COVID-19 Results Briefing

United States of America

June 9, 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 June 8, 2022, with data through June 6, 2022.

The secondary Omicron wave has peaked and is declining in the Northeast while it continues to unfold in many parts of the South and West. Increases are larger in hospital admissions than in reported cases and smallest for daily deaths. Larger increases in hospital admissions is likely due to two factors: 1) low rates of reporting of home rapid antigen tests to public health authorities lowering the infection-detection rate, and 2) the continued problem of reporting incidental hospitalizations, namely admissions with COVID-19 but not due to COVID-19. The experience in the Northeast replicated the rapid peak and decline of secondary Omicron waves seen in Europe. We expect this pattern will play out in the US so that reported cases at the national level should decline through June and remain relatively low through to the fall unless a new variant emerges.

The trajectory of Omicron later in the summer and in the fall will be determined by the pattern of waning immunity from vaccination and infection. More recent studies do suggest that Omicron provides considerable protection against subsequent Omicron infection even from other subvariants. After the secondary Omicron wave subsides, we do not expect infections to increase again until late September. Longer-range models do suggest further increases in the fall. The combination of fourth-dose boosters and wider use of antivirals as needed should keep the death toll in the winter down to levels far below the last winter.

The challenge for the coming months is not Omicron but the possible emergence of a new variant. Three aspects will determine the impact of a new variant: transmissibility, immune escape, and severity. Further increases in transmissibility over BA.4 or BA.5 will have a very limited impact if cross-omicron variant immunity stays as high as observed for BA.2 versus BA1. A much bigger issue is the emergence of a variant with considerable immune escape. However, even a variant with substantial immune escape will only cause a major risk for the US if it is associated with considerable increases in severity compared to Omicron. The combination of immune escape and increased severity is certainly possible. Surveillance efforts to help detect the emergence of new variants with immune escape and increased severity should be maintained and strengthened around the world. Hospital and death reporting for COVID-19-positive patients should be disaggregated by diagnosis with separate reporting of hospital admissions and deaths with a respiratory syndrome. In this way, incidental admissions and deaths can be removed from the trend analysis. Jurisdictions should be careful to not overreact to the secondary Omicron wave given no evidence of substantial increases in deaths to date.

Current situation

- Estimated daily infections in the last week decreased to 567,000 per day on average compared to 610,000 the week before (Figure 1.1). Daily hospital census in the last week (through June 6) increased to 33,000 per day on average compared to 31,000 the week before.
- Daily reported cases in the last week decreased to 90,000 per day on average compared to 101,000 the week before (Figure 2.1).
- Reported deaths due to COVID-19 in the last week decreased to 290 per day on average compared to 310 the week before (Figure 3.1).
- Total deaths due to COVID-19 in the last week decreased to 370 per day on average compared to 400 the week before (Figure 3.1). This makes COVID-19 the number six cause of death in the US this week (Table 1). Estimated total daily deaths due to COVID-19 in the past week were 1.3 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 Montana (Figure 4.1).
- The daily rate of total deaths due to COVID-19 is greater than 4 per million in four states (Figure 4.2).
- We estimate that 81% of people in the US have been infected at least once as of June 6 (Figure 6.1). Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 18 states (Figure 7.1).
- The infection-detection rate in the US was close to 14% on June 6 (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 remains the dominant variant in all states.

Trends in drivers of transmission

- Mobility last week was 7% lower than the pre-COVID-19 baseline (Figure 11.1). Mobility was lower than 15% of baseline in two states (Figure 12.1).
- As of May 30, in the COVID-19 Trends and Impact Survey, 18% of people self-reported that they always wore a mask when leaving their home (Figure 13.1).
- There were 259 diagnostic tests per 100,000 people on June 6 (Figure 15.1).
- As of June 6, 33 states and the District of Columbia have reached 70% or more of the population who have received at least one vaccine dose, and 21 states and the District of Columbia have reached 70% or more of the population who are fully vaccinated (Figures 17.1 and 17.2). 79% of people in the US have received at least one vaccine dose, and 68% are fully vaccinated.

- In the US, 86.2% of the population that is 12 years and older say they would accept a vaccine for COVID-19 (Figure 18.1). The proportion of the population who are open to receiving a COVID-19 vaccine ranges from 65% in West Virginia to 100% in the District of Columbia (Figure 19.1). Note that vaccine acceptance is calculated using survey data from the 18+ population.
- As of May 30, 2022, 2% of the population in the US say they would accept a vaccine for COVID-19 but have not yet been vaccinated.
- In our current reference scenario, we expect that 258.9 million people will be vaccinated with at least one dose by October 1 (Figure 21.1). We expect that 73% of the population will be fully vaccinated by October 1.

Projections and scenarios

We produce three scenarios when projecting COVID-19. The **reference scenario** is our forecast of what we think is most likely to happen:

- 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 will decline to 50% of the minimum level it reached between January 1, 2021, and May 1, 2022. This decline begins after the last observed data point in each location and transitions linearly to the minimum over a period of six weeks.
- Mobility increases as vaccine coverage increases.
- 80% of those who have had two doses of vaccine (or one dose for Johnson & Johnson) receive a third dose at six months after their second dose.
- Antiviral utilization for COVID-19 risk prevention in high-risk populations will reach 80% between June 15, 2022, and July 31, 2022. This applies in high-income countries, but not low- and middle-income countries, and this rollout assumption follows a similar pattern to global vaccine rollouts.

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

The **antiviral access scenario** makes all the same assumptions as the reference scenario but assumes globally distributed antivirals and extends coverage to all low- and middle-income countries between July 15, 2022, and September 15, 2022.

Infections

- Daily estimated infections in the **reference scenario** will decline to 223,920 by August 19, 2022 (Figure 23.1).
- Daily estimated infections in the **80% mask use scenario** will decline to 17,560 by September 6, 2022 (Figure 23.1).

Cases

- Daily estimated cases in the **reference scenario** will decline to 26,520 by September 3, 2022 (Figure 23.2).
- Daily estimated cases in the **80% mask use scenario** will decline to 2,110 by September 21, 2022 (Figure 23.2).

Hospitalizations

- Daily hospital census in the **reference scenario** will decline to 5,330 by September 4, 2022 (Figure 23.3). At some point from June through October 1, one state will have high or extreme stress on hospital beds (Figure 25.1). At some point from June through October 1, no states will have high or extreme stress on intensive care unit (ICU) capacity (Figure 26.1).
- Daily hospital census in the **80% mask use scenario** will decline to 420 by September 23, 2022 (Figure 23.3).

Deaths

- In our **reference scenario**, our model projects 1,027,000 cumulative reported deaths due to COVID-19 on October 1. This represents 23,000 additional deaths from June 6 to October 1. Daily reported COVID-19 deaths in the **reference scenario** will rise to 390 by June 29, 2022 (Figure 23.4).
- Under our **reference scenario**, our model projects 1,307,000 cumulative total deaths due to COVID-19 on October 1. This represents 30,000 additional deaths from June 6 to October 1 (Figure 23.5).
- In our **80% mask use scenario**, our model projects 1,018,000 cumulative reported deaths due to COVID-19 on October 1. This represents 14,000 additional deaths from June 6 to October 1. (Figure 23.4).
- Figure 24.1 compares our reference scenario forecasts to other publicly archived models. The SIKJalpha model projects massive increases; other models do not.

Model updates

This month, we have made three alterations to our reference assumptions in the model. First, we expect the recent rollout of Paxlovid treatments in high-income settings to greatly reduce severe disease and death outcomes. We do not currently have data to inform levels of coverage, so we have introduced a simple scale-up model that assumes individuals over the age of 65 will be targeted for treatment, and access to treatment among this group will rise from 0% on June 15, 2022, to a maximum of 80% on July 31, 2022. Clinical trials suggest a Paxlovid provides an 88% reduction in the risk of hospitalization and death https://www.pfizer.com/news/press-release/press-release-detail/pfizer-announces-additional-phase-23-study-results among people treated within five days of symptom onset. We make a slightly more conservative assumption that the hospitalization and death rates will be reduced by 80% to account for variations in treatment timing and patient adherence in a real-world setting.

Second, survey data suggest that mask use is continuing to decline in most world locations. We have updated our reference mask use forecast to introduce a linear decline in mask use prevalence down to 50% of the minimum use level between January 1, 2021, and May 1, 2022, in each location. We have kept our previous assumption that mask use will continue at current levels in China, South Korea, Japan, Taiwan, Singapore, and South Africa, as current data do not suggest an imminent reduction.

Finally, similar to mask use, observed mobility continues to increase in much of the world. We have replaced our previous reference scenario that assumed current levels of mobility would persist indefinitely with a scenario that has mobility increase to match vaccine coverage. We continue to produce three scenarios when projecting COVID-19, but we have replaced the increased booster coverage scenario with an antiviral access scenario that examines the impact of more equitable distribution of Paxlovid to low- and middle-income countries (LMICs).

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

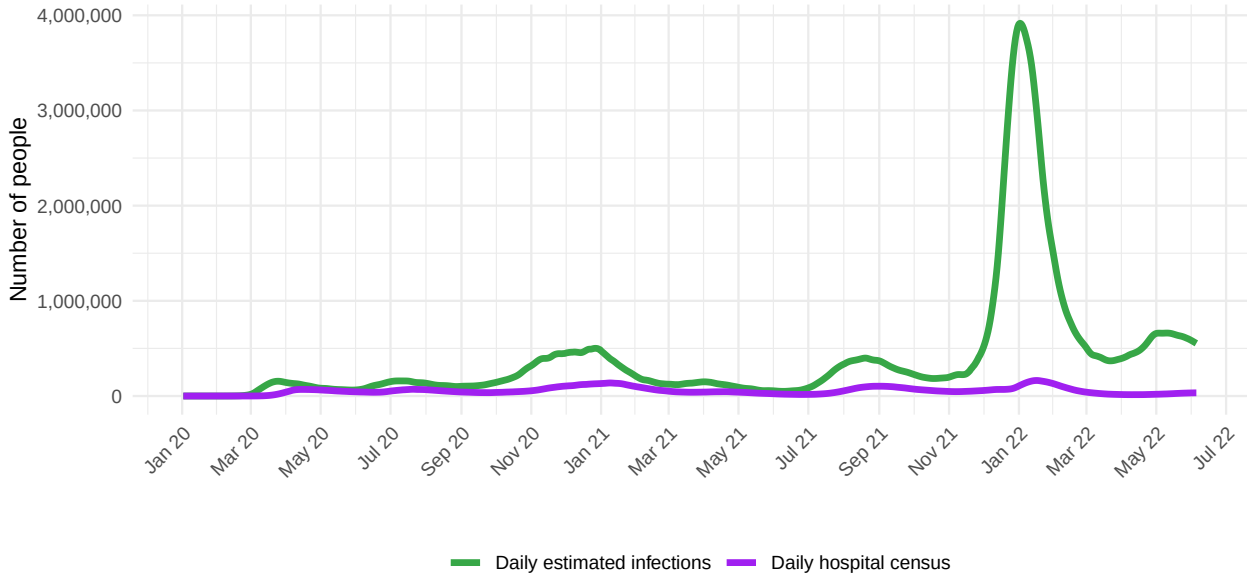


Figure 2.1: Reported daily COVID-19 cases, moving average

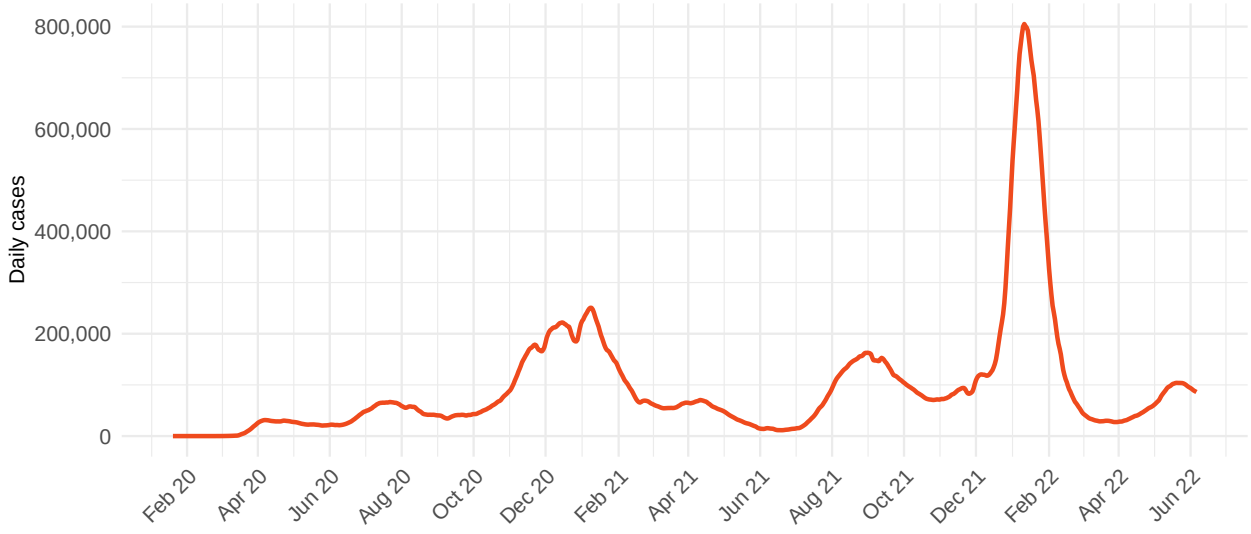
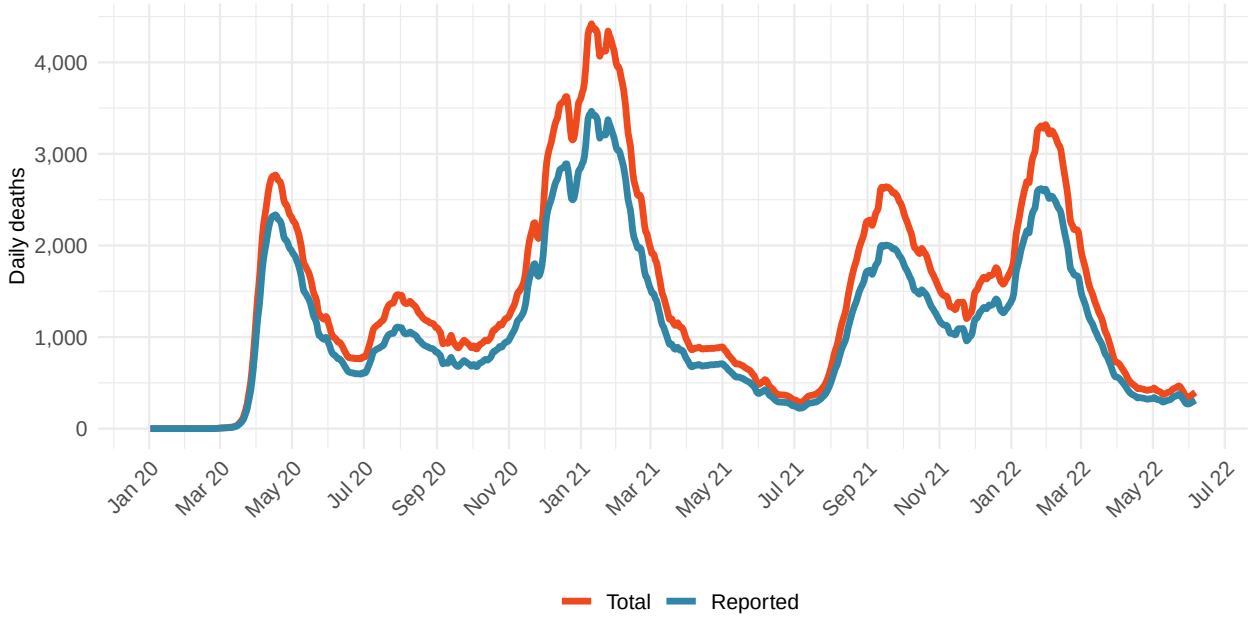


Table 1: Ranking of total deaths due to COVID-19 among the leading causes of mortality this week, assuming uniform deaths of non-COVID causes throughout the year

Cause name	Weekly deaths	Ranking
Ischemic heart disease	10,724	1
Tracheal, bronchus, and lung cancer	3,965	2
Chronic obstructive pulmonary disease	3,766	3
Stroke	3,643	4
Alzheimer's disease and other dementias	2,768	5
COVID-19	2,576	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 daily COVID-19 deaths



Daily COVID-19 death rate per 1 million on June 6, 2022

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

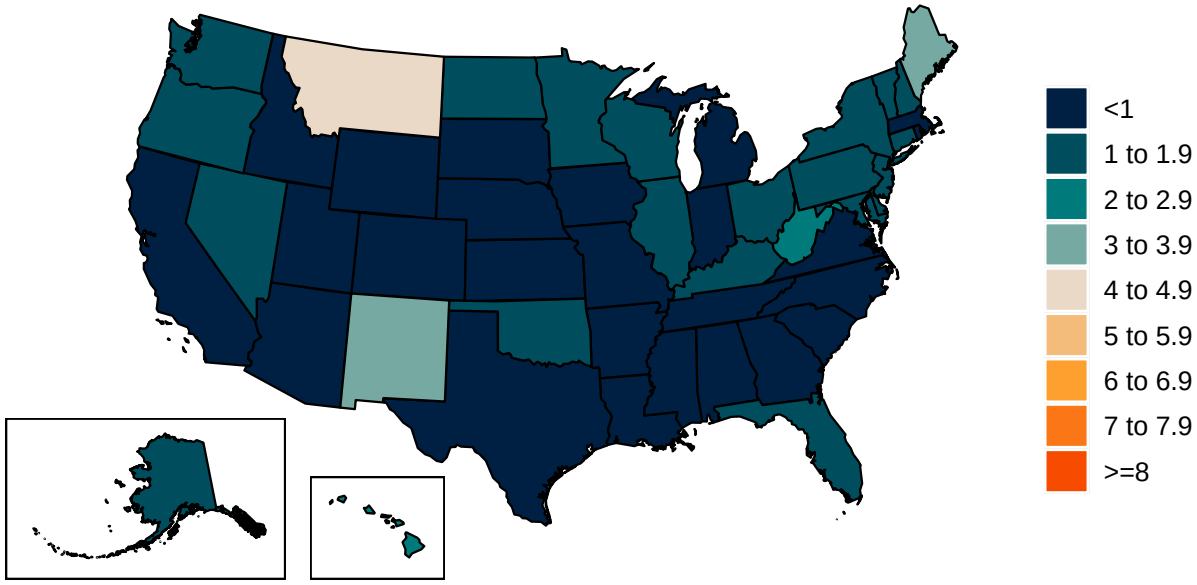
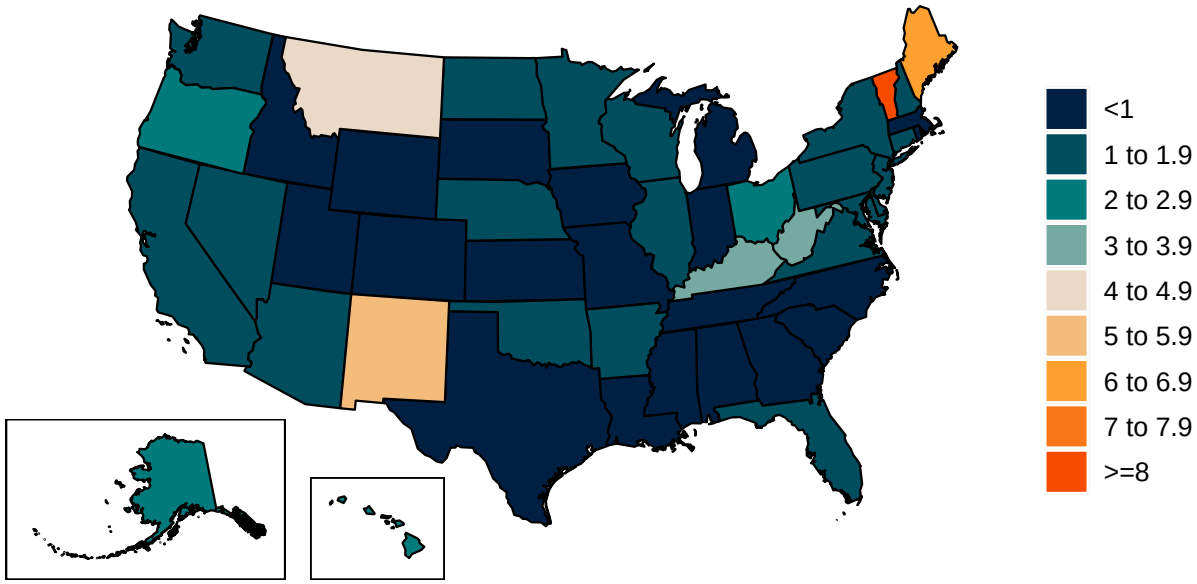


Figure 4.2: Daily total COVID-19 death rate per 1 million



Cumulative COVID-19 deaths per 100,000 on June 6, 2022

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

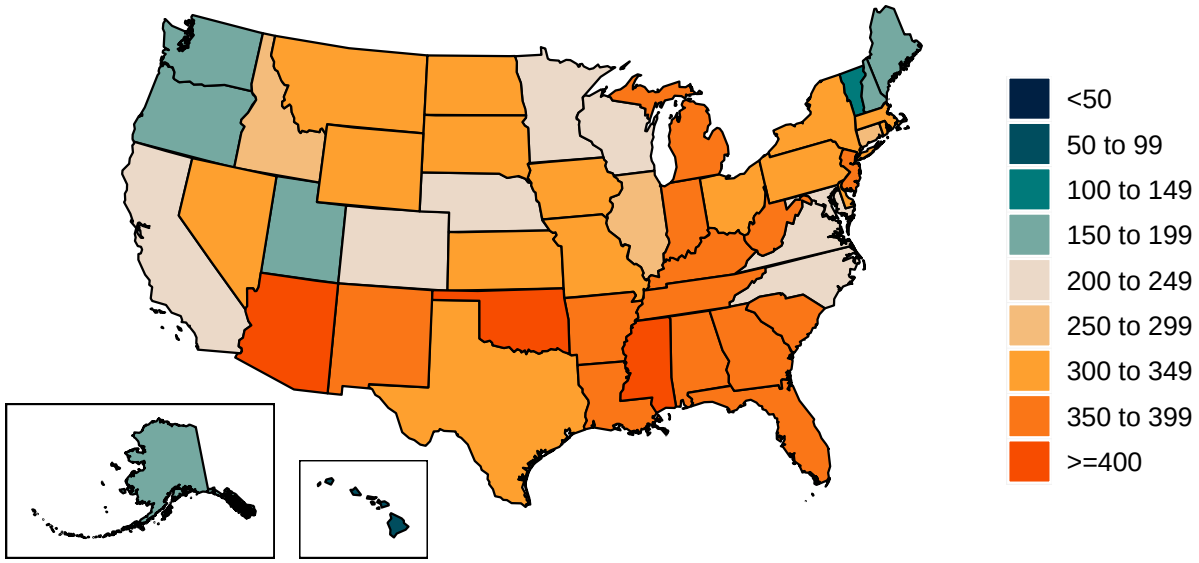


Figure 5.2: Total cumulative COVID-19 deaths per 100,000

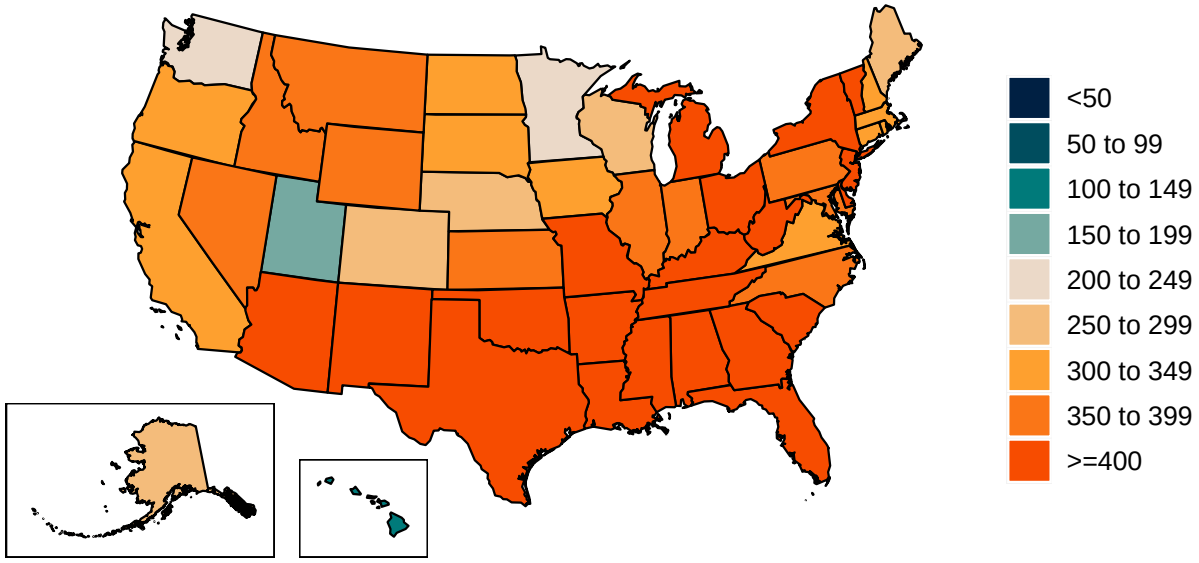


Figure 6.1: Estimated percent of the population infected with COVID-19 on June 6, 2022

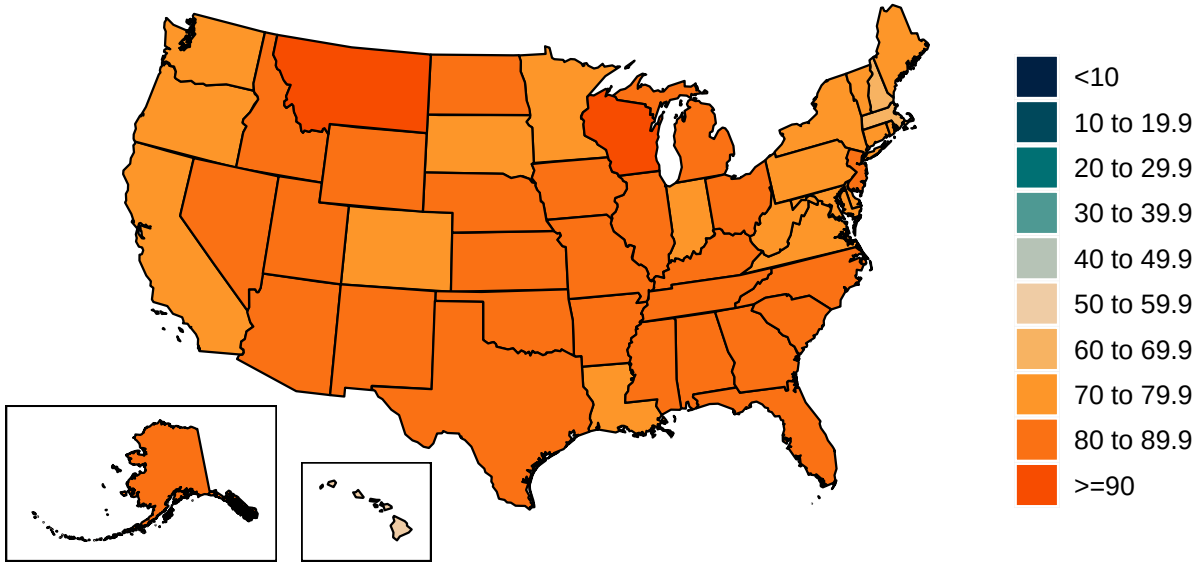


Figure 7.1: Mean effective R on May 26, 2022. Effective R less than 1 means that transmission should decline, all other things being held the same. The estimate of effective R is based on the combined analysis of deaths, case reporting, and hospitalizations where available. Current reported cases reflect infections 11-13 days prior, so estimates of effective R can only be made for the recent past.

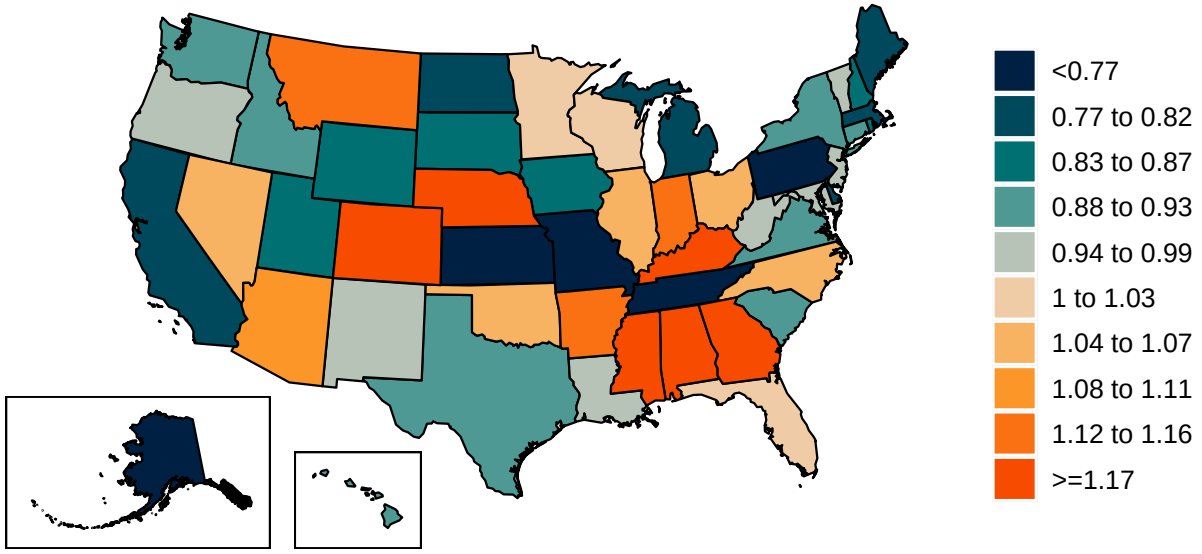
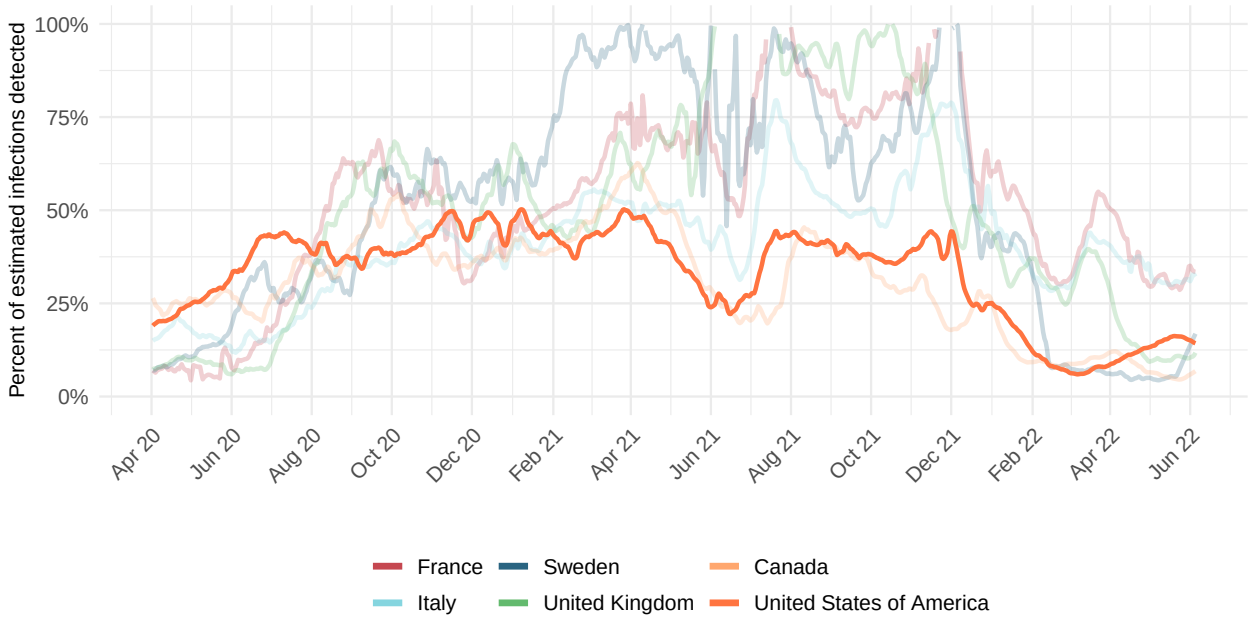


Figure 8.1: Percent of estimated COVID-19 infections detected. This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model. Due to measurement errors in cases and testing rates, the infection-detection rate can exceed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



Estimated percent of circulating SARS-CoV-2 for primary variant families on June 6, 2022

Figure 9.1: Estimated percent of new infections that are Alpha variant

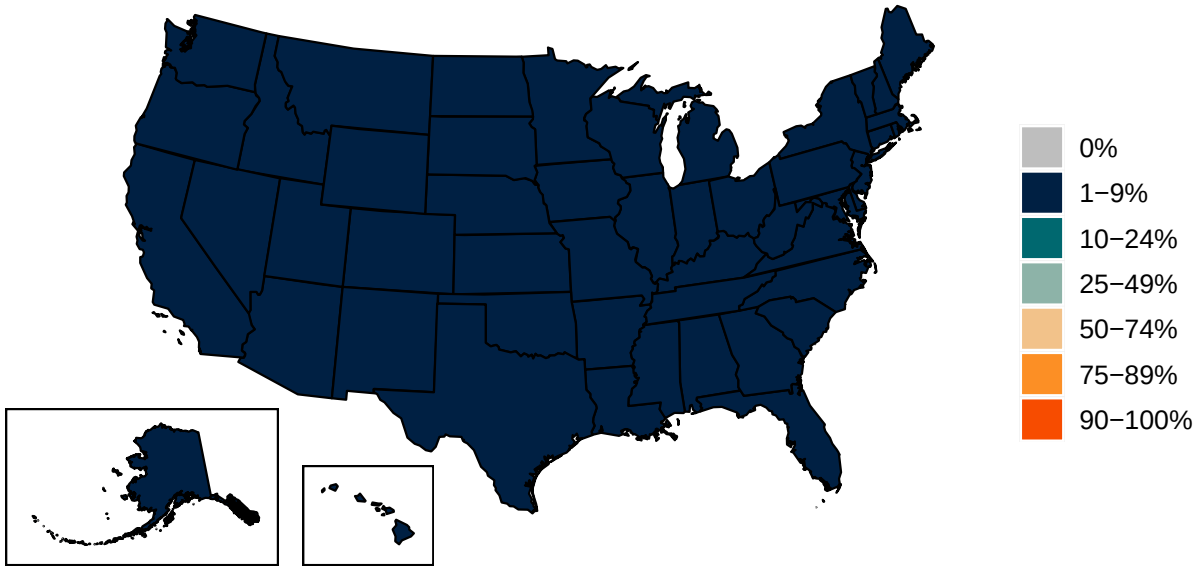


Figure 9.2: Estimated percent of new infections that are Beta variant

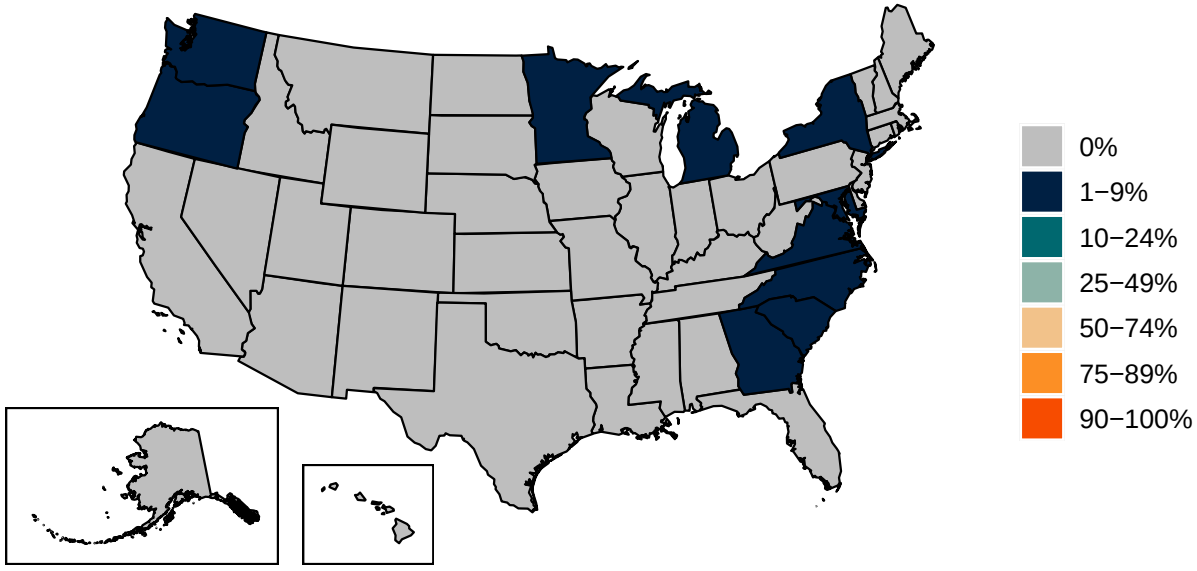


Figure 9.3: Estimated percent of new infections that are Delta variant

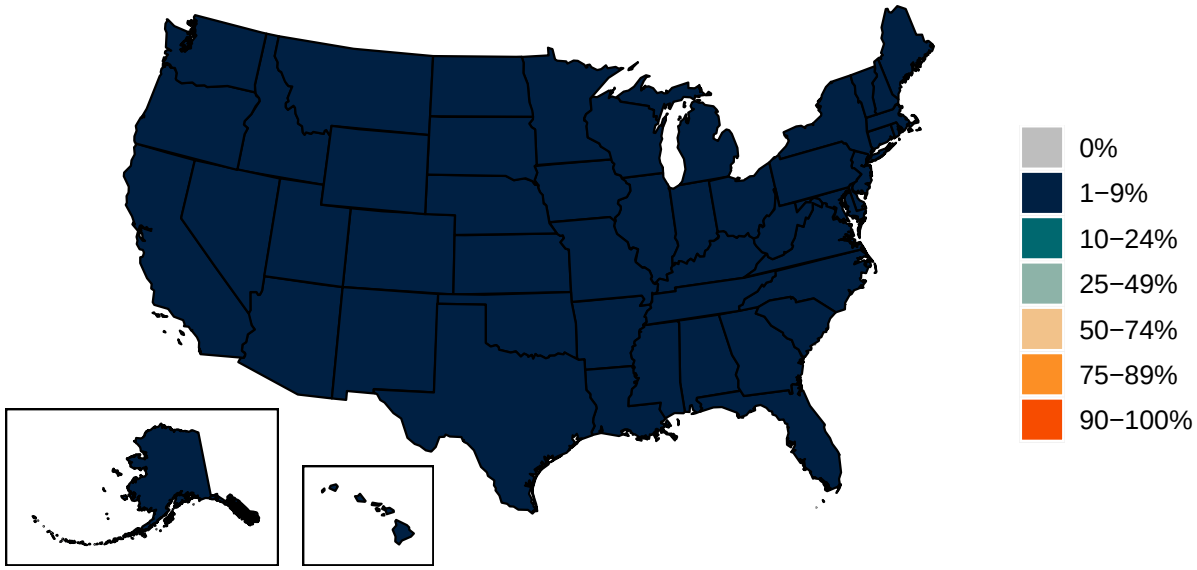


Figure 9.4: Estimated percent of new infections that are Gamma variant

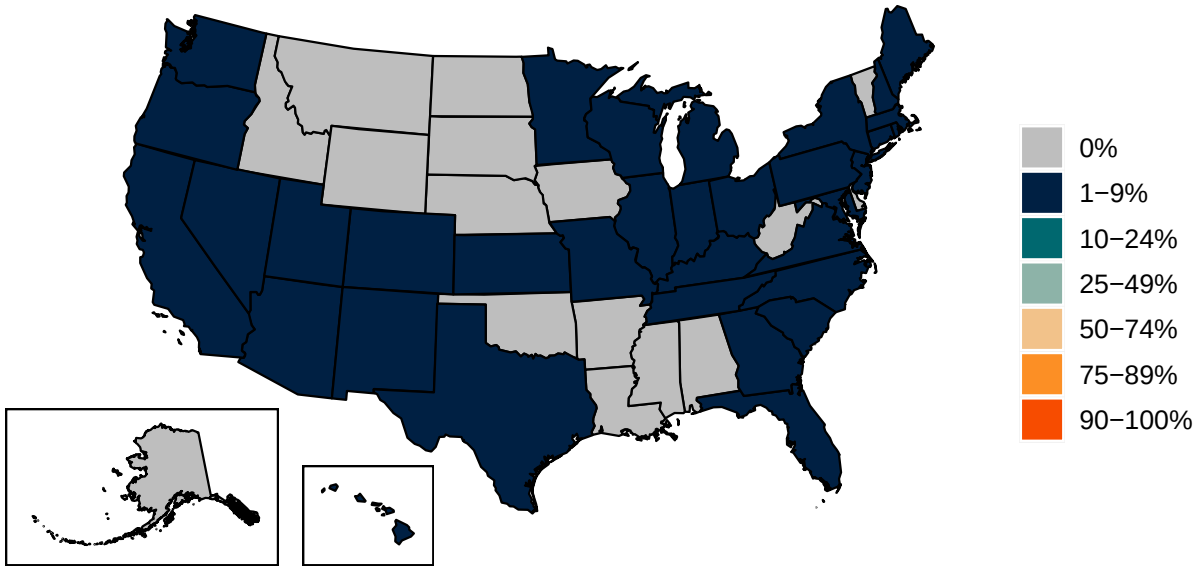


Figure 9.5: Estimated percent of new infections that are Omicron variant

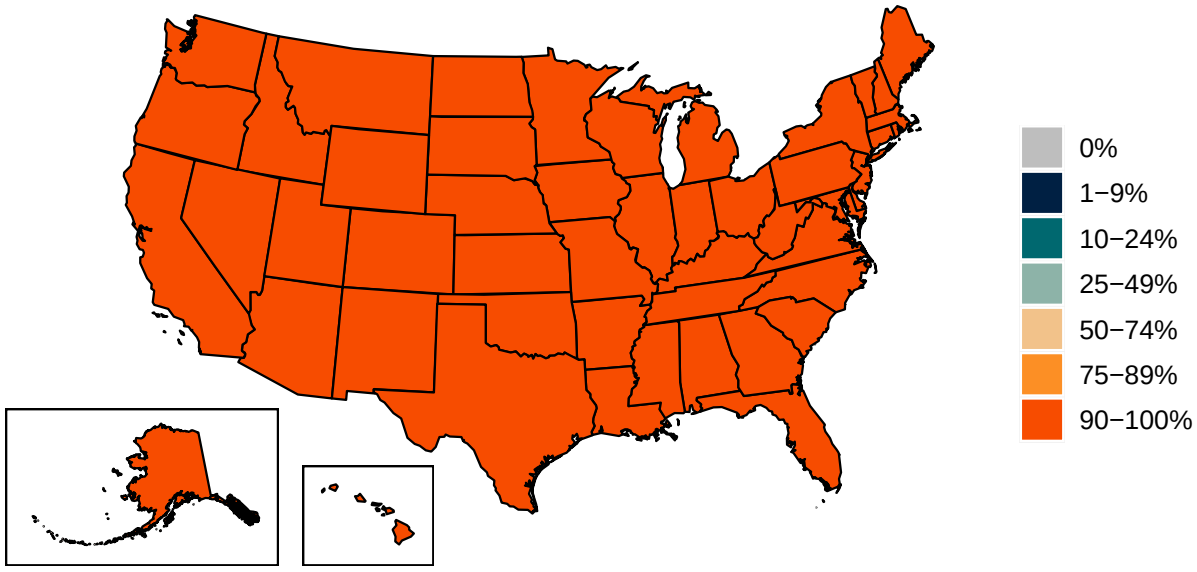
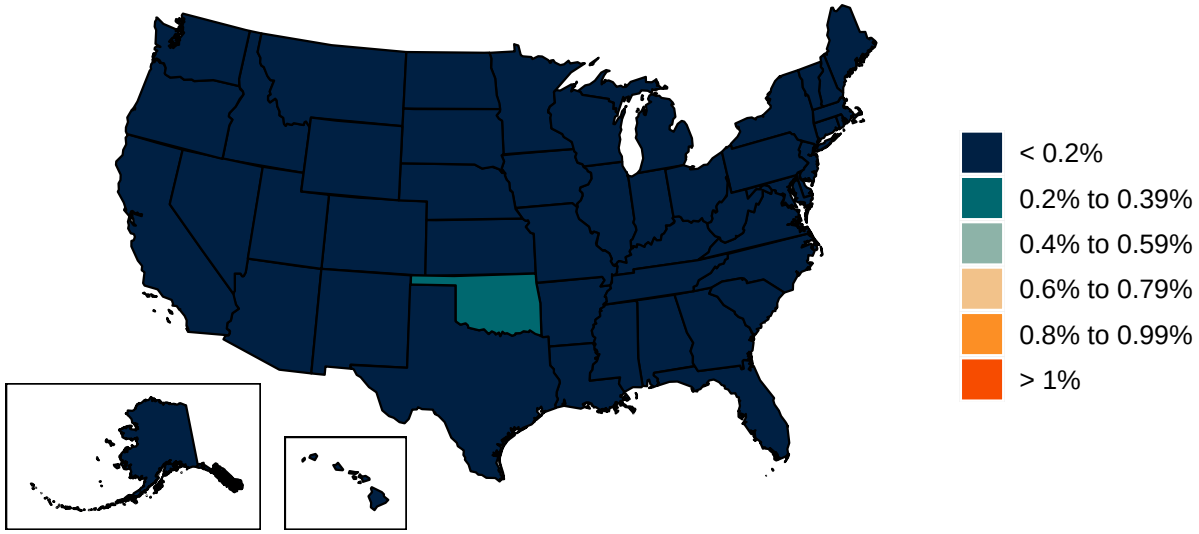


Figure 10.1: Infection-fatality rate on June 6, 2022. This is estimated as the ratio of COVID-19 deaths to estimated daily COVID-19 infections.



Critical drivers

Table 2: Current mandate implementation

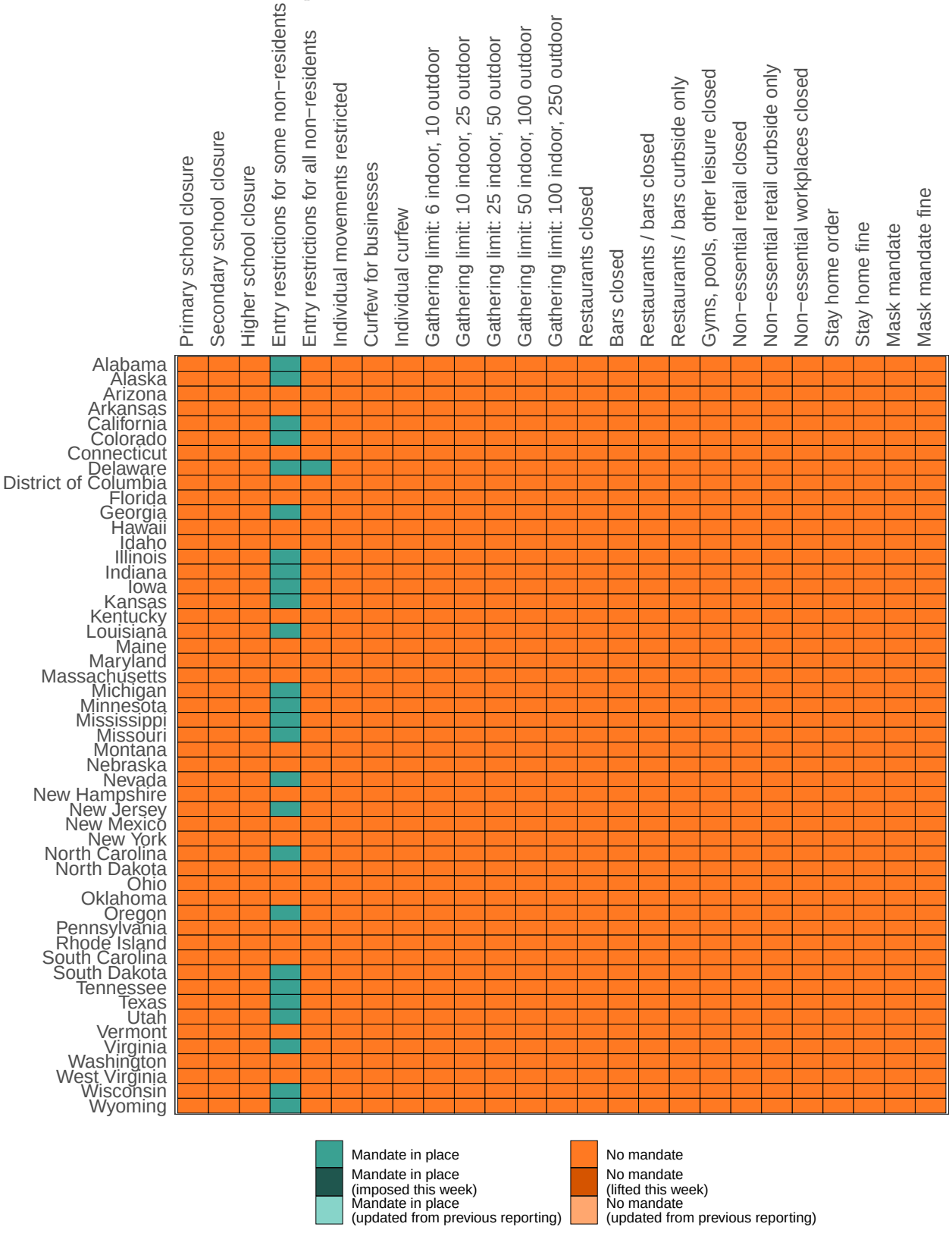


Figure 11.1: Trend in mobility as measured through smartphone app use, compared to January 2020 baseline

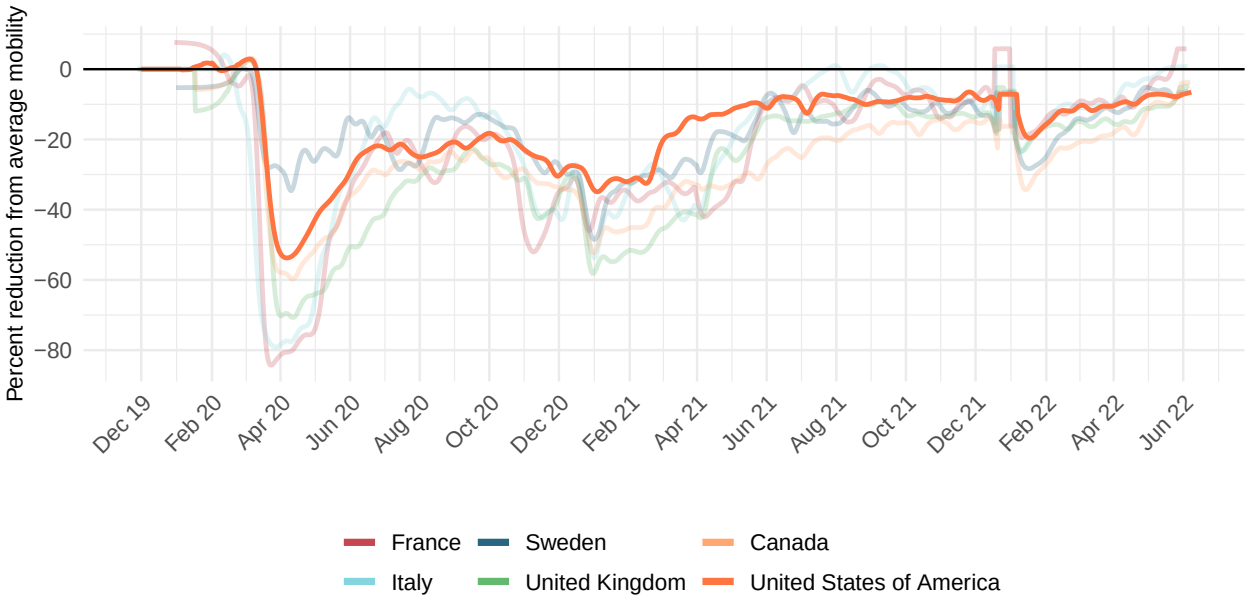


Figure 12.1: Mobility level as measured through smartphone app use, compared to January 2020 baseline (percent) on June 6, 2022

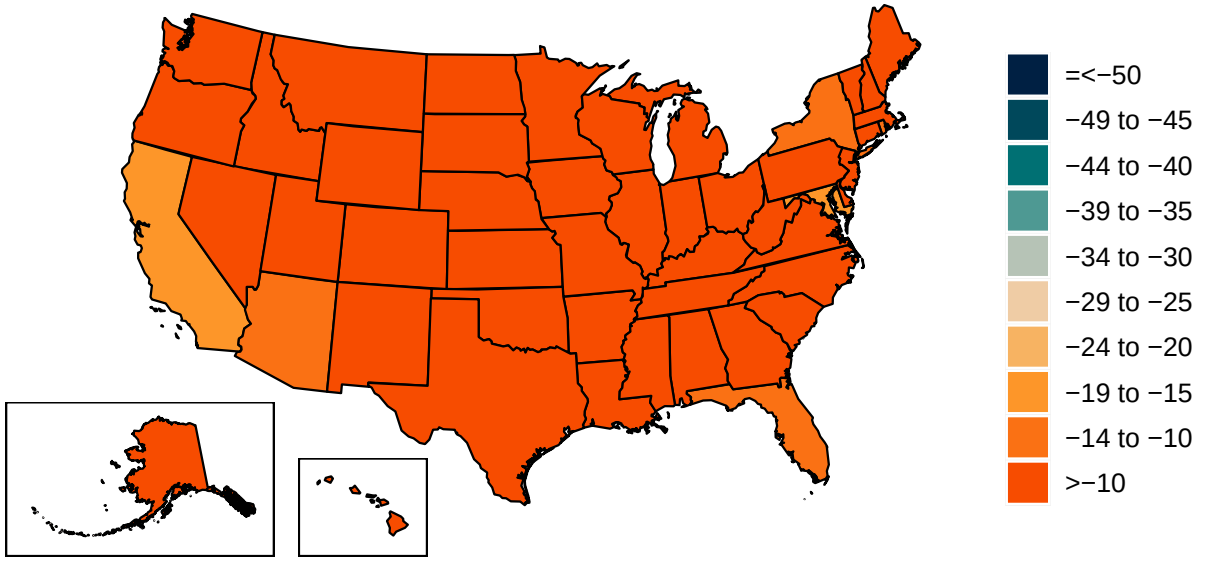


Figure 13.1: Trend in the proportion of the population reporting always wearing a mask when leaving home

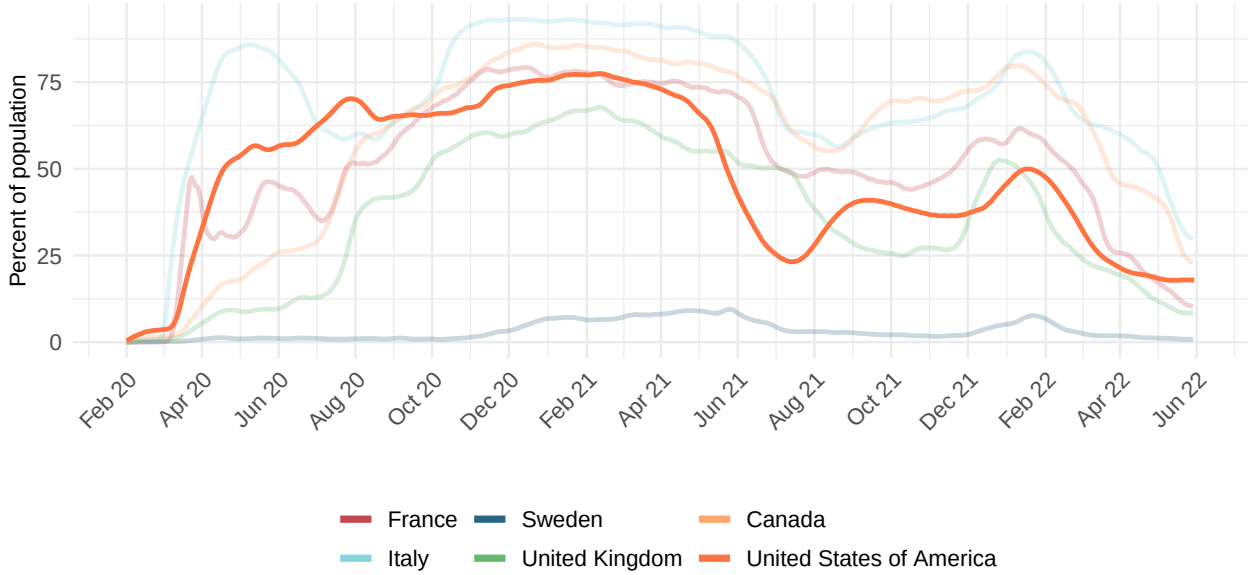


Figure 14.1: Proportion of the population reporting always wearing a mask when leaving home on June 6, 2022

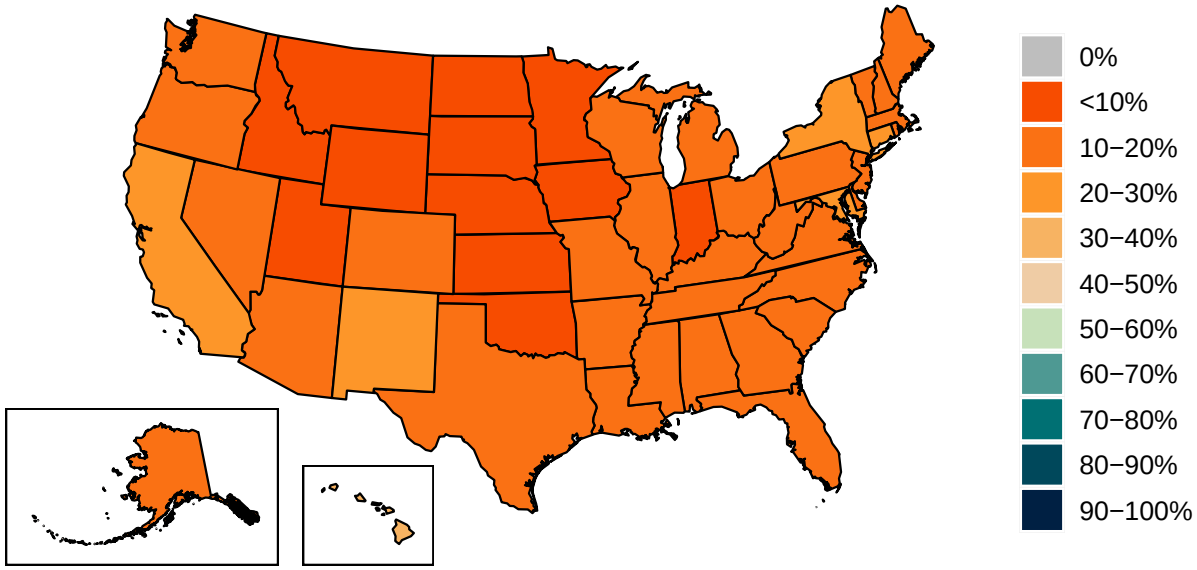


Figure 15.1: Trend in COVID-19 diagnostic tests per 100,000 people

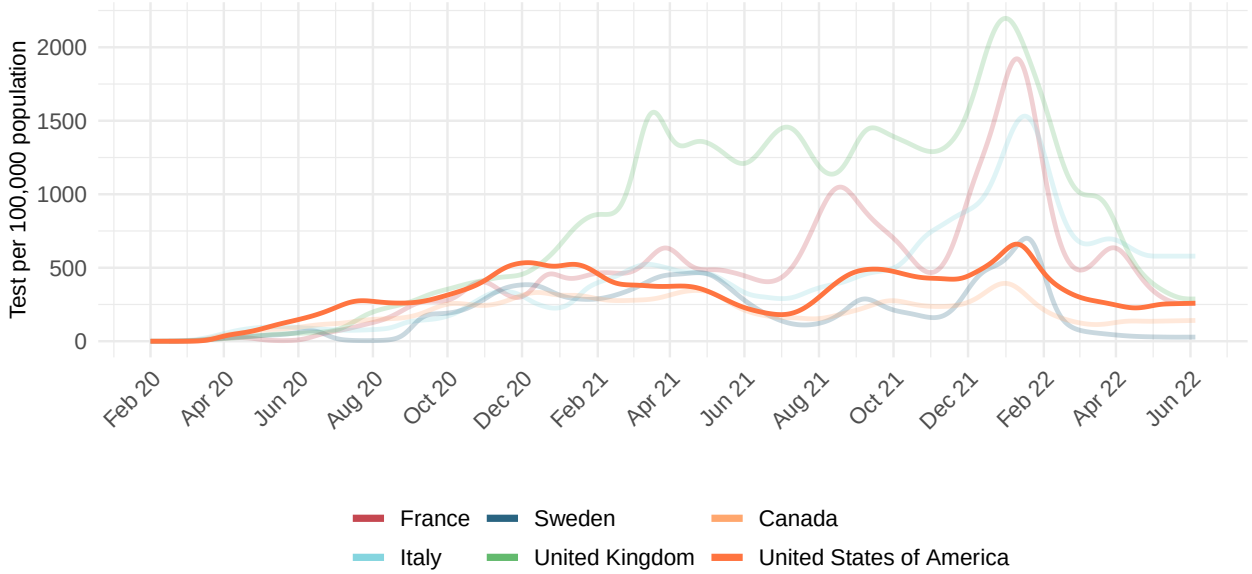


Figure 16.1: COVID-19 diagnostic tests per 100,000 people on June 6, 2022

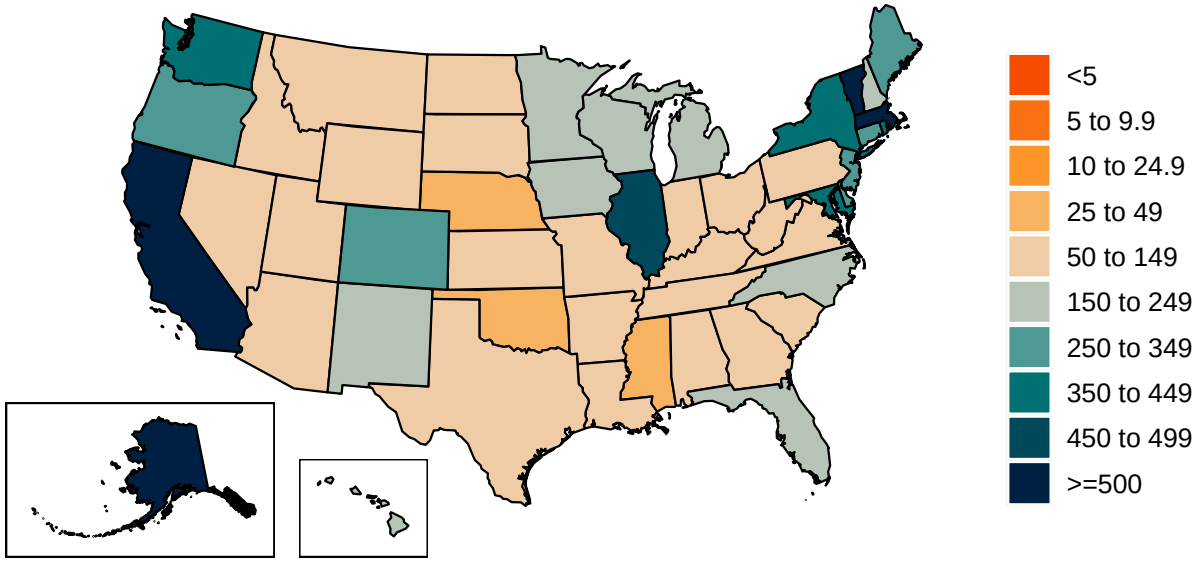


Table 3: Estimates of vaccine effectiveness for specific vaccines used in the model at preventing severe disease and infection. We use data from clinical trials directly, where available, and make estimates otherwise. More information can be found on our website.

	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 June 6, 2022

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

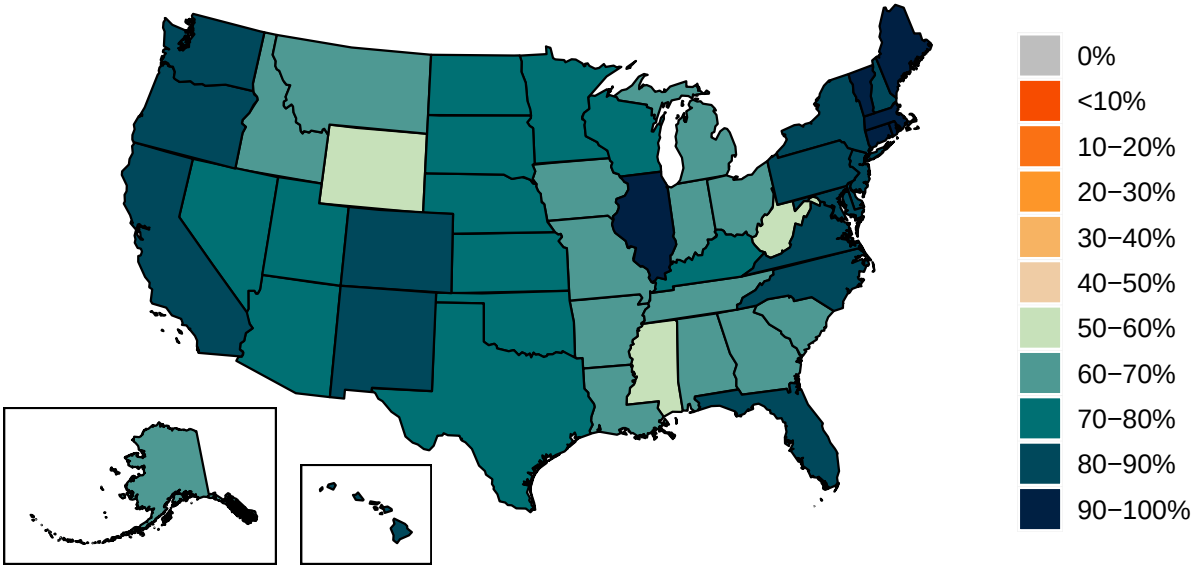


Figure 17.2: Percent of the population fully vaccinated against SARS-CoV-2

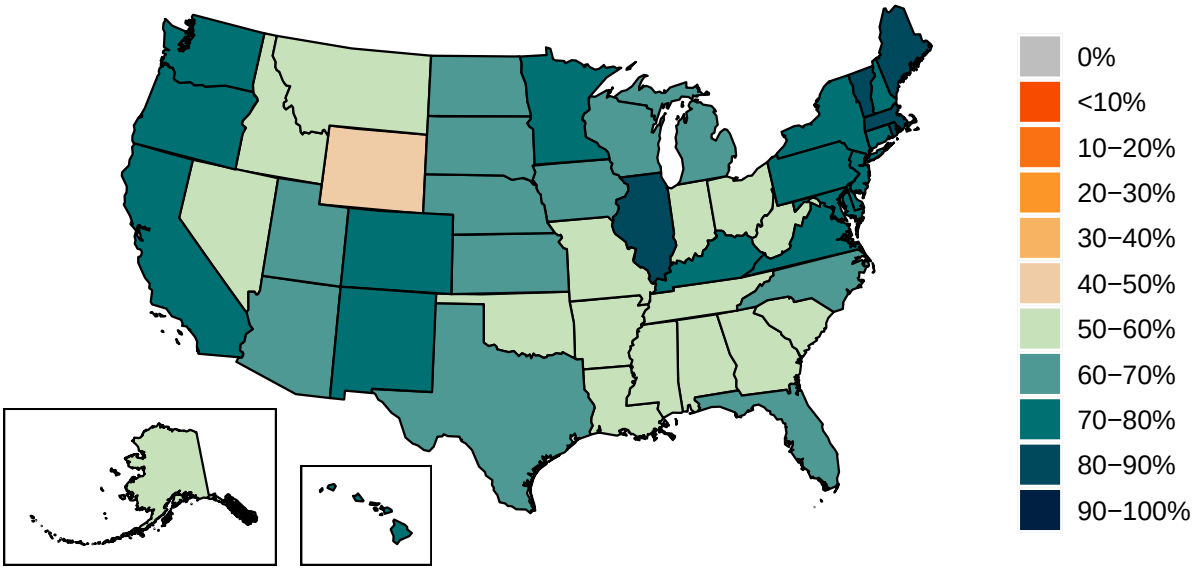


Figure 18.1: Trend in the estimated proportion of the population that is 12 years and older that has been vaccinated or would definitely receive the COVID-19 vaccine if available. Note that vaccine acceptance is calculated using survey data from the 18+ population.

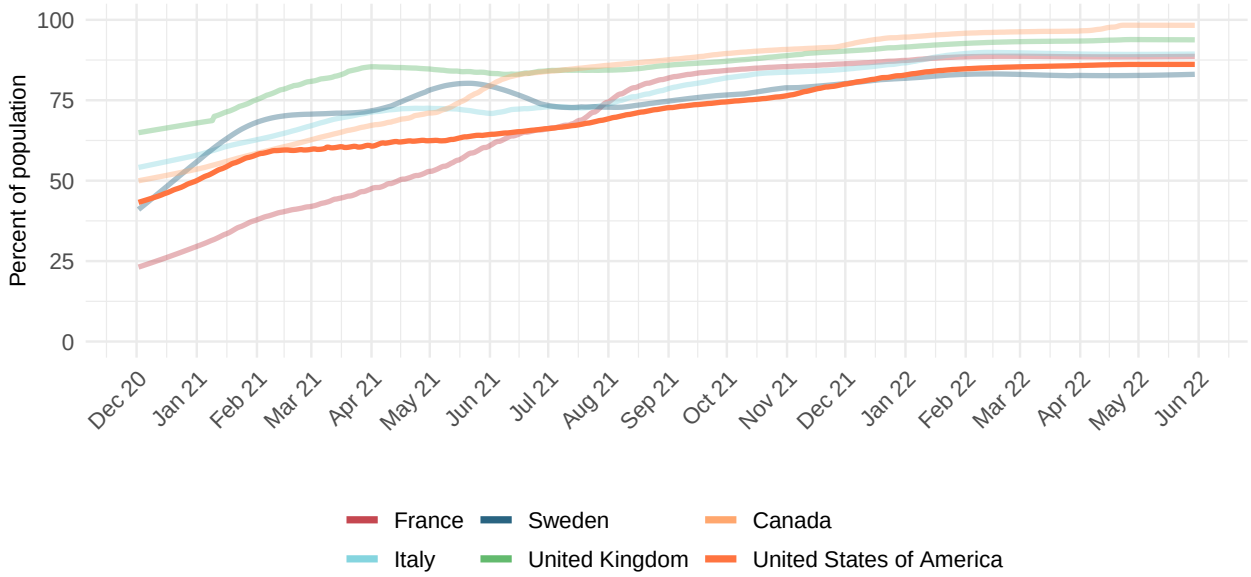


Figure 19.1: Estimated proportion of the population that is 12 years and older that has been vaccinated or would definitely receive the COVID-19 vaccine if available. Note that vaccine acceptance is calculated using survey data from the 18+ population.

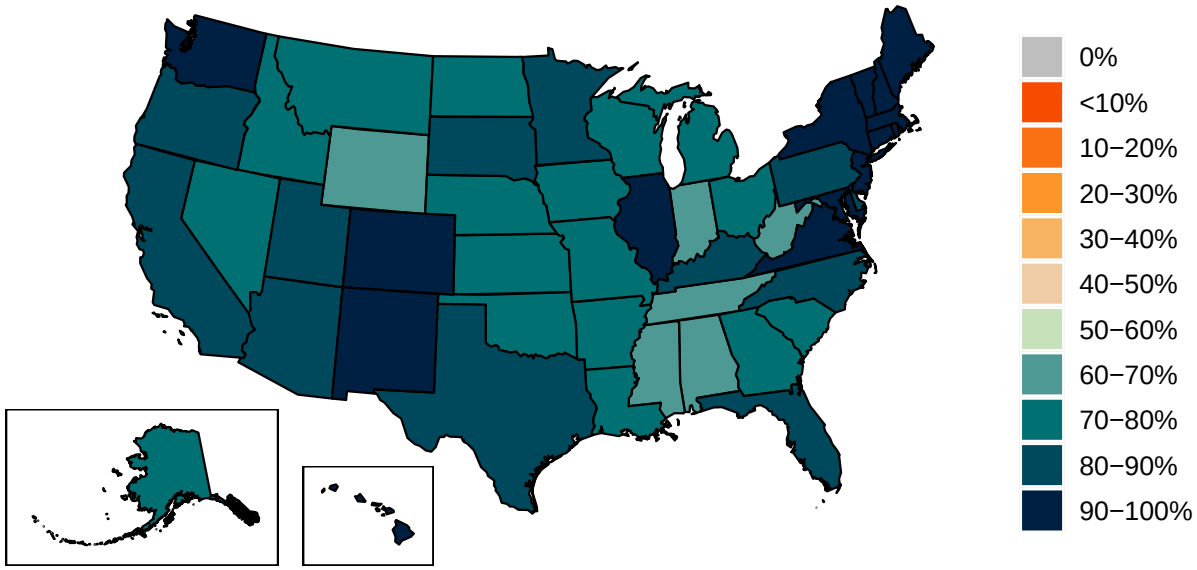


Figure 20.1: Estimated proportion of the total population that is not vaccinated but willing to be vaccinated as of May 30, 2022

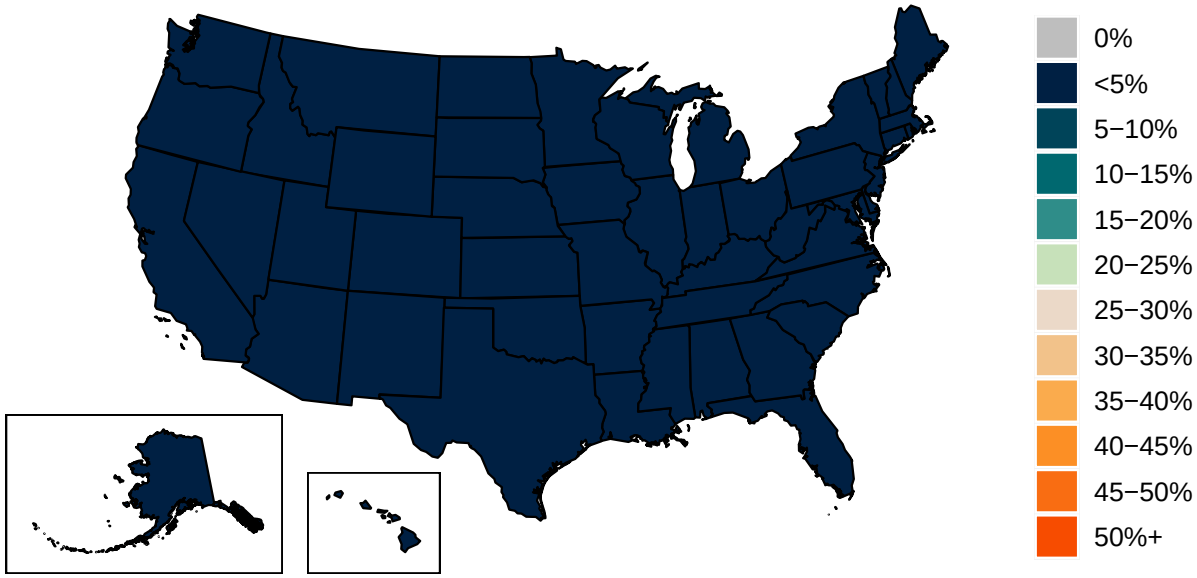


Figure 21.1: Percent of people who receive at least one dose of a COVID-19 vaccine and those who are fully vaccinated

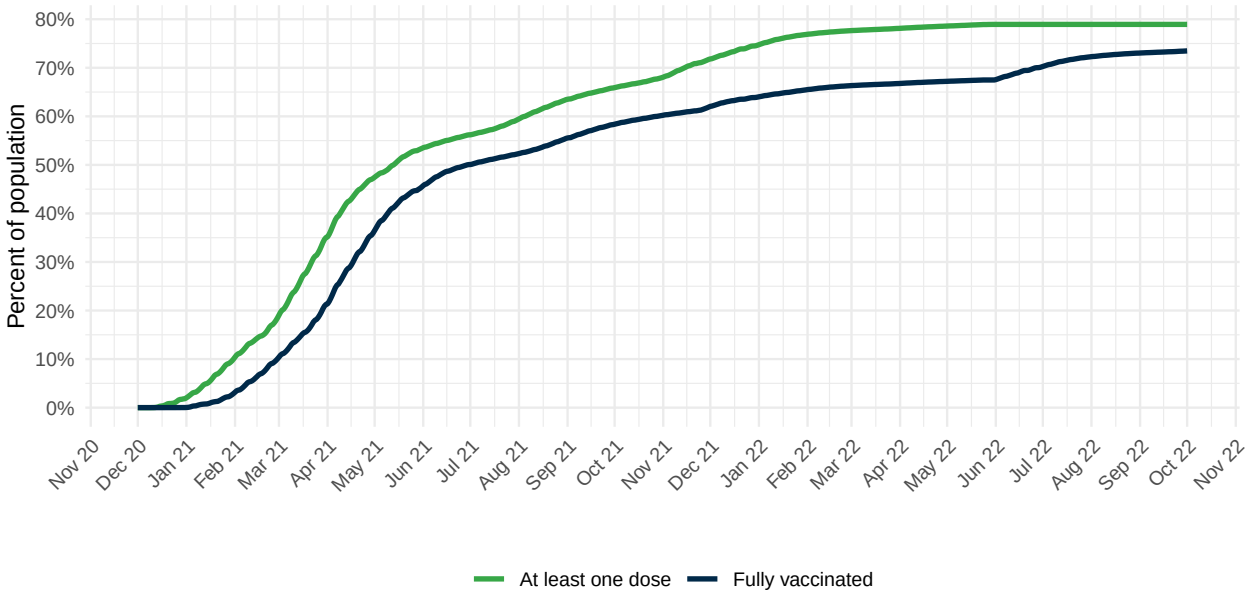
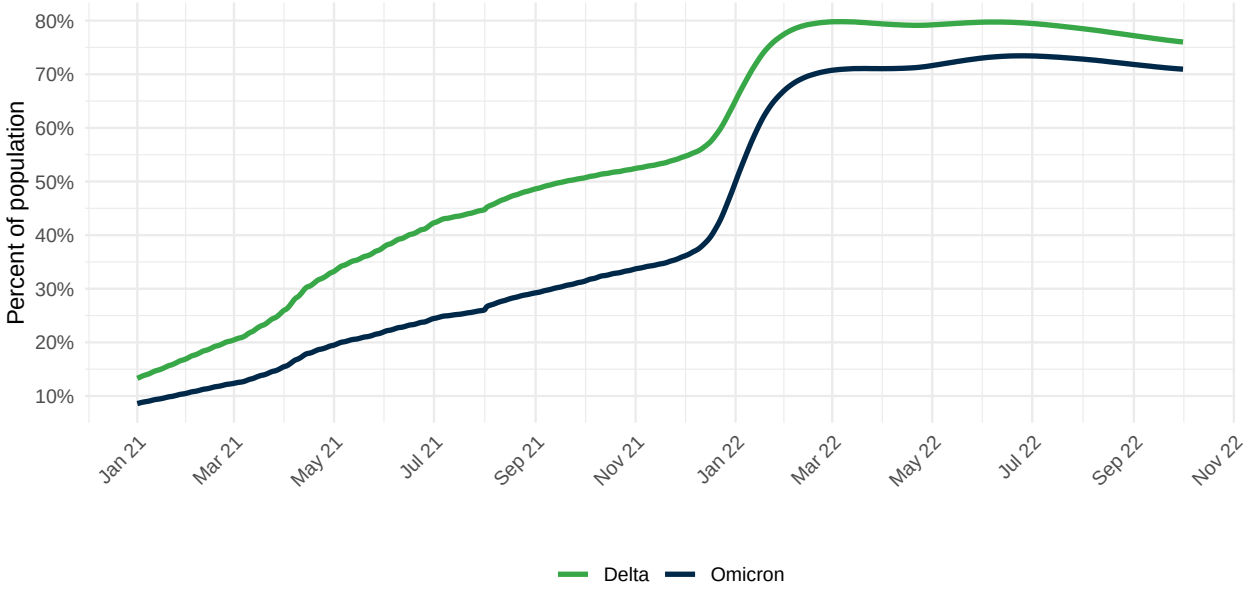


Figure 22.1: Percent of people who are immune to Delta or Omicron. Immunity is based on protection due to prior vaccination and infection(s). Moreover, variant-specific immunity is also based on variant-variant specific protection.



Projections and scenarios

Figure 23.1: Daily COVID-19 infections until October 01, 2022 for three scenarios

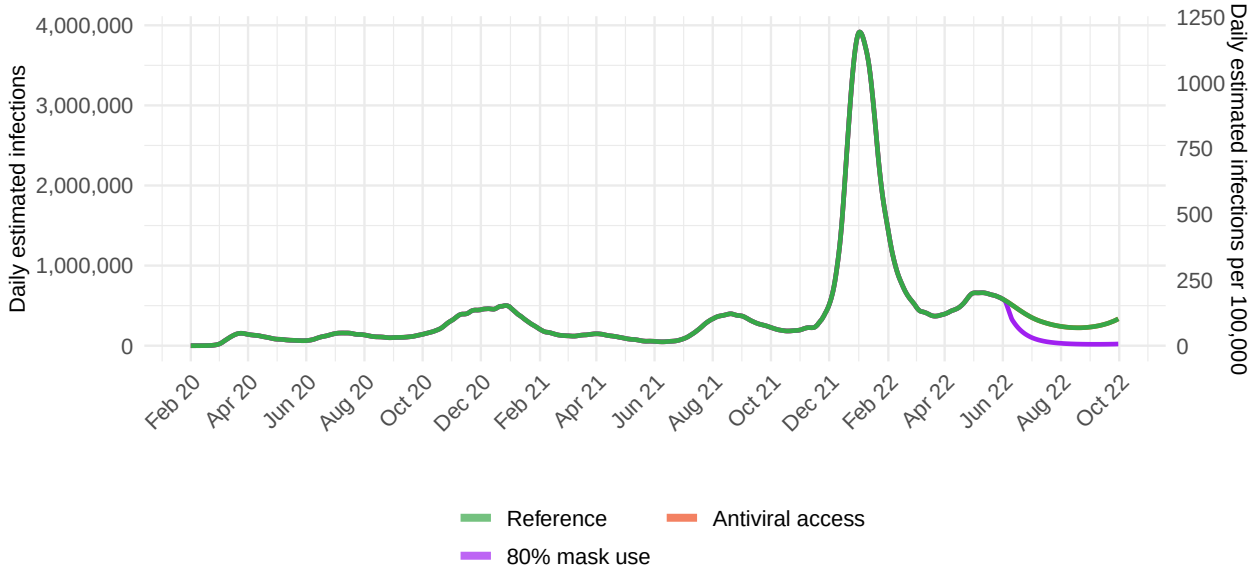


Figure 23.2: Daily COVID-19 reported cases until October 01, 2022 for three scenarios

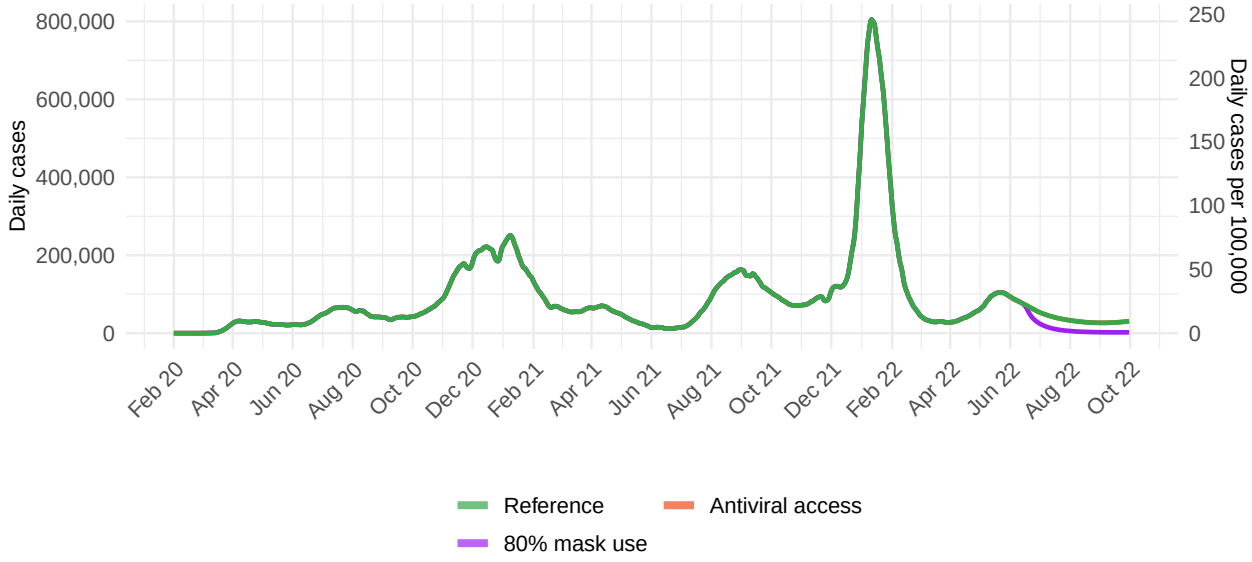


Figure 23.3: Daily COVID-19 hospital census until October 01, 2022 for three scenarios

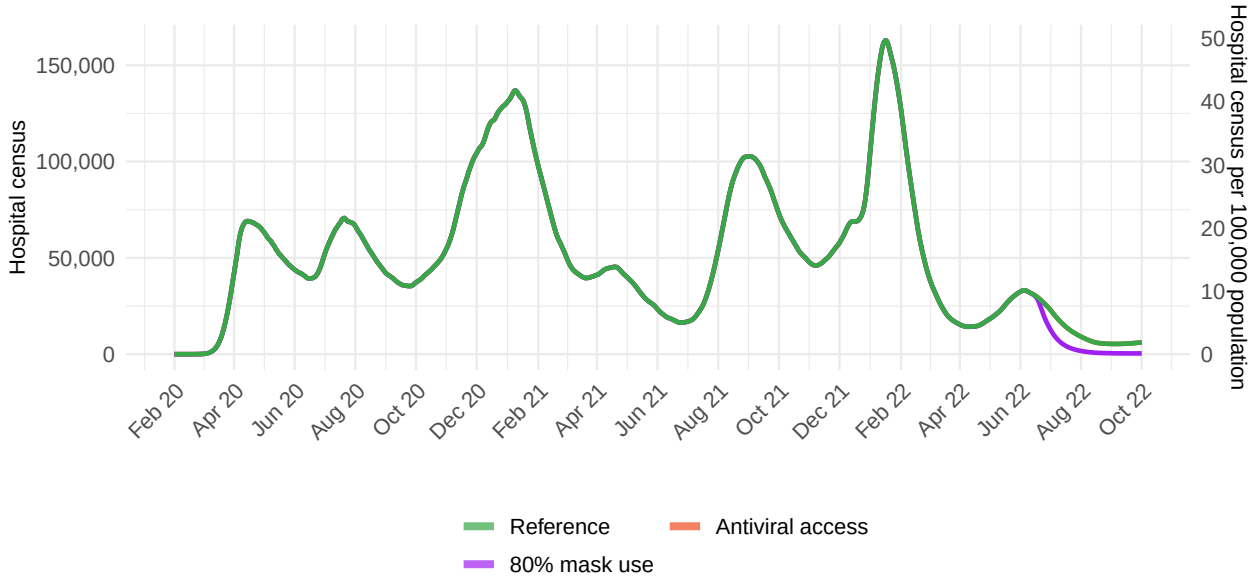


Figure 23.4: Reported daily COVID-19 deaths per 100,000

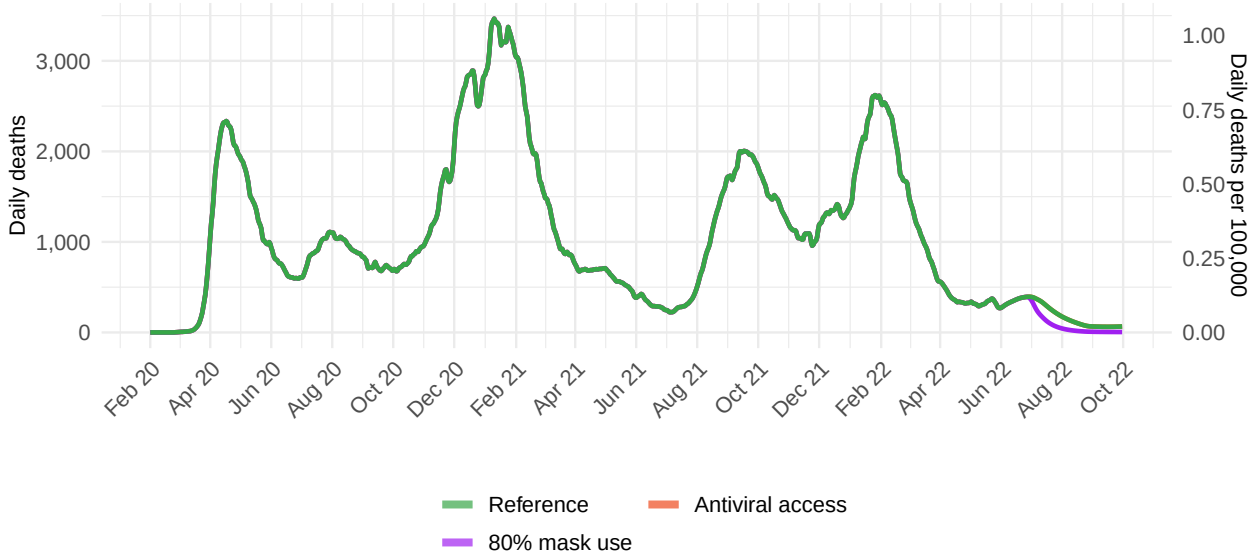


Figure 23.5: Total daily COVID-19 deaths per 100,000

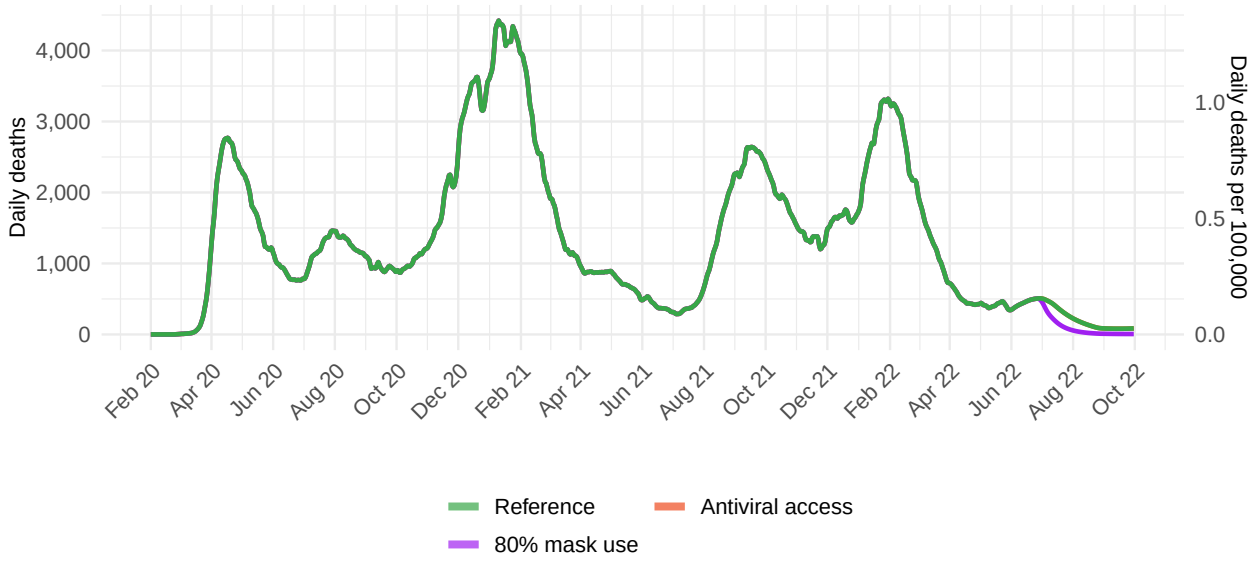


Figure 24.1: Comparison of reference model projections with other COVID modeling groups. For this comparison, we are including projections of daily COVID-19 deaths from other modeling groups when available, last model update in brackets: Delphi from the Massachusetts Institute of Technology (Delphi) [May 29, 2022], the SI-KJalpha model from the University of Southern California (SIKJalpha) [June 9, 2022], and the CDC Ensemble Model (CDC) [June 6, 2022]. Regional values are aggregates from available locations in that region.

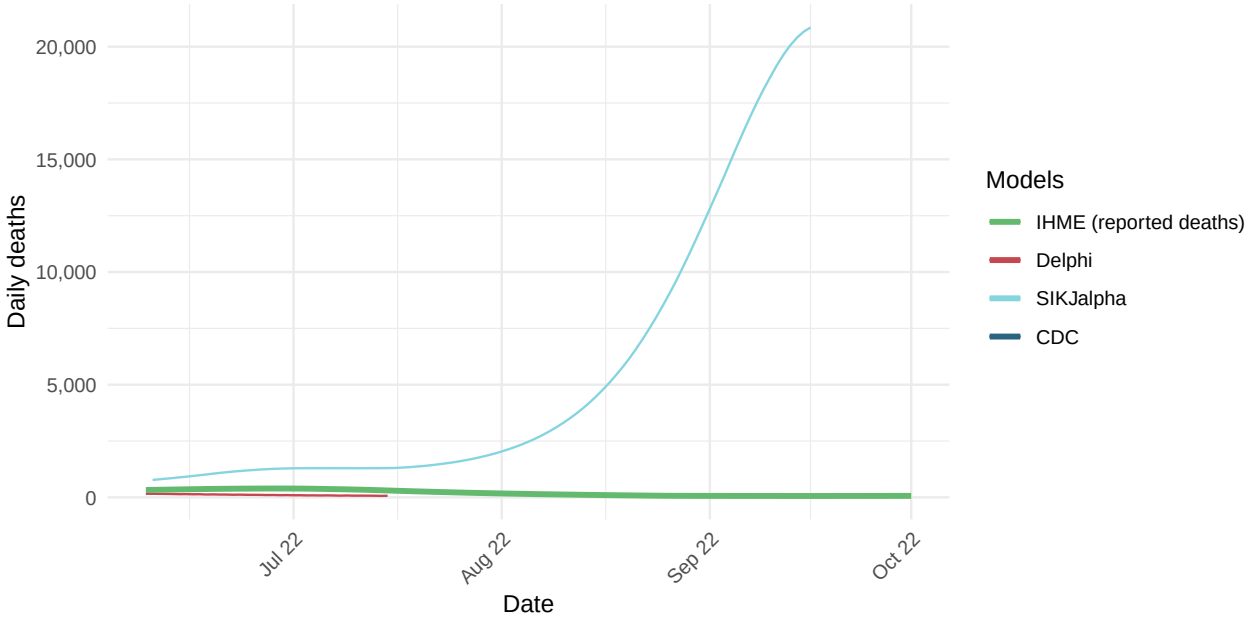


Figure 25.1: The estimated inpatient hospital usage is shown over time. The percent of hospital beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of beds occupied by COVID-19 patients. Less than 5% is considered *low stress*, 5-9% is considered *moderate stress*, 10-19% is considered *high stress*, and 20% or greater is considered *extreme stress*.

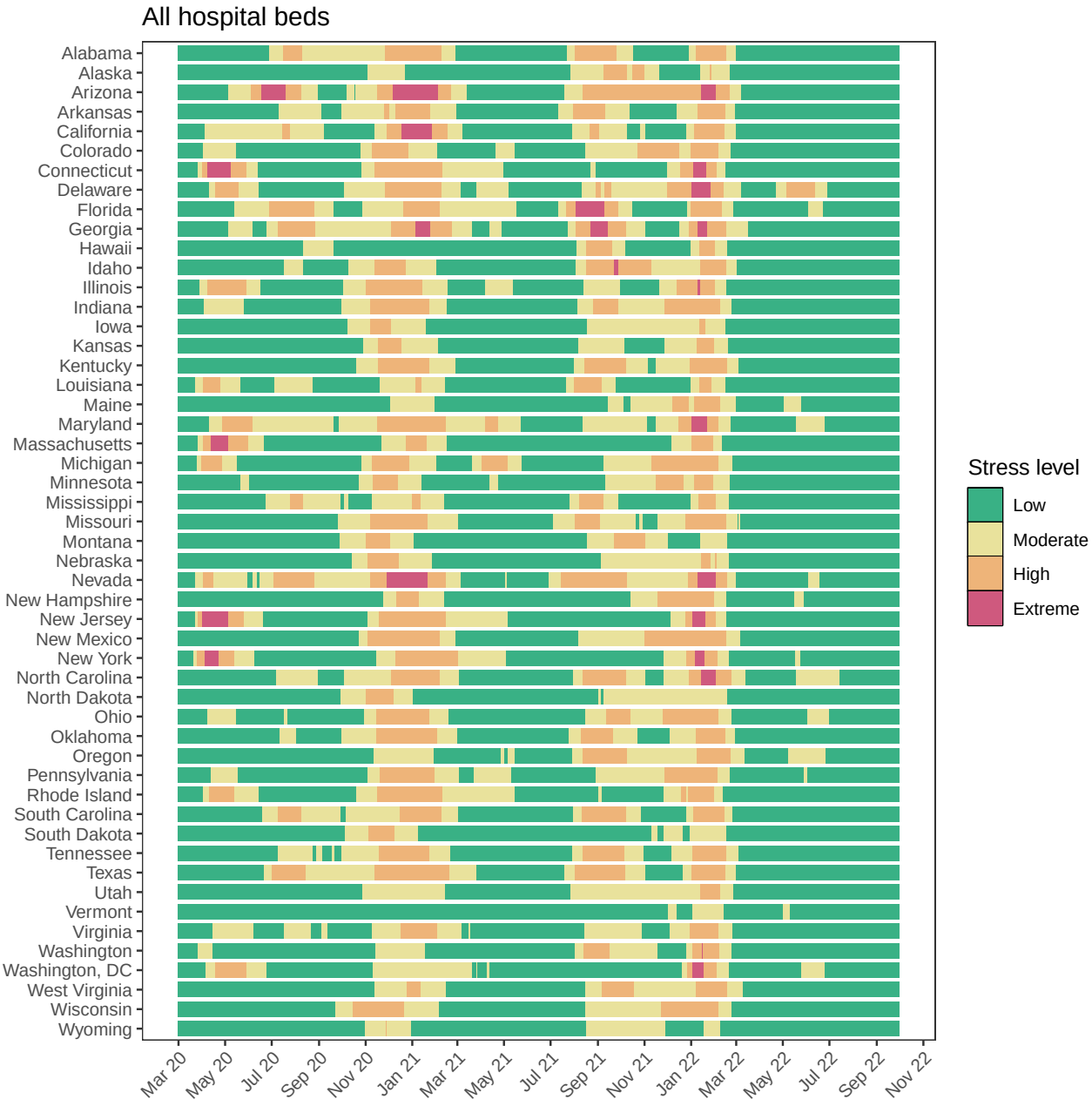
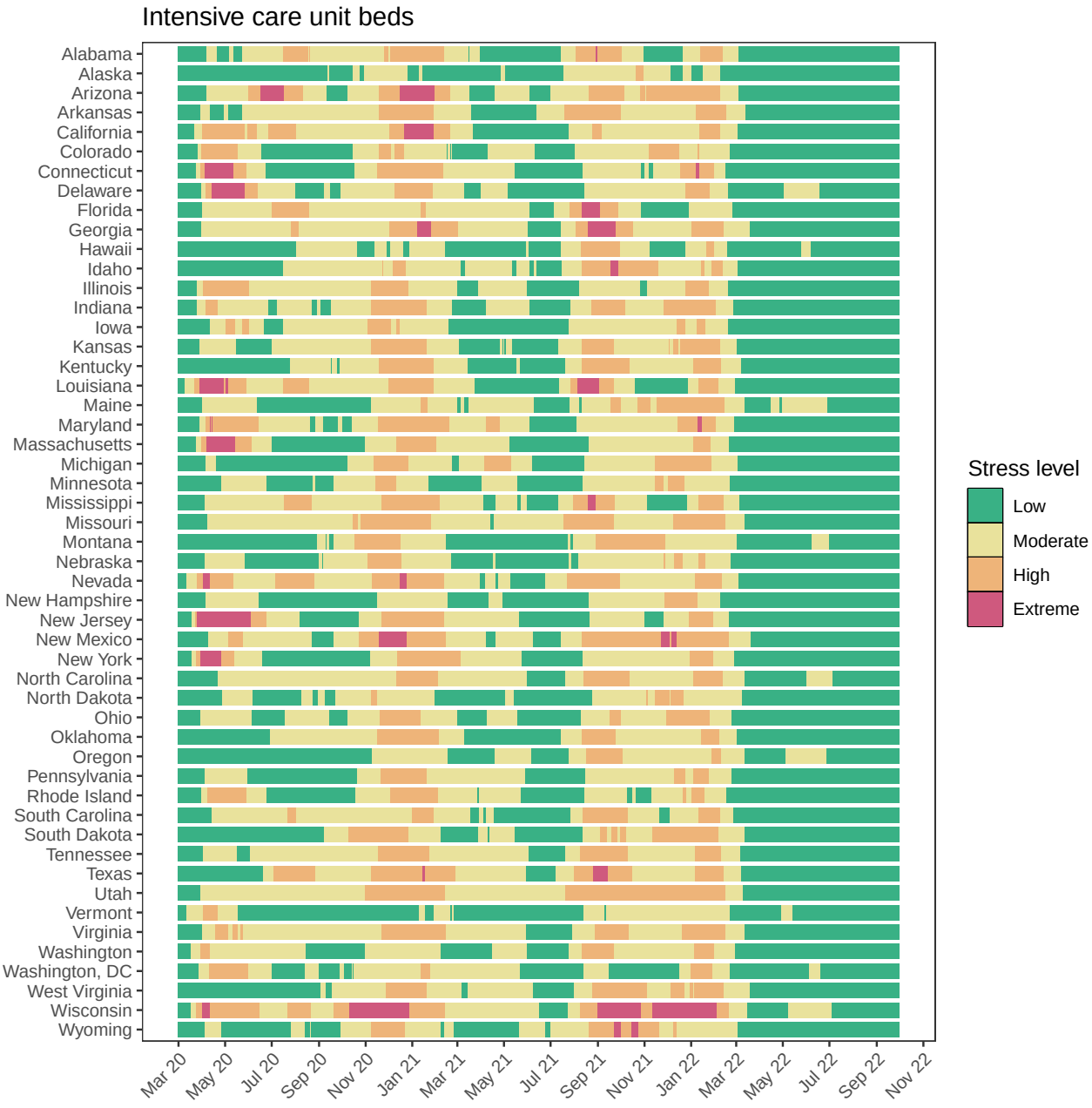


Figure 26.1: The estimated intensive care unit (ICU) usage is shown over time. The percent of ICU beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of ICU beds occupied by COVID-19 patients. Less than 10% is considered *low stress*, 10-29% is considered *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.