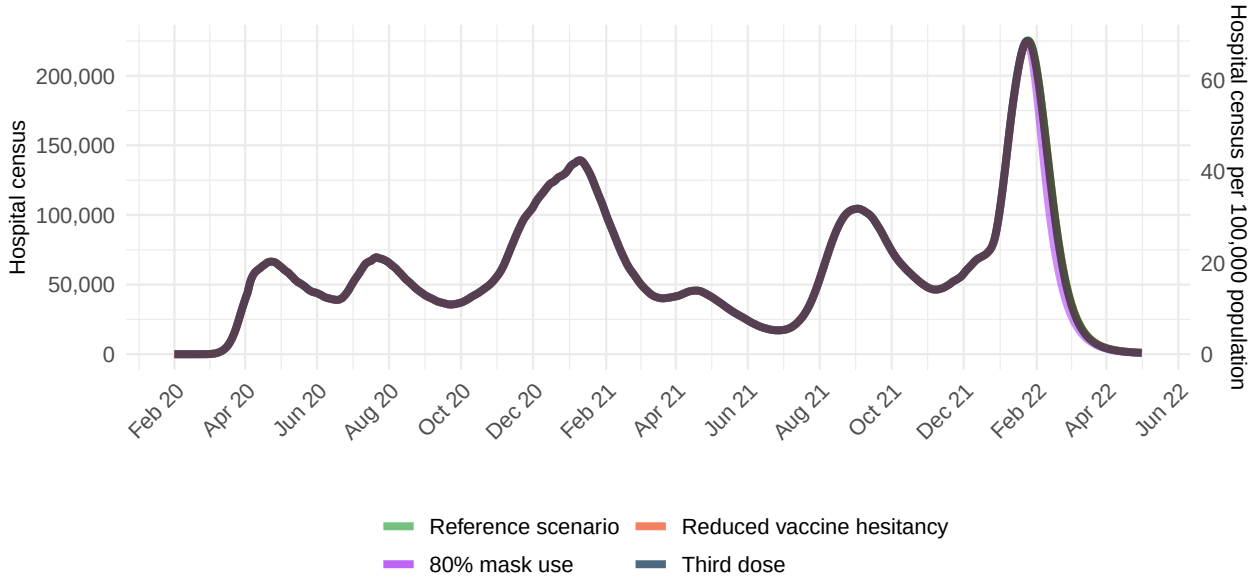


Figure 21.4 Reported daily COVID-19 deaths per 100,000

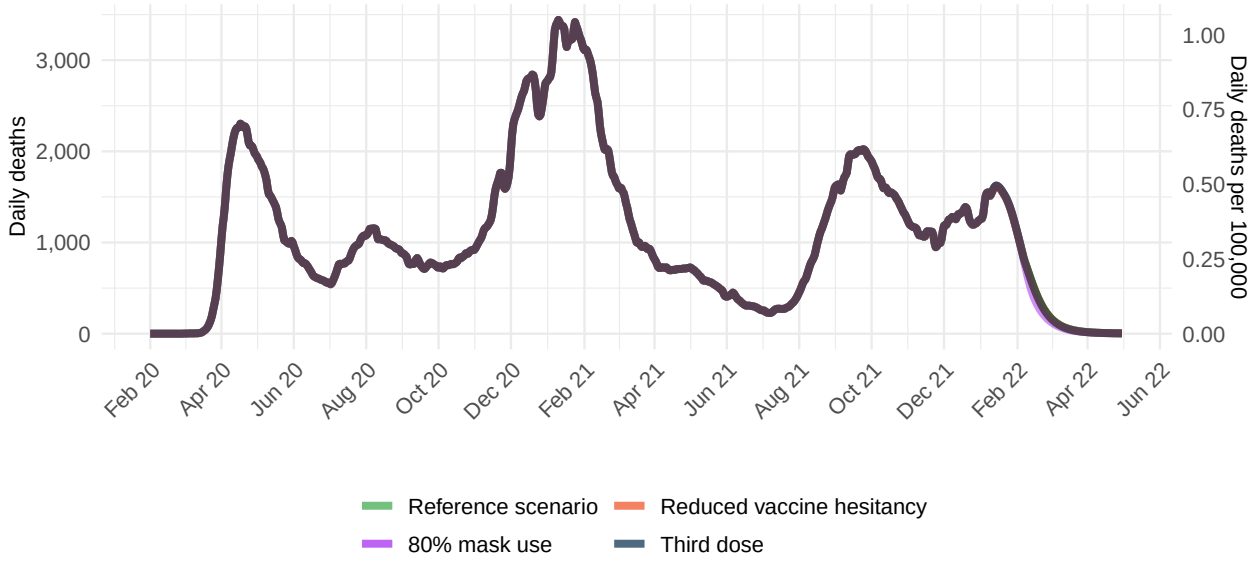


Figure 21.5 Total daily COVID-19 deaths per 100,000

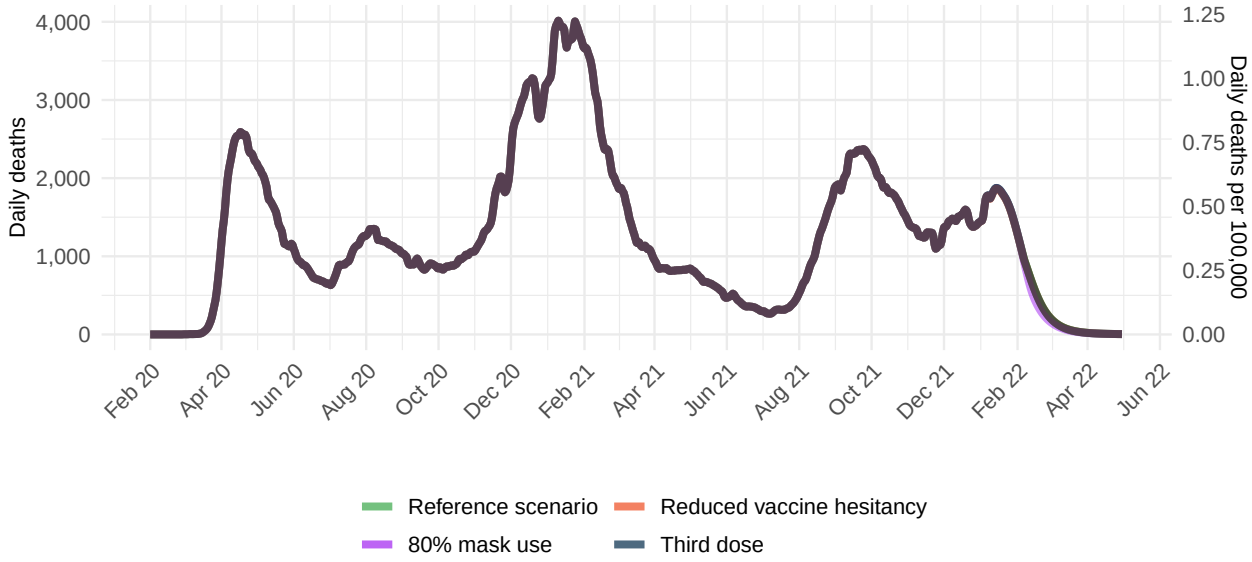


Figure 22.1. Comparison of reference model projections with other COVID modeling groups. For this comparison, we are including projections of daily COVID-19 deaths from other modeling groups when available, last model update in brackets: Delphi from the Massachusetts Institute of Technology (Delphi) [January 14, 2022], Imperial College London (Imperial) [December 26, 2021], the SI-KJalpha model from the University of Southern California (SIKJalpha) [January 13, 2022], and the CDC Ensemble Model (CDC) [January 10, 2022]. Daily deaths from other modeling groups are smoothed to remove inconsistencies with rounding. Regional values are aggregates from available locations in that region.

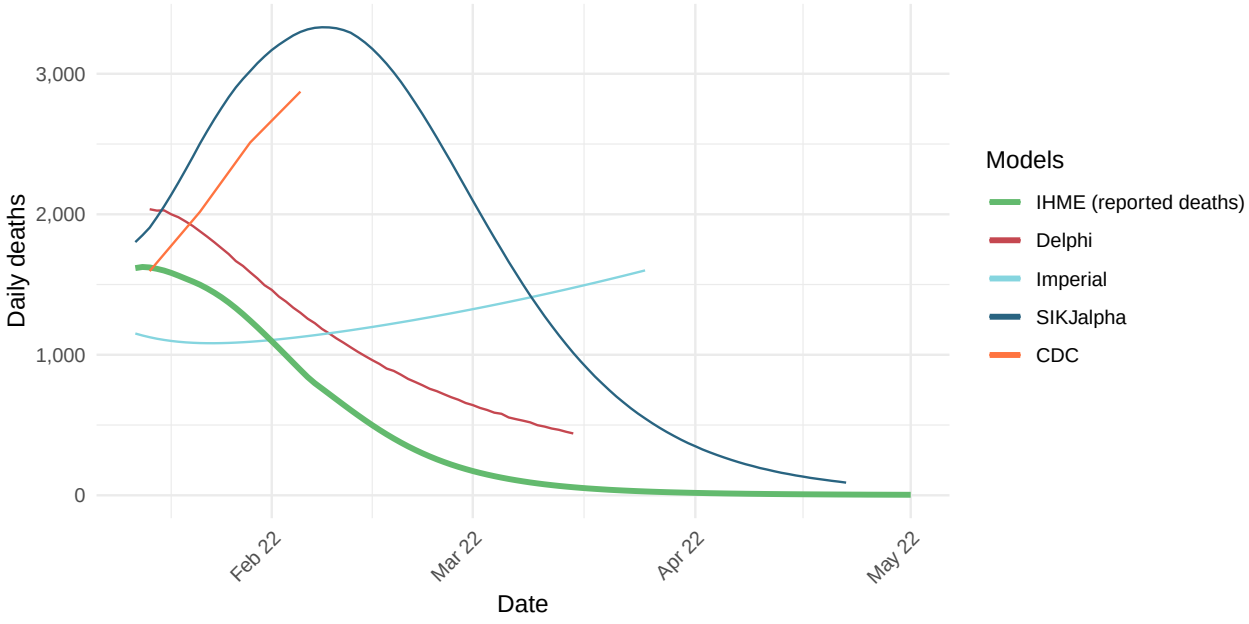


Figure 23.1. The estimated inpatient hospital usage is shown over time. The percent of hospital beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of beds occupied by COVID-19 patients. Less than 5% is considered *low stress*, 5-9% is considered *moderate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

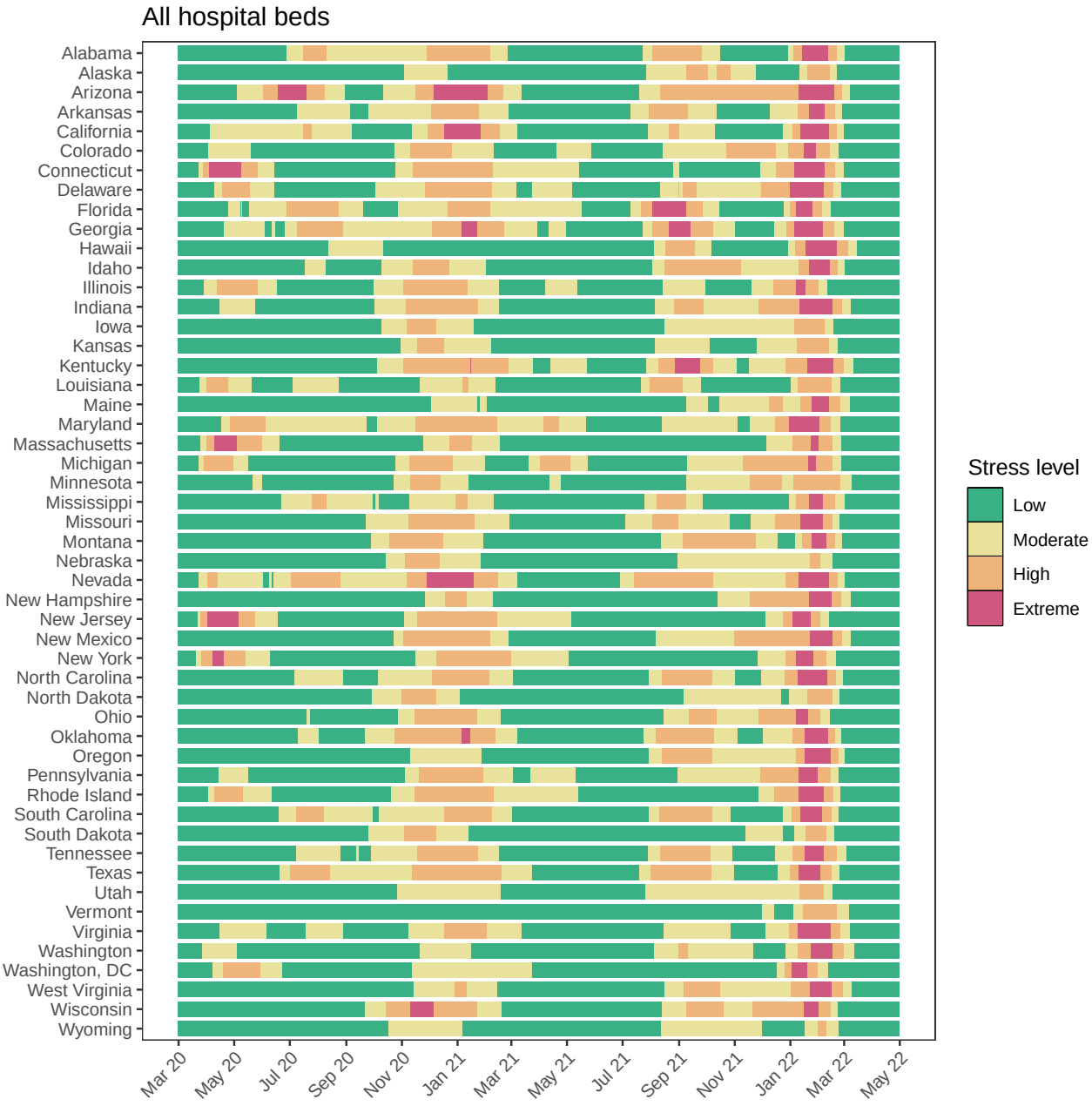
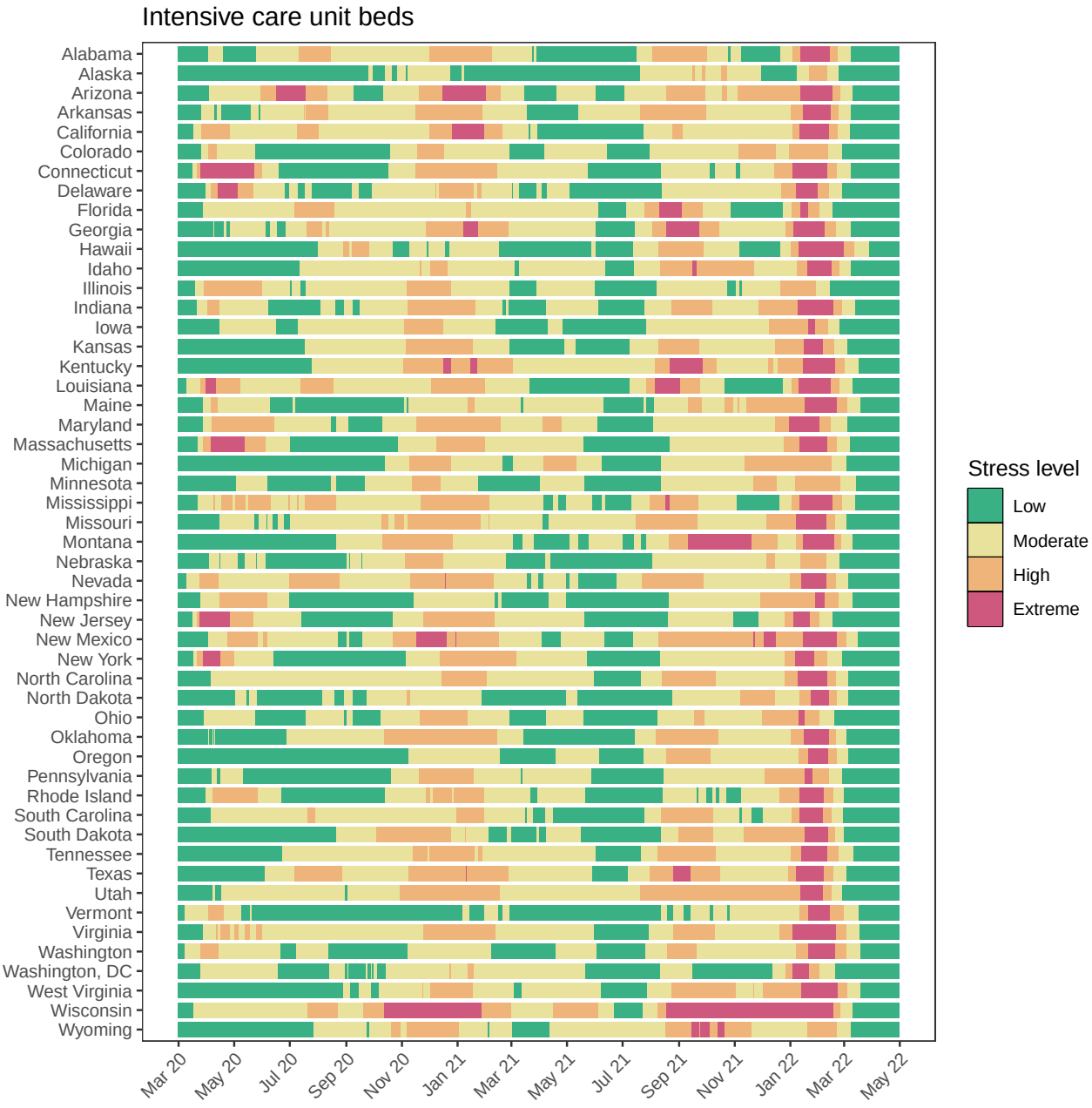


Figure 24.1. The estimated intensive care unit (ICU) usage is shown over time. The percent of ICU beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of ICU beds occupied by COVID-19 patients. Less than 10% is considered *low stress*, 10-29% is considered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