

## COVID-19 Results Briefing

### United States of America

April 7, 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 April 7, 2022, with data through April 4, 2022.

All reported cases, hospital admissions, and deaths continue to decline at the national level. Some states, such as South Dakota, Iowa, and Georgia, report slight increases in hospital admissions but no increase in reported cases. These may be early signs of BA.2-related increases in transmission or the impact of mask use dropping to the lowest level since April 2020. Most BA.2 and behavioral relaxation-driven increases in some Western European countries appear to have peaked and are declining. Our models do not suggest a substantial BA.2 surge in the US, but even if one occurs, the European experience suggests it will last approximately 3 weeks. Given wide circulation in the US of BA.2 already, we expect that even with a BA.2 surge, transmission should return to low levels over the summer months unless a major new variant emerges.

Looking ahead to the emergence of new variants that may be more severe than Omicron, there are several strategies for the US to pursue. First, maintain surveillance with a focus on early detection globally of new variants and monitoring of when any new variant may arrive in the US. Second, ensure that there is widespread access to effective antivirals in advance of a new and potentially more severe variant. To date, there appears to be more policy discussion of vaccination and boosters than there is of antivirals; this imbalance should be corrected. Third, time the delivery of boosters for the elderly and those with comorbidities to have maximum impact on the next new variant. There is not sufficient evidence at this time that BA.2 spread warrants a broader push on a fourth booster except in those at high risk. Fourth, when and if transmission begins increasing substantially, individuals at risk should consider wearing a mask and socially distancing.

### Current situation

- Estimated daily infections in the last week decreased to 390,000 per day on average compared to 440,000 the week before (Figure 1.1).
- Daily hospital census in the last week (through April 4) decreased to 15,000 per day on average compared to 17,000 the week before.
- Daily reported cases in the last week decreased to 28,000 per day on average compared to 29,000 the week before (Figure 2.1).
- Reported deaths due to COVID-19 in the last week decreased to 560 per day on average compared to 770 the week before (Figure 3.1).

- Total deaths due to COVID-19 in the last week decreased to 730 per day on average compared to 1,000 the week before (Figure 3.1). This makes COVID-19 the number two 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 five states (Figure 4.1).
- The daily rate of total deaths due to COVID-19 is greater than 4 per million in nine states (Figure 4.2).
- We estimate that 76% of people in the US have been infected at least once as of April 4 (Figure 6.1).
- Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 19 states (Figure 7.1).
- The infection-detection rate in the US was close to 7% on April 4 (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

- The only mandates in place at the state level are testing and vaccination requirements for non-residents.
- Mobility last week was 8% lower than the pre-COVID-19 baseline (Figure 11.1). Mobility was lower than 15% of baseline in four states.
- As of April 4, in the COVID-19 Trends and Impact Survey, 23% of people self-report that they always wore a mask when leaving their home (Figure 13.1). Mask use is at the lowest level since early April 2020.
- There were 319 diagnostic tests per 100,000 people on April 4 (Figure 15.1).
- As of April 4, 32 states and the District of Columbia have reached 70% or more of the population who have received at least one vaccine dose, and 18 states and the District of Columbia have reached 70% or more of the population who are fully vaccinated (Figure 17.1). 77% of people in the US have received at least one vaccine dose, and 72% are fully vaccinated. Only Wyoming has less than 50% of the population fully vaccinated.
- In the US, 83.8% of the population that is 12 years and older say they would accept a vaccine for COVID-19. Note that vaccine acceptance is calculated using survey data from the 18+ population. The proportion of the population who are open to receiving a COVID-19 vaccine ranges from 63% in Mississippi to 99% in Massachusetts (Figure 19.1).

- In our current reference scenario, we expect that 253.1 million people will be vaccinated with at least one dose by August 1 (Figure 20.1). We expect that 73% of the population will be fully vaccinated by August 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 is the mean of mask use over the last seven 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 six 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 seven 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 six months.

## Projections

### Infections

- Daily estimated infections in the **reference scenario** will decline to 55,510 by August 1, 2022 (Figure 22.1).
- Daily estimated infections in the **80% mask use scenario** will decline to 5,160 by August 1, 2022 (Figure 22.1).
- Daily estimated infections in the **third dose scenario** will decline to 49,470 by August 1, 2022 (Figure 22.1).

### Cases

- Daily estimated cases in the **reference scenario** will rise to 37,640 by April 24, 2022 (Figure 22.2).
- Daily estimated cases in the **80% mask use scenario** will rise to 34,840 by April 13, 2022 (Figure 22.2).
- Daily estimated cases in the **third dose scenario** will rise to 37,610 by April 23, 2022 (Figure 22.2).

### Hospitalizations

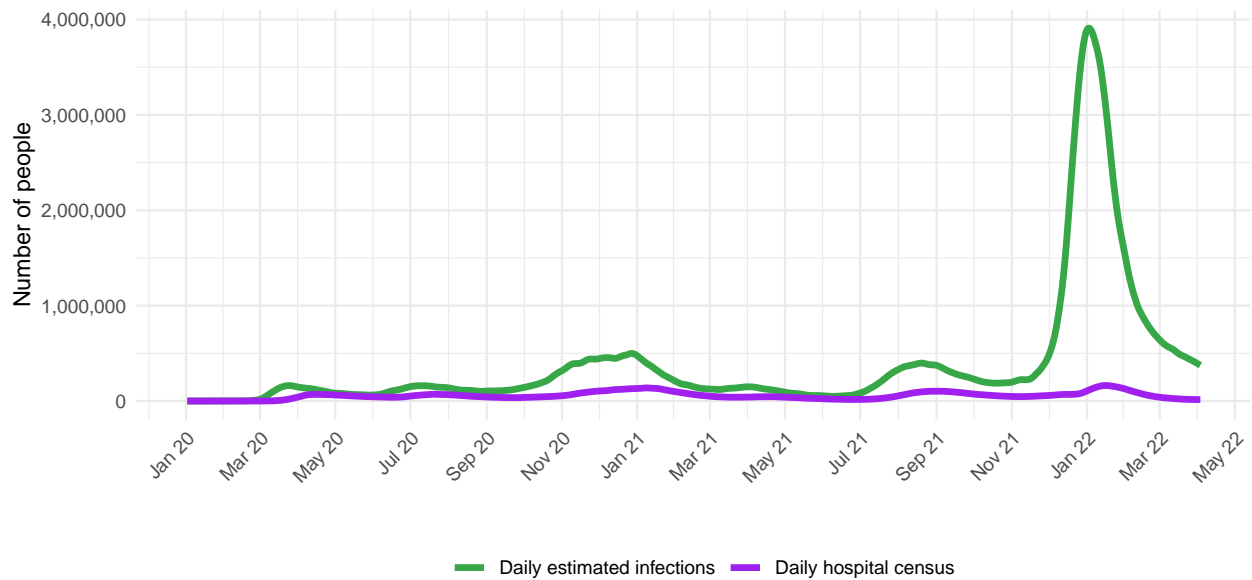
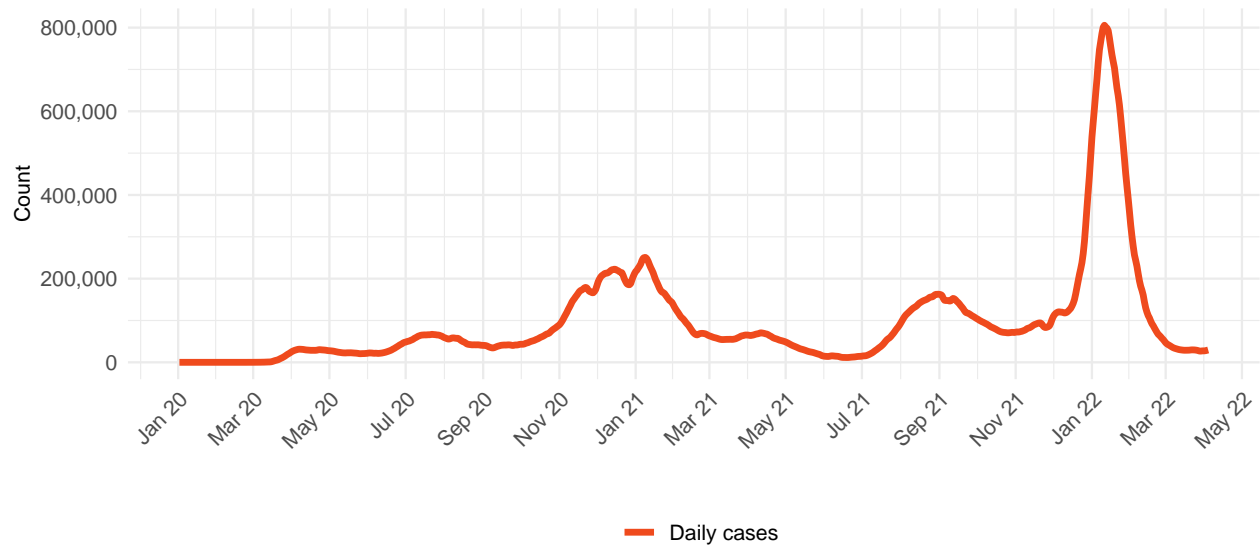
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- Daily hospital census in the **reference scenario** will rise to 14,570 by April 20, 2022 (Figure 22.3).
  - Daily hospital census in the **80% mask use scenario** will decline to 320 by August 1, 2022 (Figure 22.3).
  - Daily hospital census in the **third dose scenario** will rise to 14,570 by April 20, 2022 (Figure 22.3).

## Deaths

- In our **reference scenario**, our model projects 998,000 cumulative reported deaths due to COVID-19 on August 1. This represents 19,000 additional deaths from April 4 to August 1. Daily reported COVID-19 deaths in the **reference scenario** will decline to 50 by August 1, 2022 (Figure 22.4).
- Under our **reference scenario**, our model projects 1,270,000 cumulative total deaths due to COVID-19 on August 1. This represents 24,000 additional deaths from April 4 to August 1 (Figure 22.5).
- In our **80% mask use scenario**, our model projects 992,000 cumulative reported deaths due to COVID-19 on August 1. This represents 13,000 additional deaths from April 4 to August 1. Daily reported COVID-19 deaths in the **80% mask use scenario** will decline to zero by August 1, 2022 (Figure 22.4).
- In our **third dose scenario**, our model projects 998,000 cumulative reported deaths due to COVID-19 on August 1. This represents 19,000 additional deaths from April 4 to August 1. Daily reported COVID-19 deaths in the **third dose scenario** will decline to 40 by August 1, 2022 (Figure 22.4).
- Figure 23.1 compares our reference scenario forecasts to other publicly archived models. Forecasts are widely divergent.
- At some point from April through August 1, no states will have high or extreme stress on hospital beds (Figure 24.1). At some point from April through August 1, no states will have high or extreme stress on intensive care unit (ICU) capacity (Figure 25.1).

## Model updates

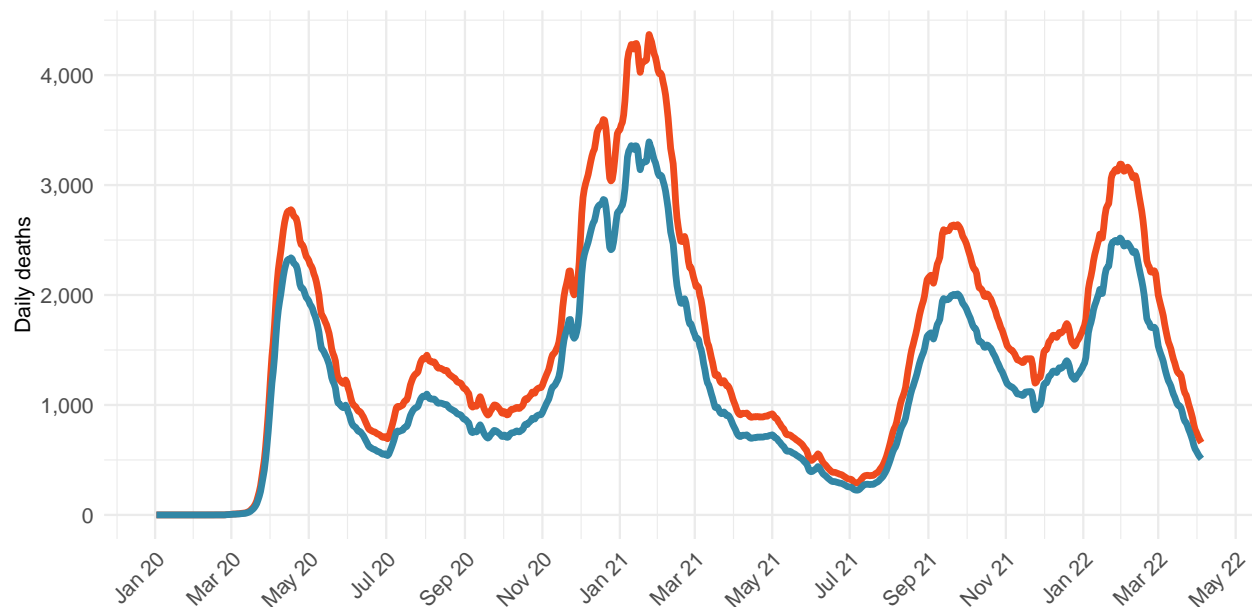
Vaccine confidence data are from The Delphi Group at Carnegie Mellon University and University of Maryland COVID-19 Trends and Impact Surveys, in partnership with Facebook. In our previous estimates of the proportion of the population that is 12 years and older who would receive the COVID-19 vaccine if available, we included survey responses of “yes, probably” and “yes, definitely” when asked “If a vaccine to prevent COVID-19 were offered to you today, would you choose to get vaccinated?” In our analysis of vaccine uptake, we have seen that vaccination rates have largely plateaued at the level implied by the “yes, definitely” response level. Therefore, we have updated our estimates of willingness to accept the vaccine to include only survey responses of “yes, definitely.”

**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	5,105	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 April 4, 2022

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

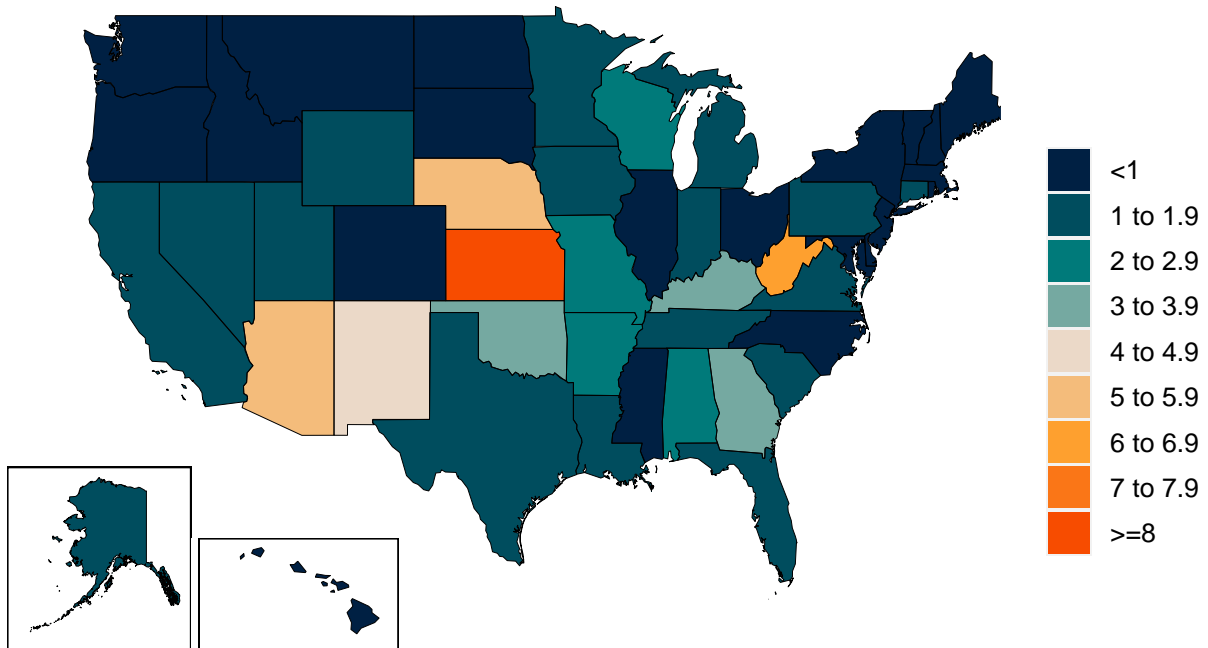
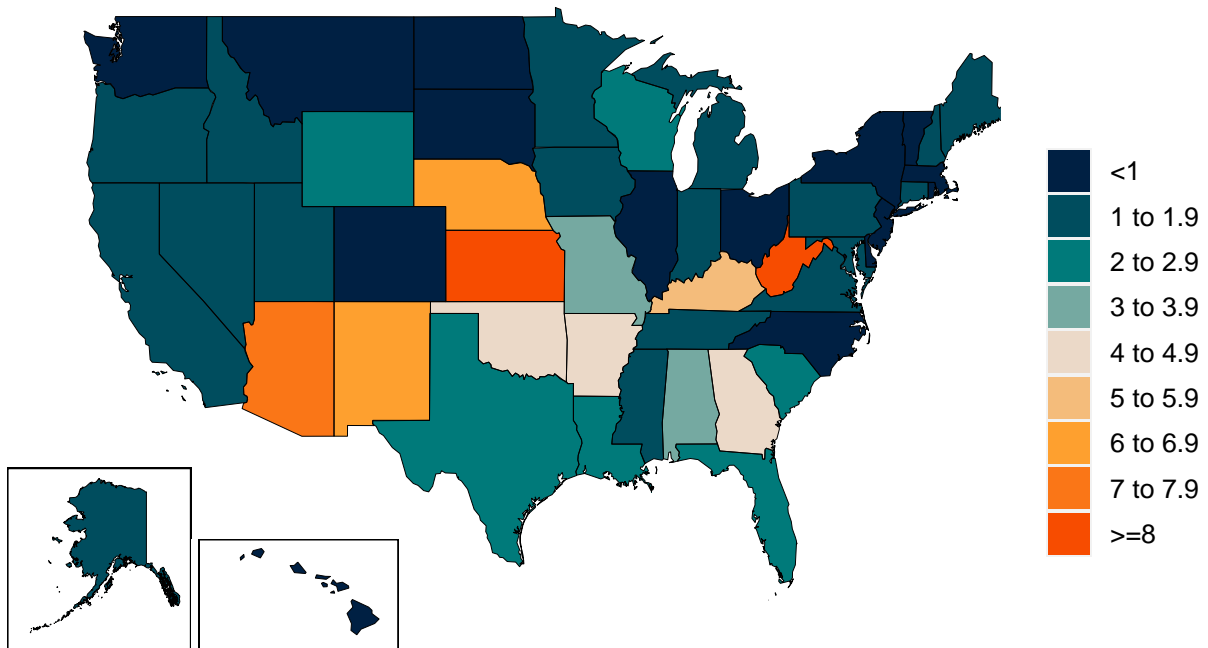


Figure 4.2: Daily total COVID-19 death rate per 1 million





Cumulative COVID-19 deaths per 100,000 on April 4, 2022

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

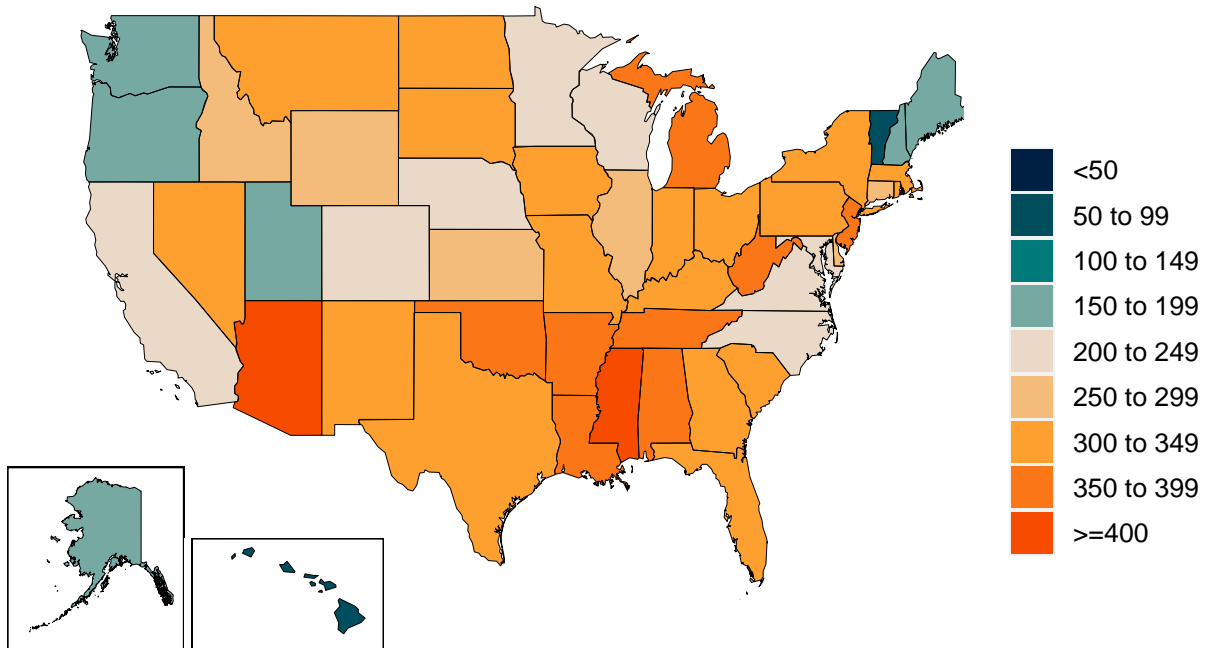
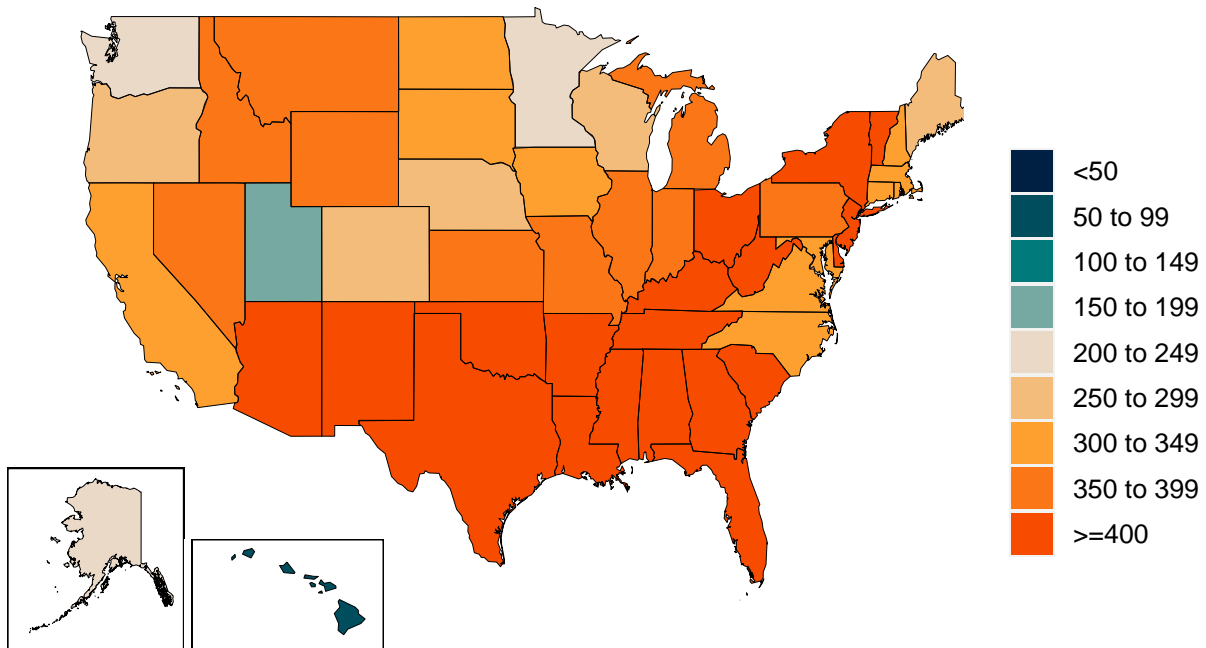
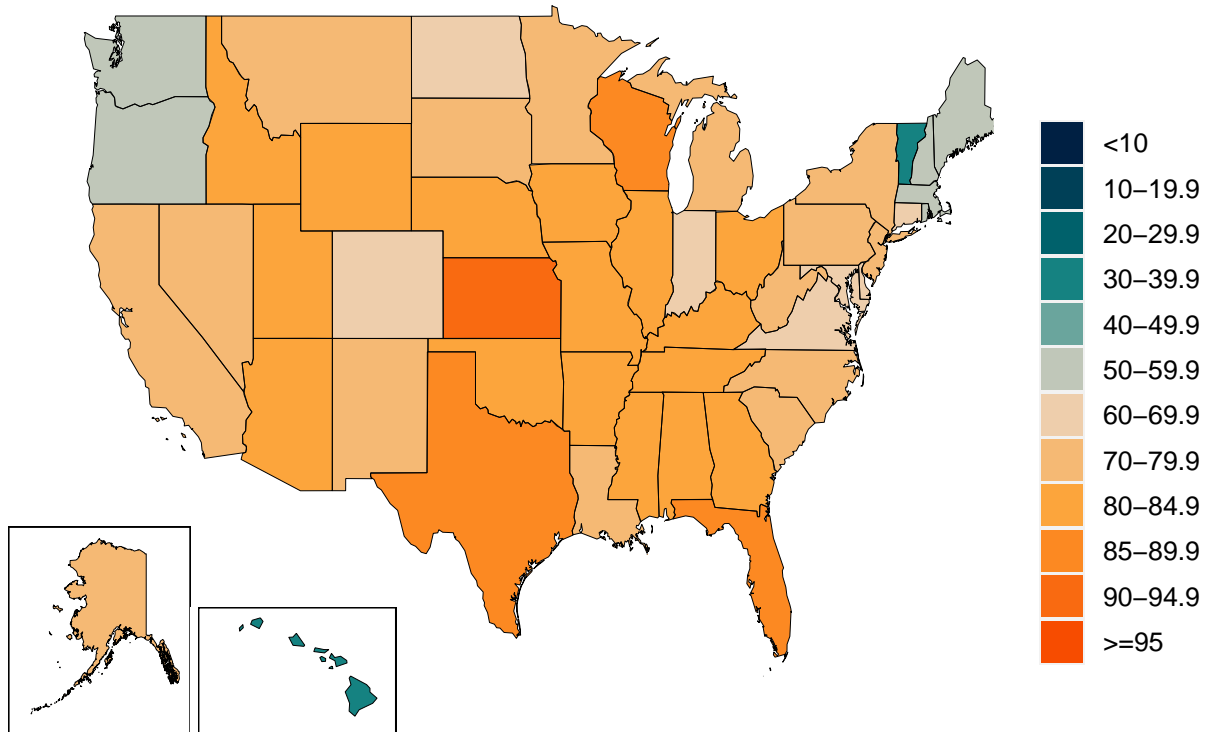


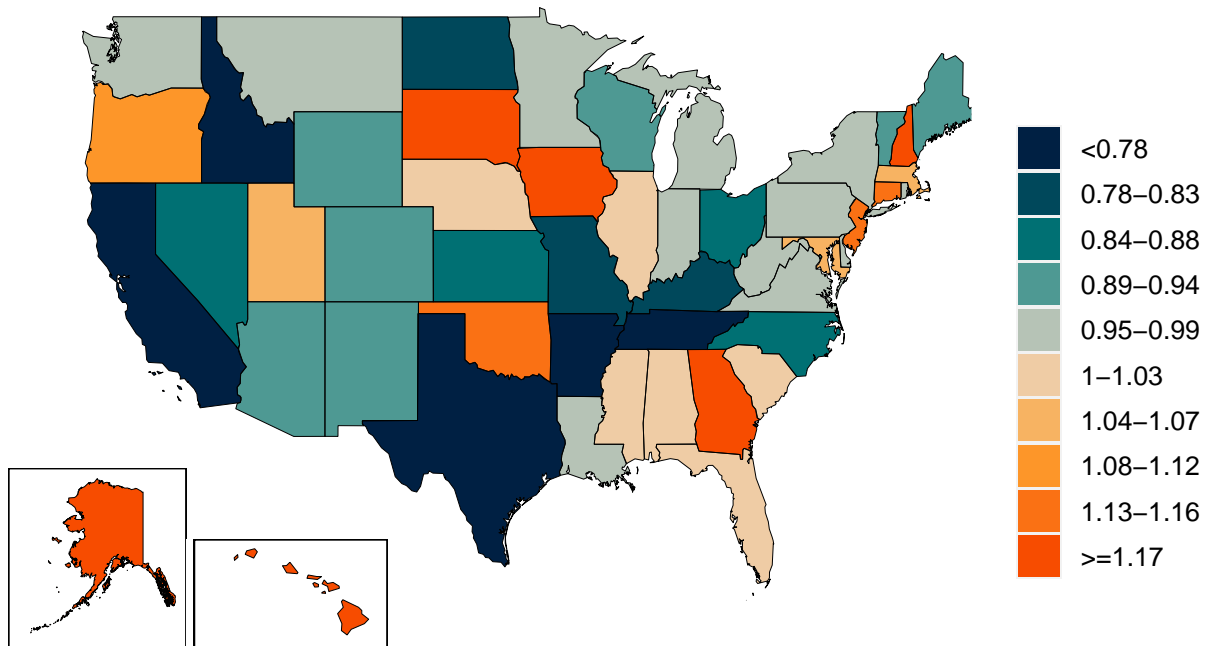
Figure 5.2: Total cumulative COVID-19 deaths per 100,000



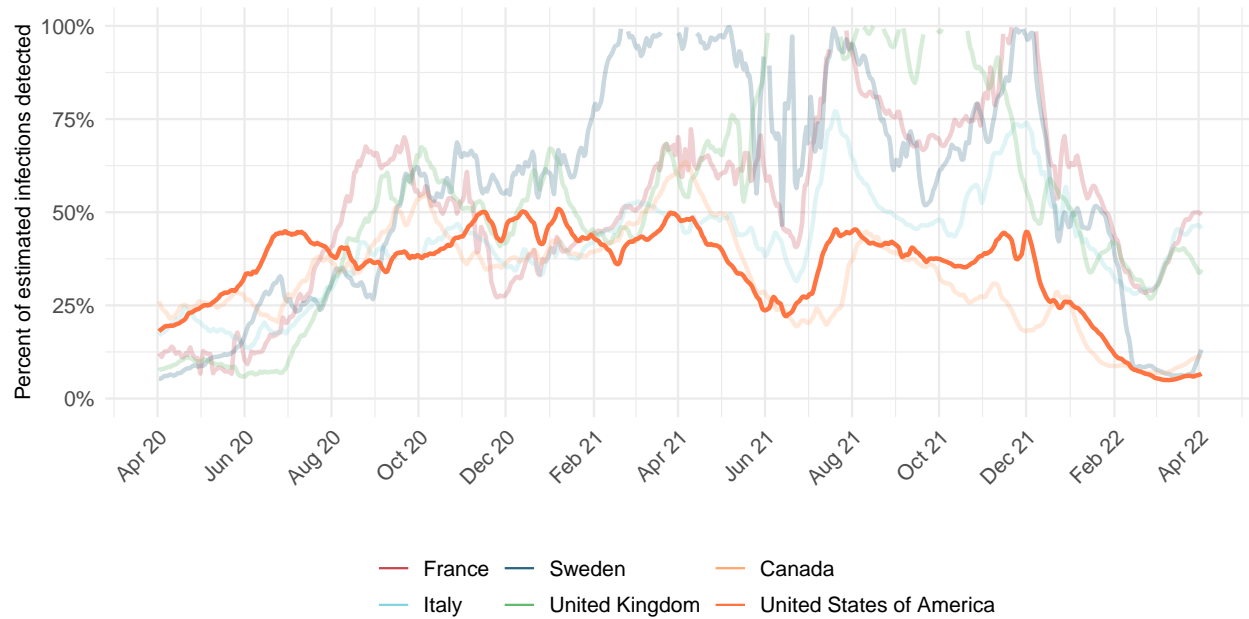
**Figure 6.1: Estimated percent of the population infected with COVID-19 on April 4, 2022**



**Figure 7.1: Mean effective R on March 24, 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 April 4, 2022

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

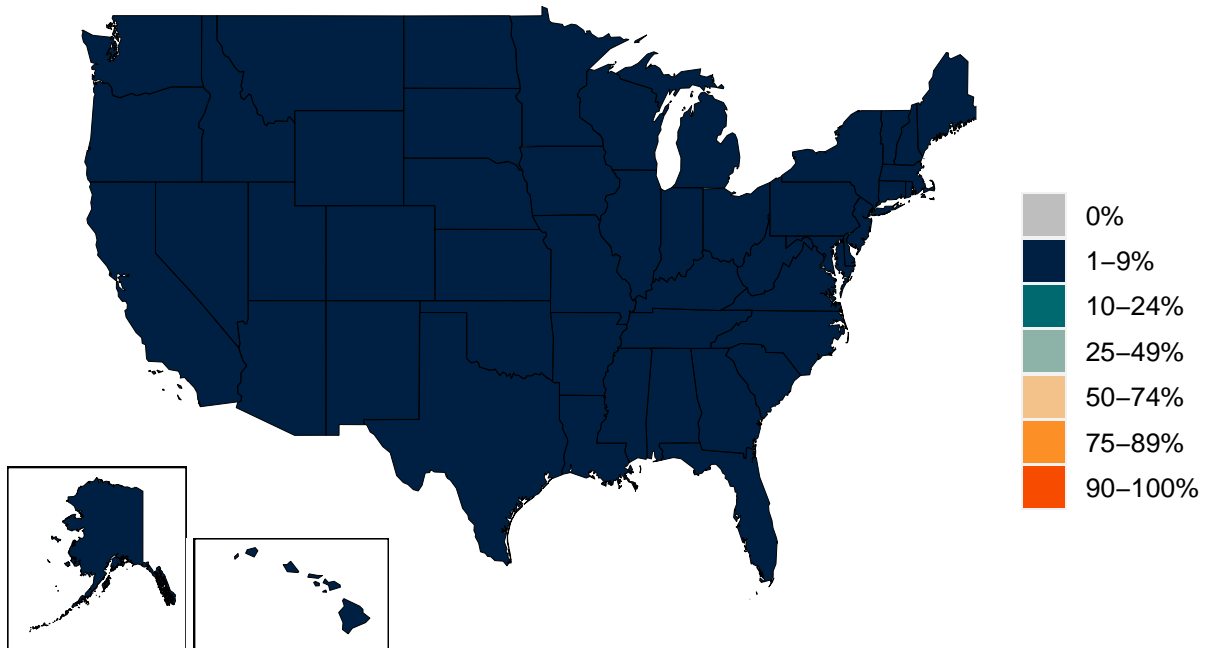


Figure 9.2: Estimated percent of new infections that are Beta variant

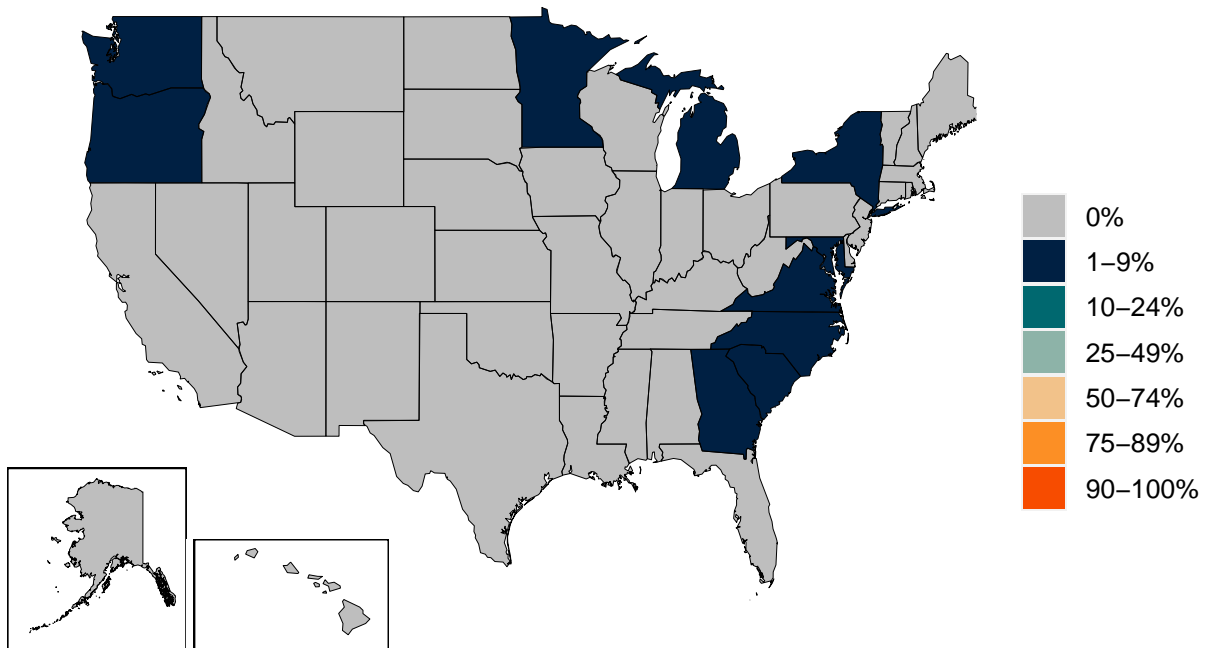


Figure 9.3: Estimated percent of new infections that are Delta variant

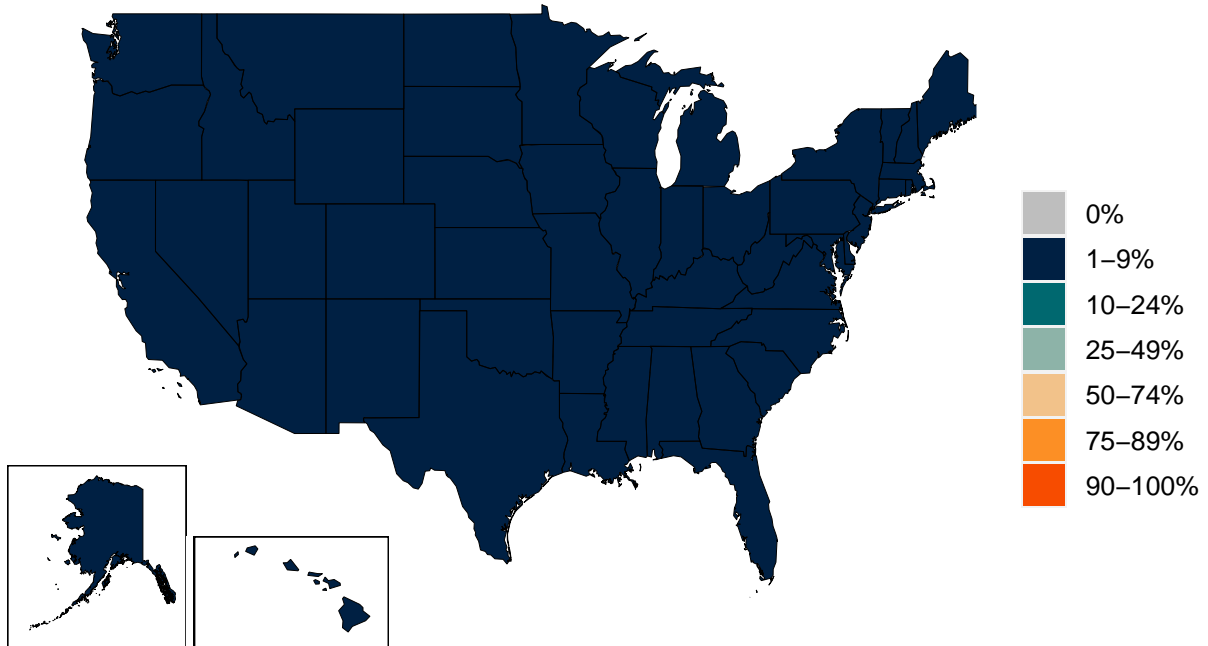


Figure 9.4: Estimated percent of new infections that are Gamma variant

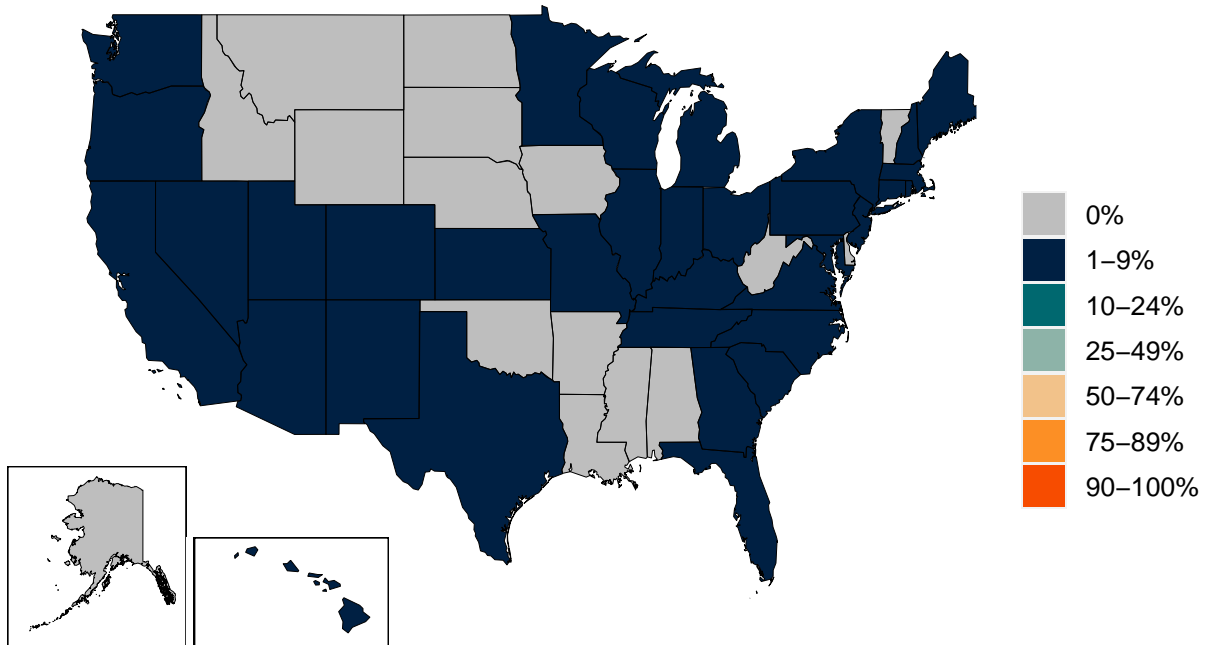
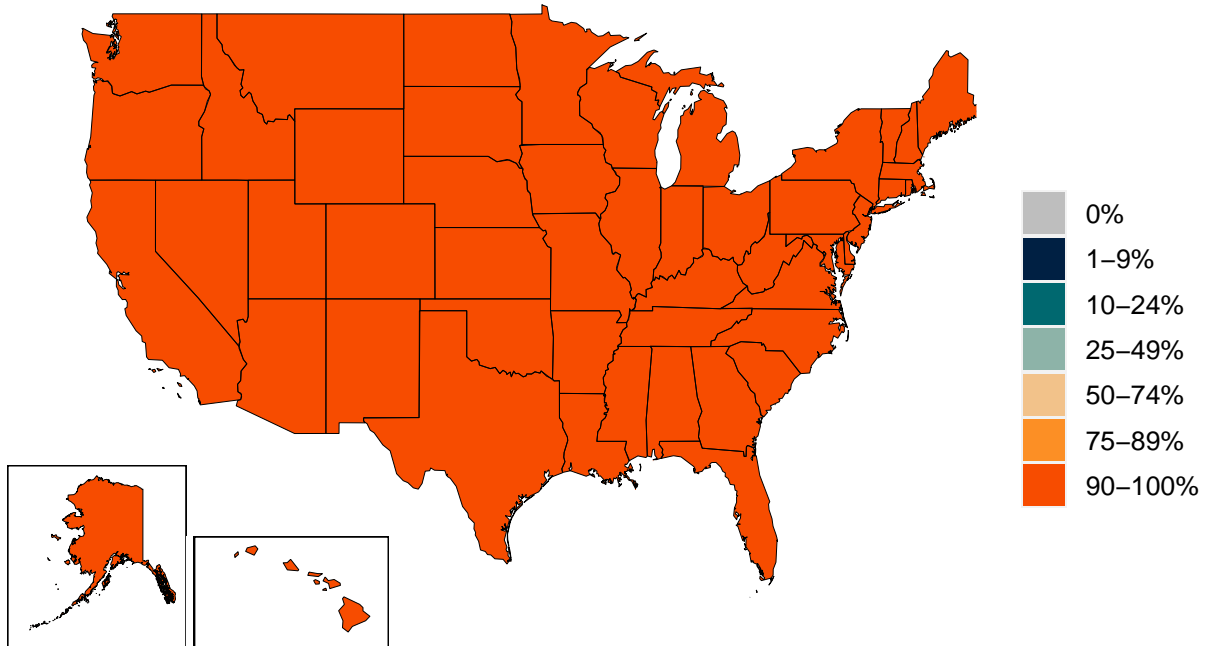
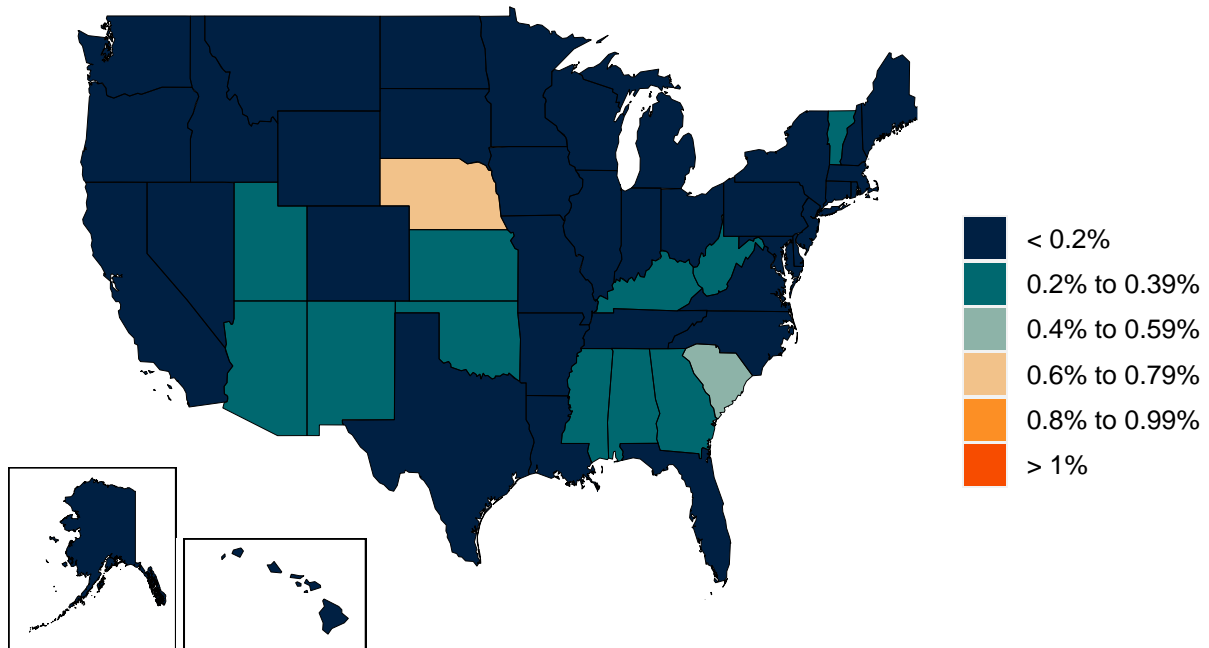


Figure 9.5: Estimated percent of new infections that are Omicron variant



**Figure 10.1: Infection-fatality rate on April 4, 2022.** This is estimated as the ratio of COVID-19 deaths to estimated daily COVID-19 infections.



## Critical drivers

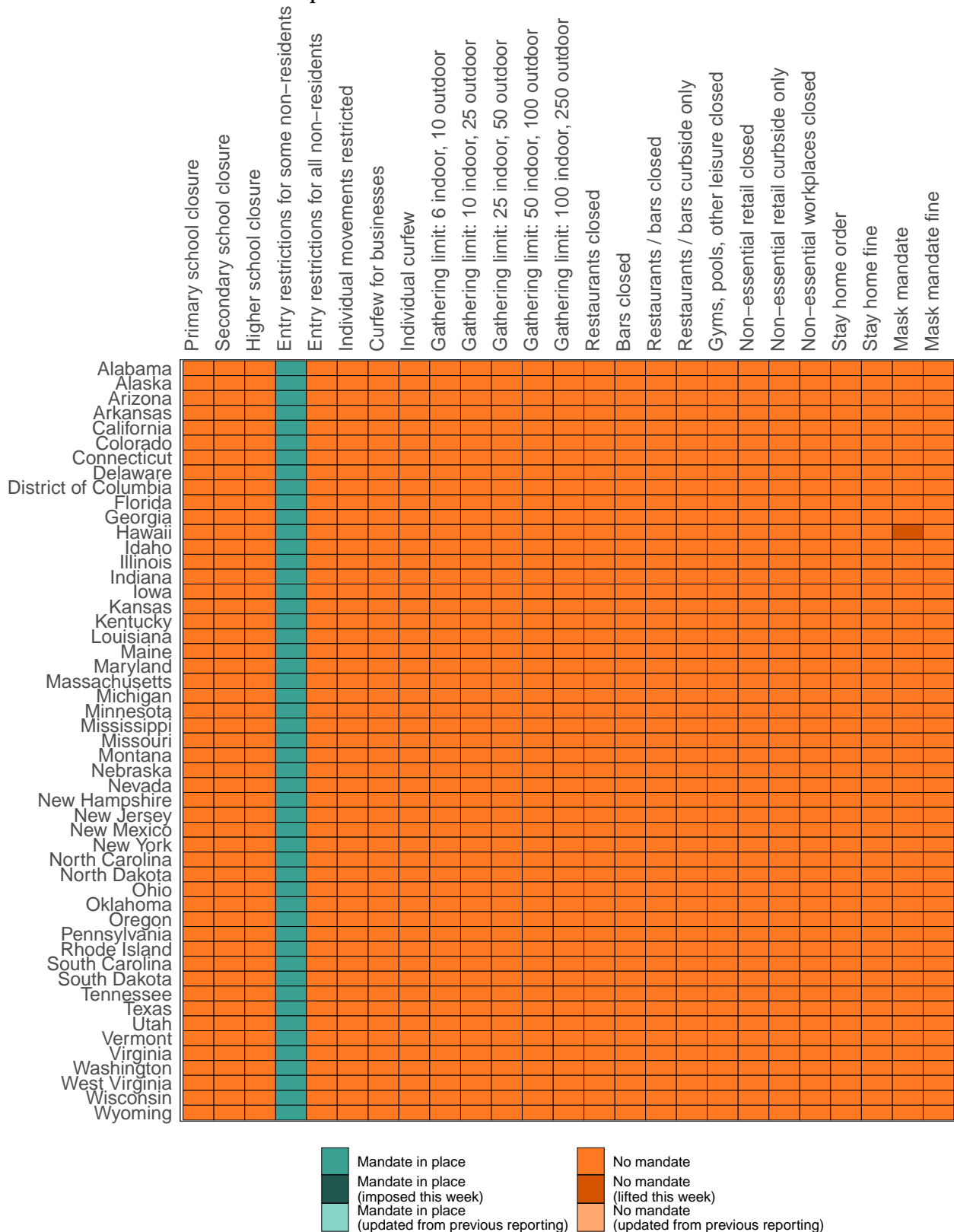
**Table 2: Current mandate implementation**




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

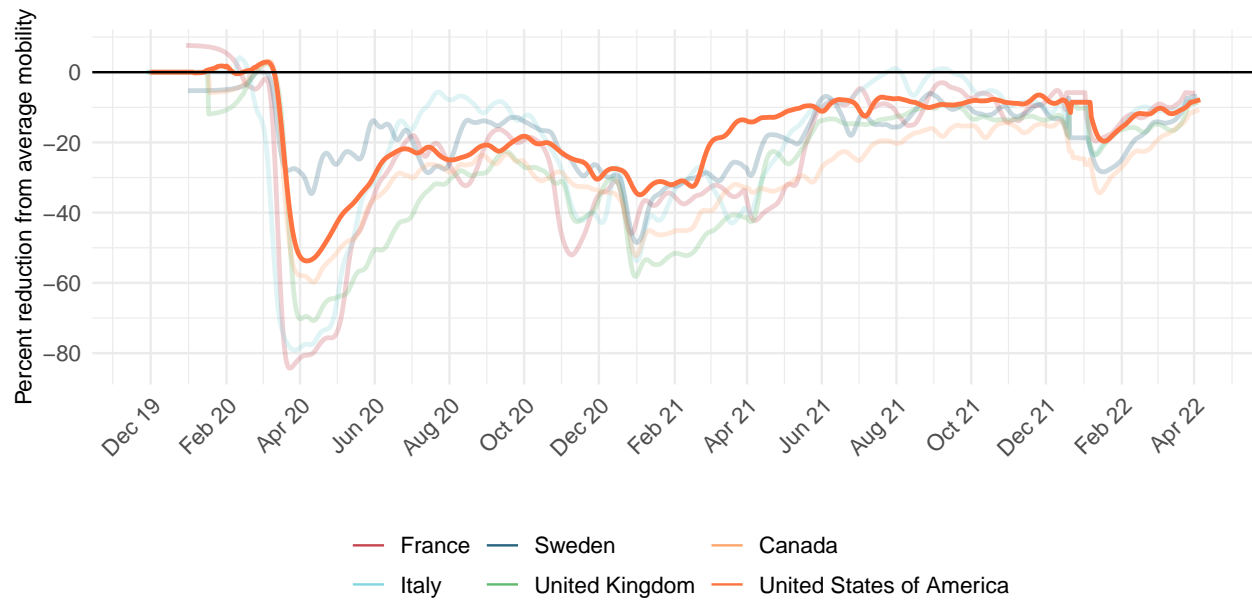


Figure 12.1: Mobility level as measured through smartphone app use, compared to January 2020 baseline (percent) on April 4, 2022

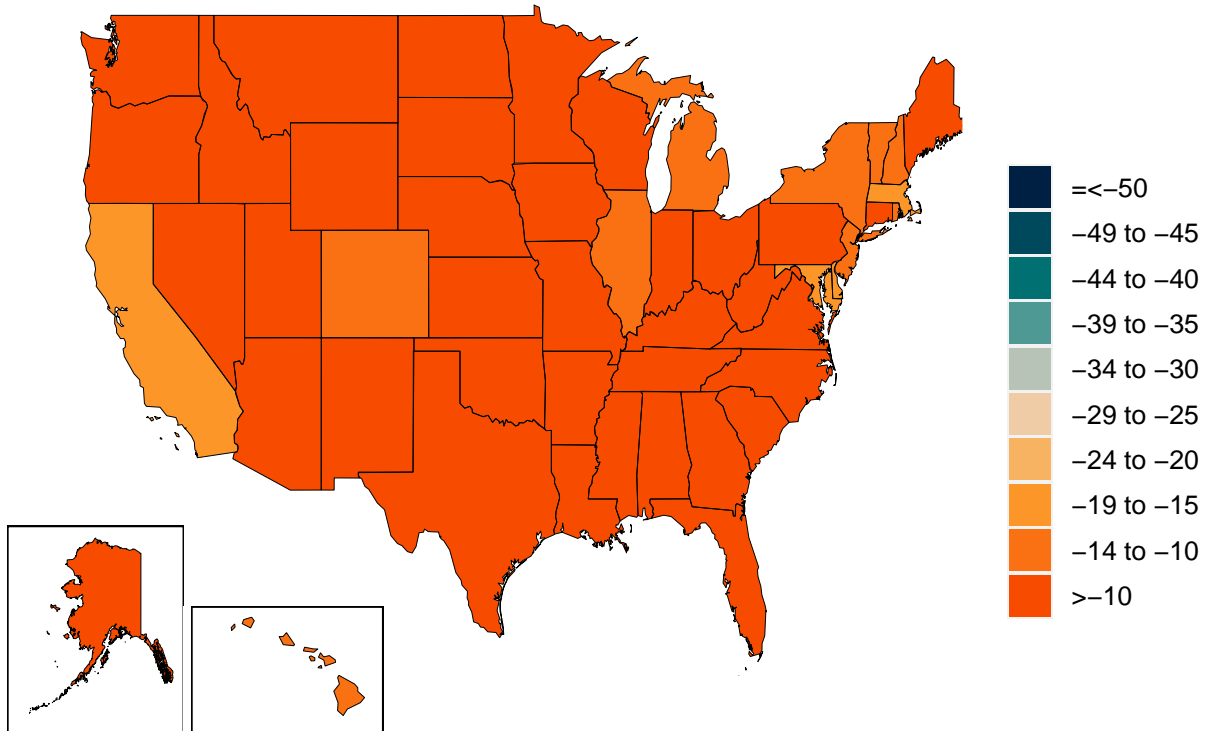


Figure 13.1: Trend in the proportion of the population reporting always wearing a mask when leaving home

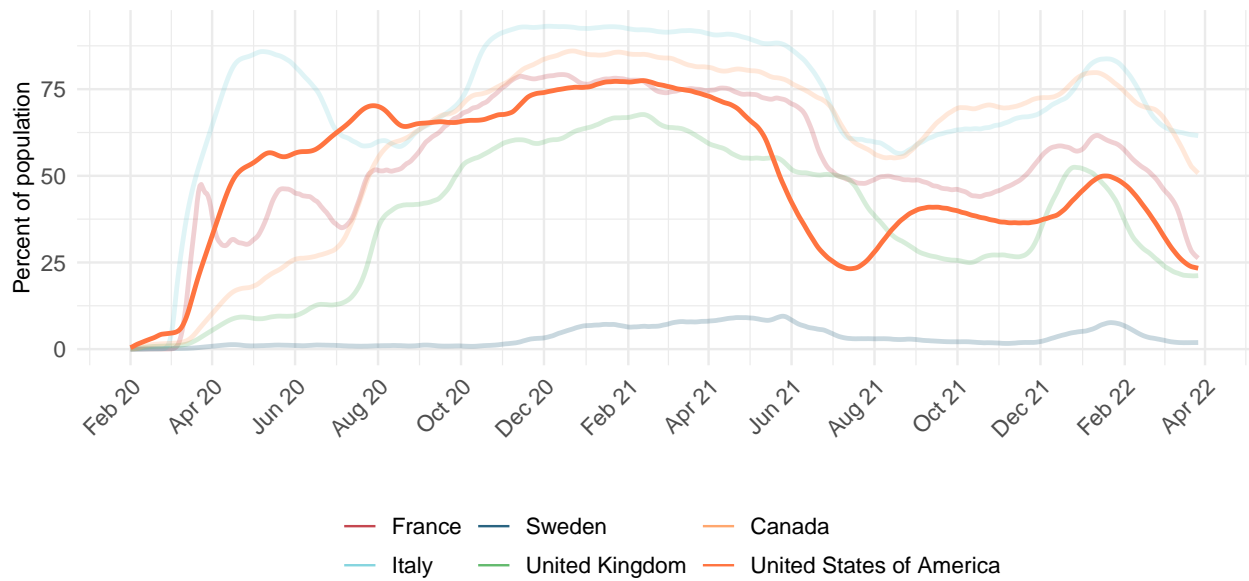


Figure 14.1: Proportion of the population reporting always wearing a mask when leaving home on April 4, 2022

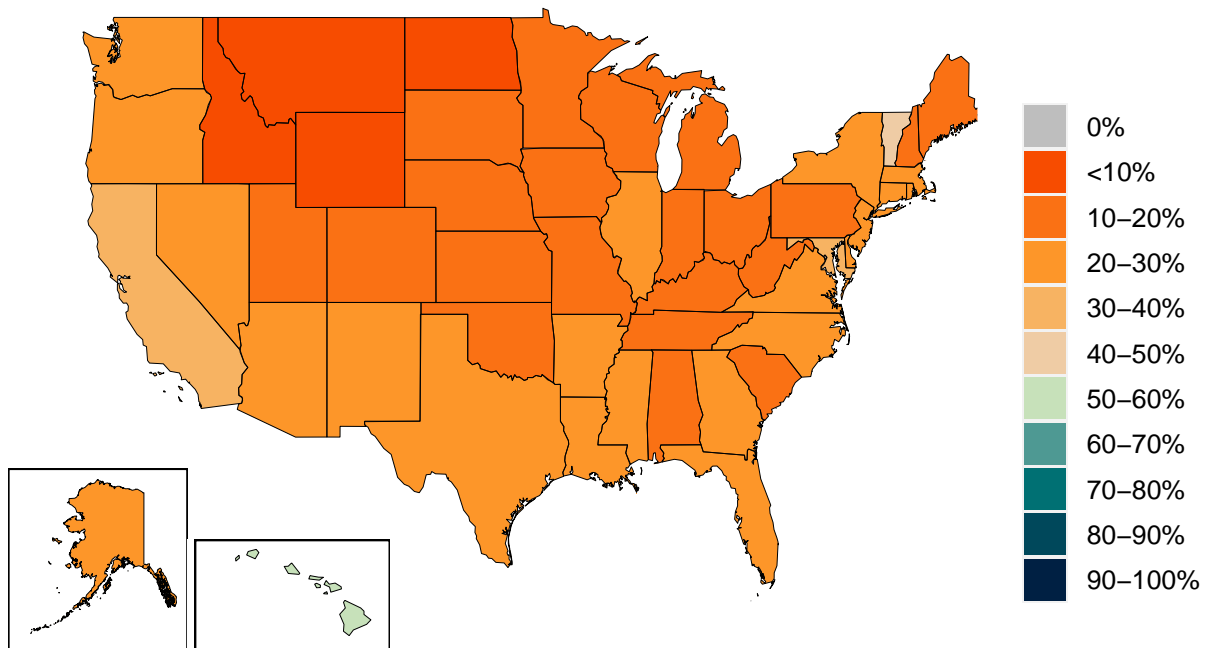


Figure 15.1: Trend in COVID-19 diagnostic tests per 100,000 people

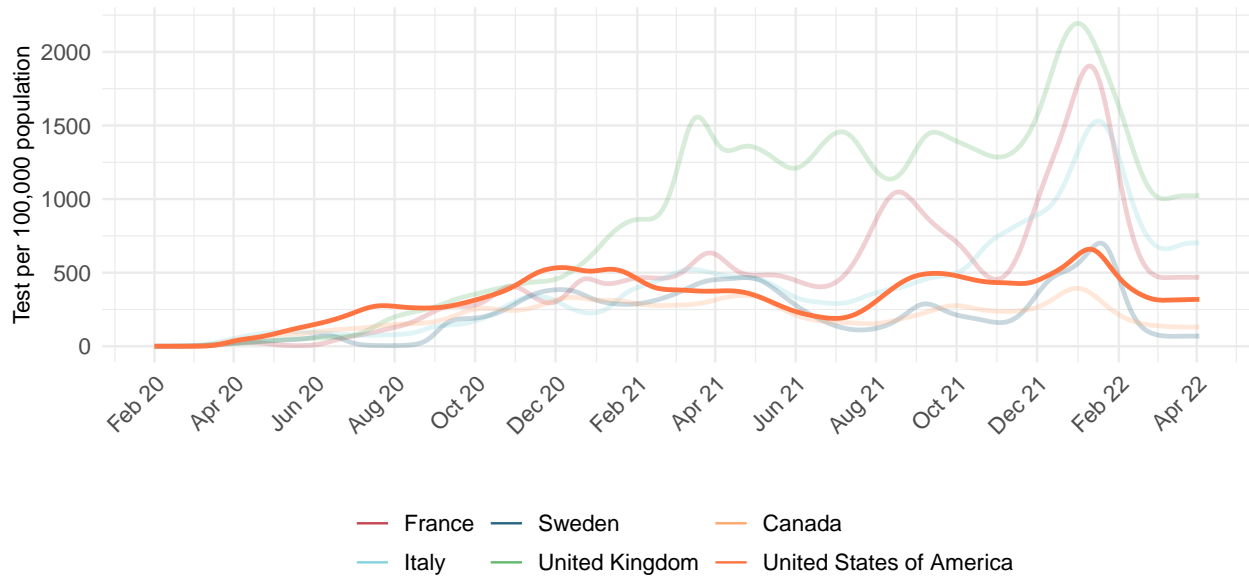
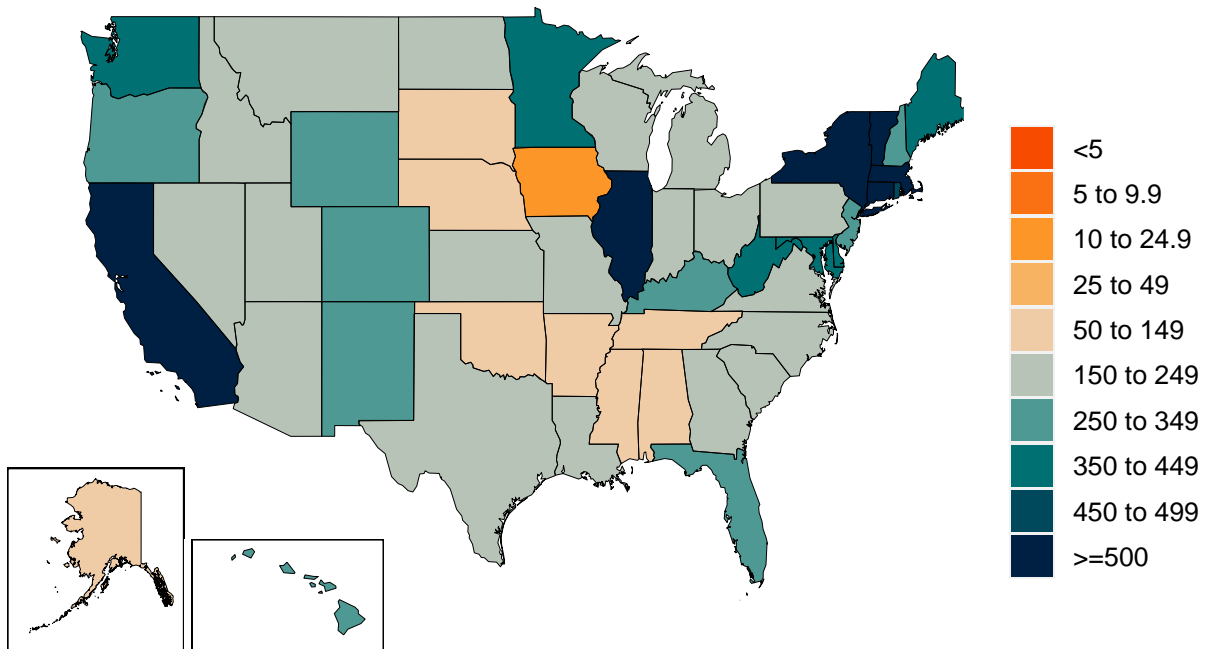


Figure 16.1: COVID-19 diagnostic tests per 100,000 people on April 4, 2022

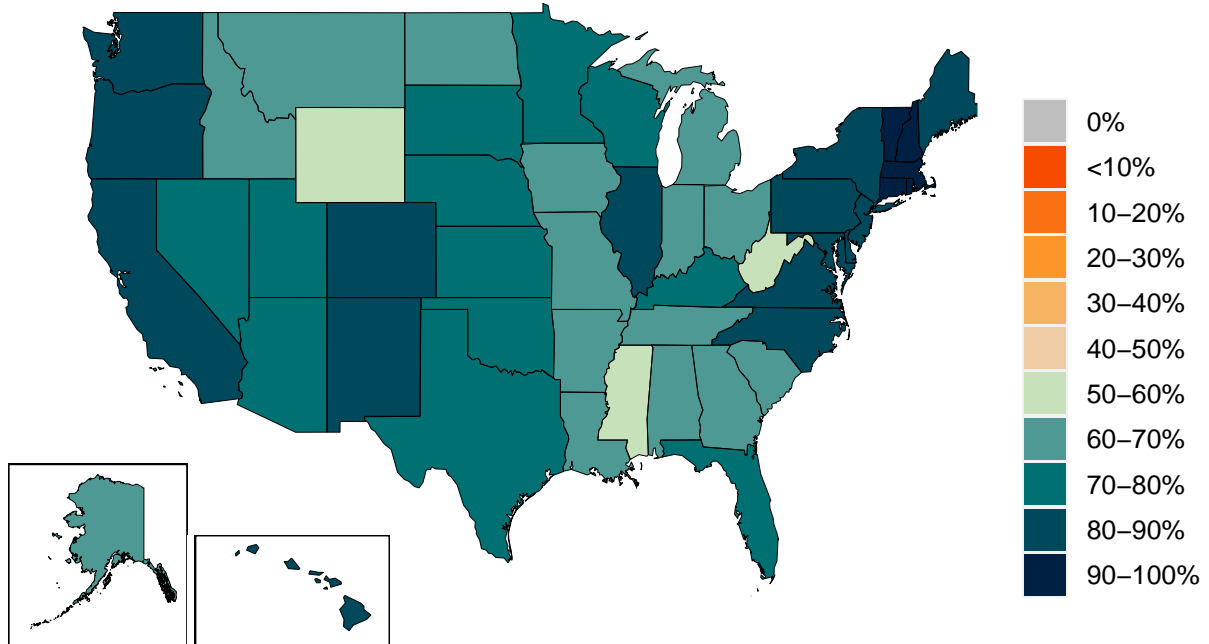


**Table 3: Estimates of vaccine effectiveness for specific vaccines used in the model at preventing severe disease and infection.** We use data from clinical trials directly, where available, and make estimates otherwise. More information can be found on our [website](#).

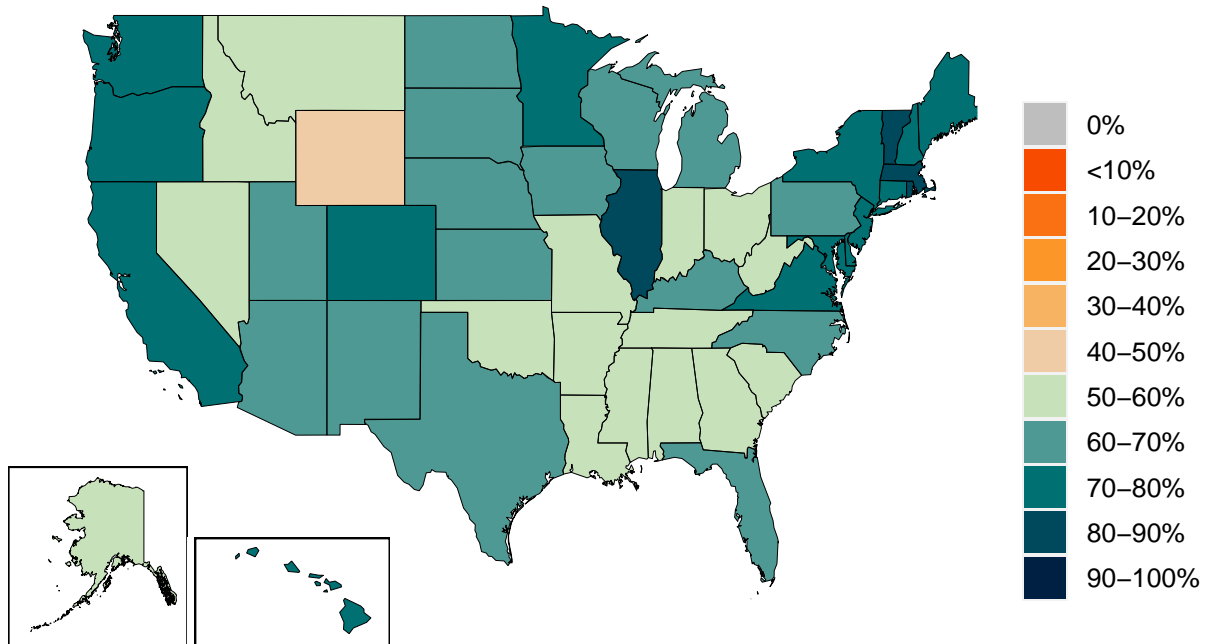
Vaccine	Effectiveness at preventing											
	Ancestral		Alpha		Beta		Gamma		Delta		Omicron	
	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection
AstraZeneca	94%	63%	94%	63%	94%	69%	94%	69%	94%	69%	71%	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 April 4, 2022

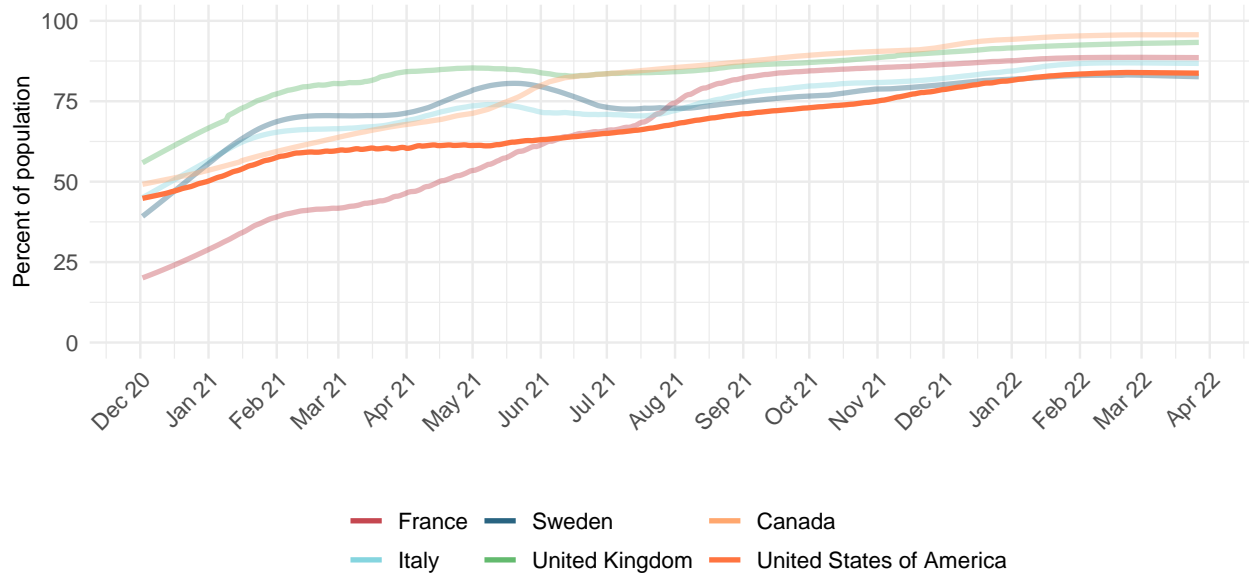
**Figure 17.1: Percent of the population having received one dose of a COVID-19 vaccine**



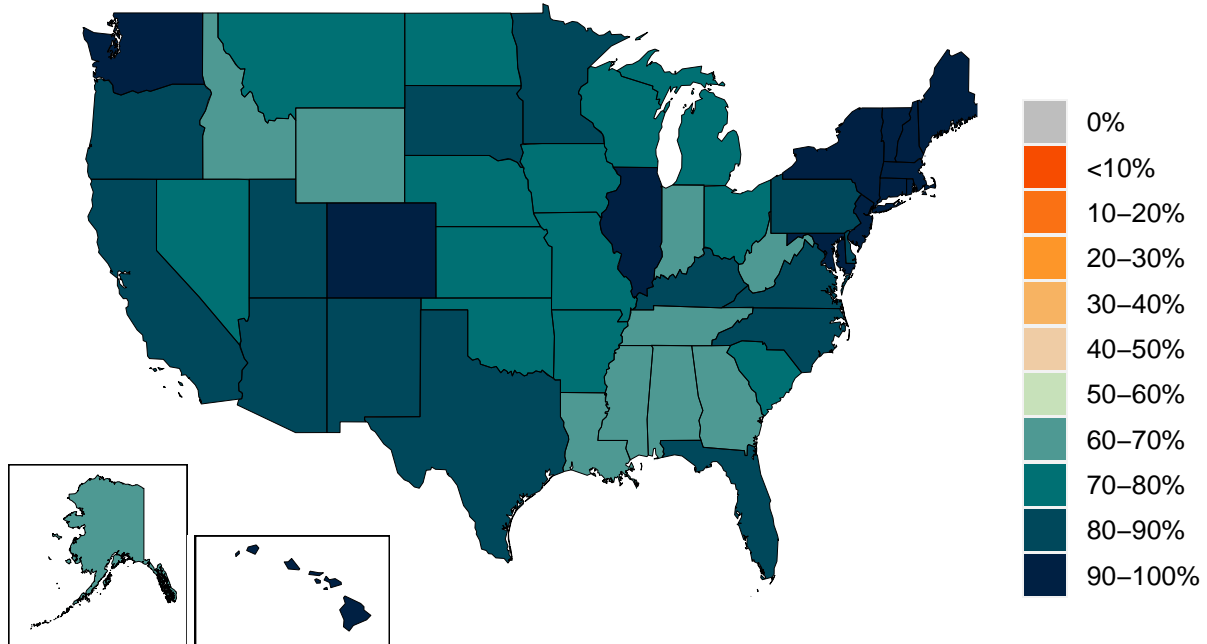
**Figure 17.2: Percent of the population fully vaccinated against SARS-CoV-2**



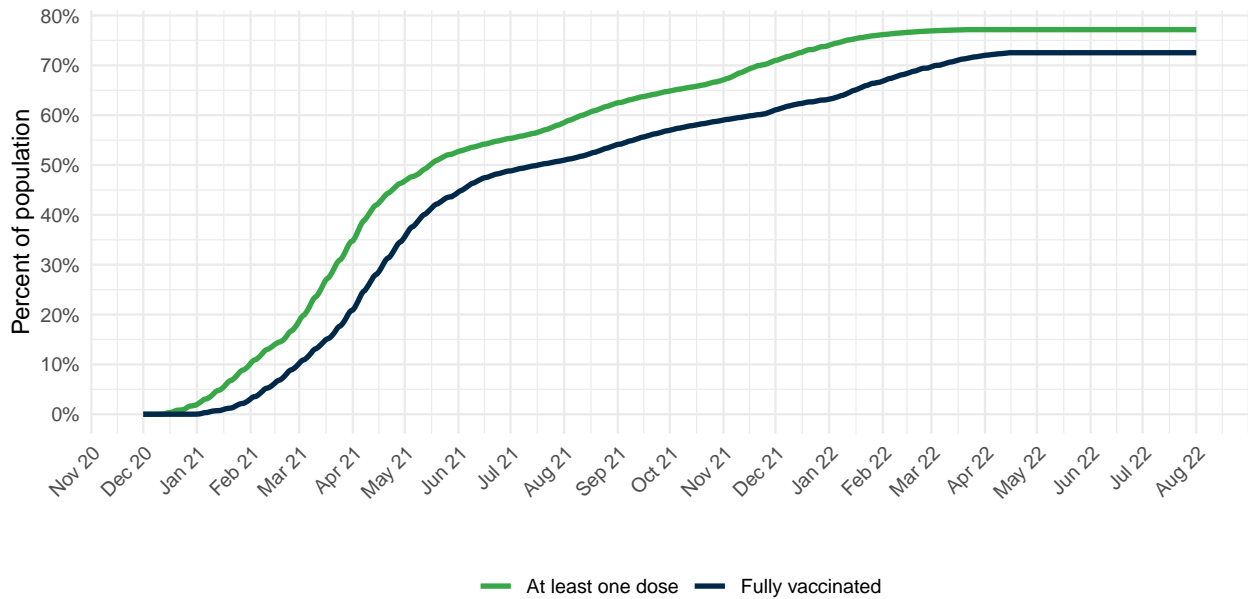
**Figure 18.1: Trend in the estimated proportion of the population that is 12 years and older that has been vaccinated or would definitely receive the COVID-19 vaccine if available.** Note that vaccine acceptance is calculated using survey data from the 18+ population.



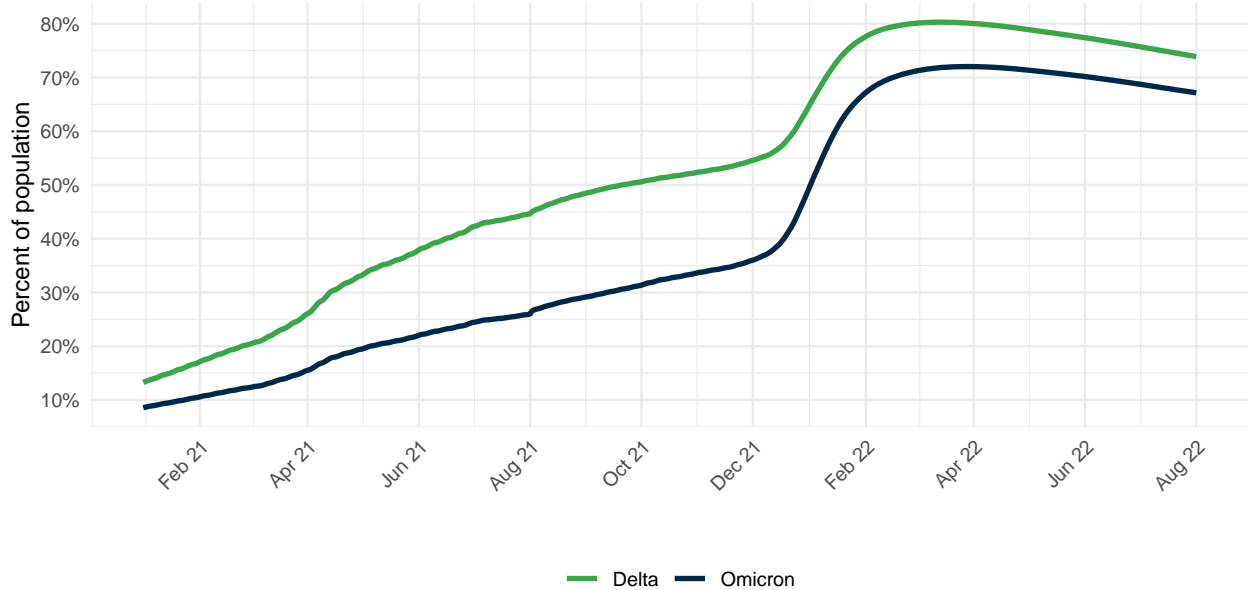
**Figure 19.1: Estimated proportion of the population that is 12 years and older that has been vaccinated or would definitely receive the COVID-19 vaccine if available.** Note that vaccine acceptance is calculated using survey data from the 18+ population.



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



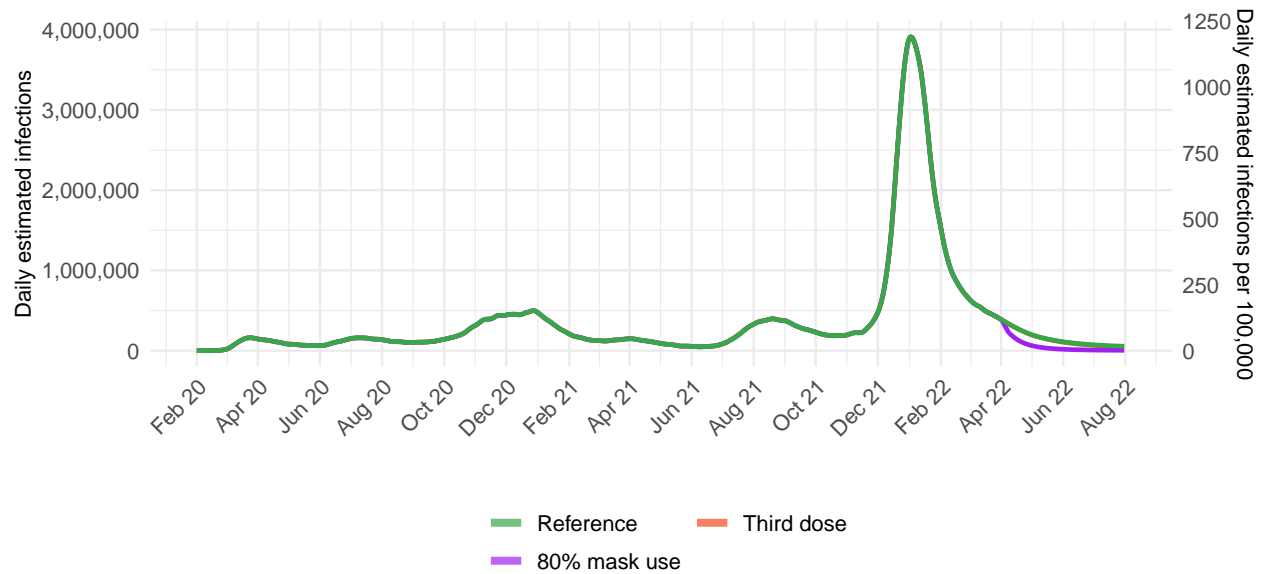
**Figure 21.1: Percent of people who are immune to Delta or Omicron. Immunity is based on protection due to prior vaccination and infection(s). Moreover, variant-specific immunity is also based on variant-variant specific protection.**





## Projections and scenarios

**Figure 22.1: Daily COVID-19 infections until August 01, 2022 for three scenarios**



**Figure 22.2: Daily COVID-19 reported cases until August 01, 2022 for three scenarios**

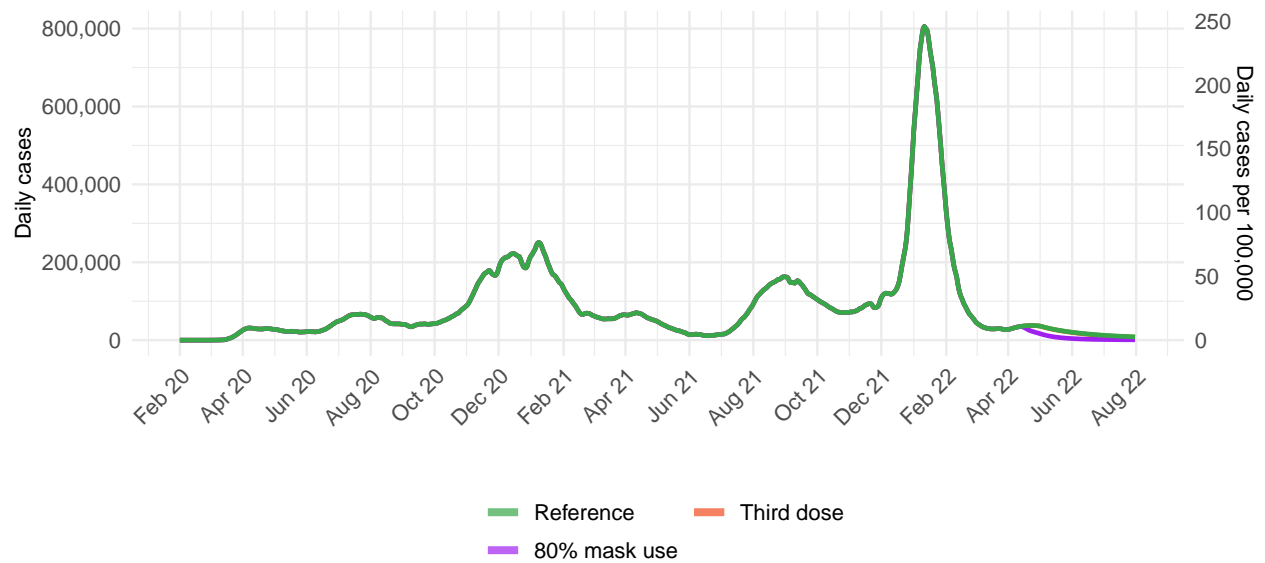
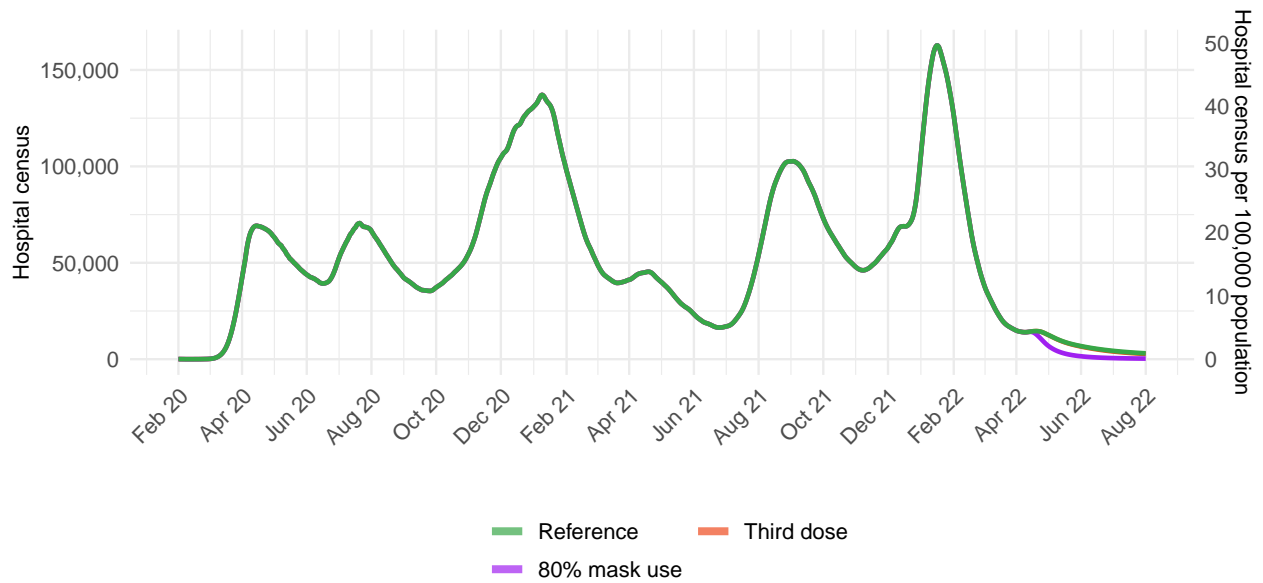
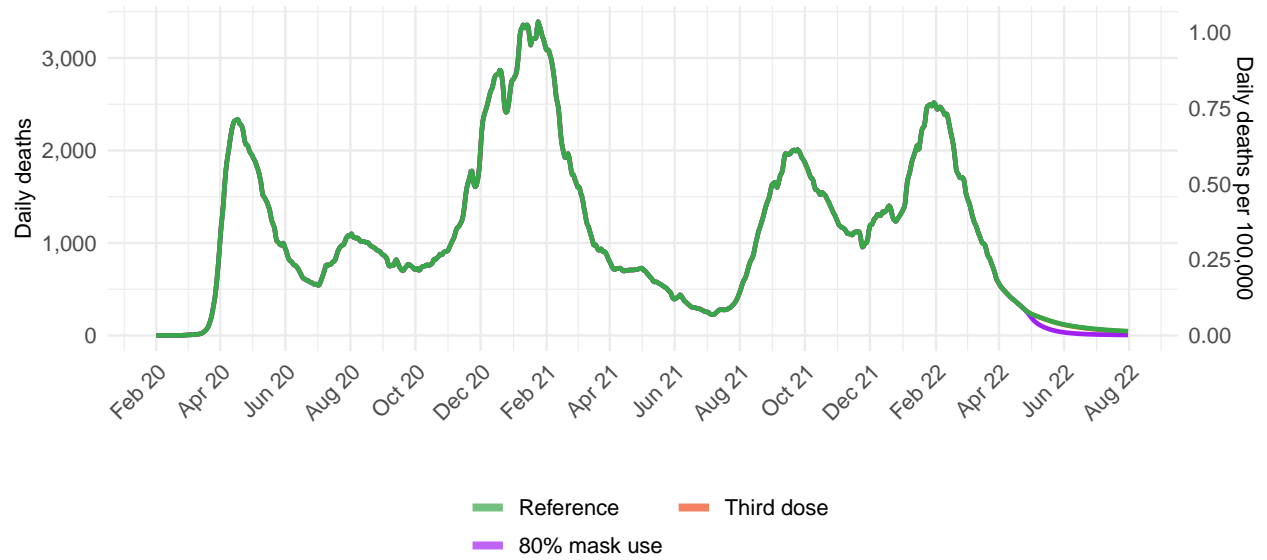
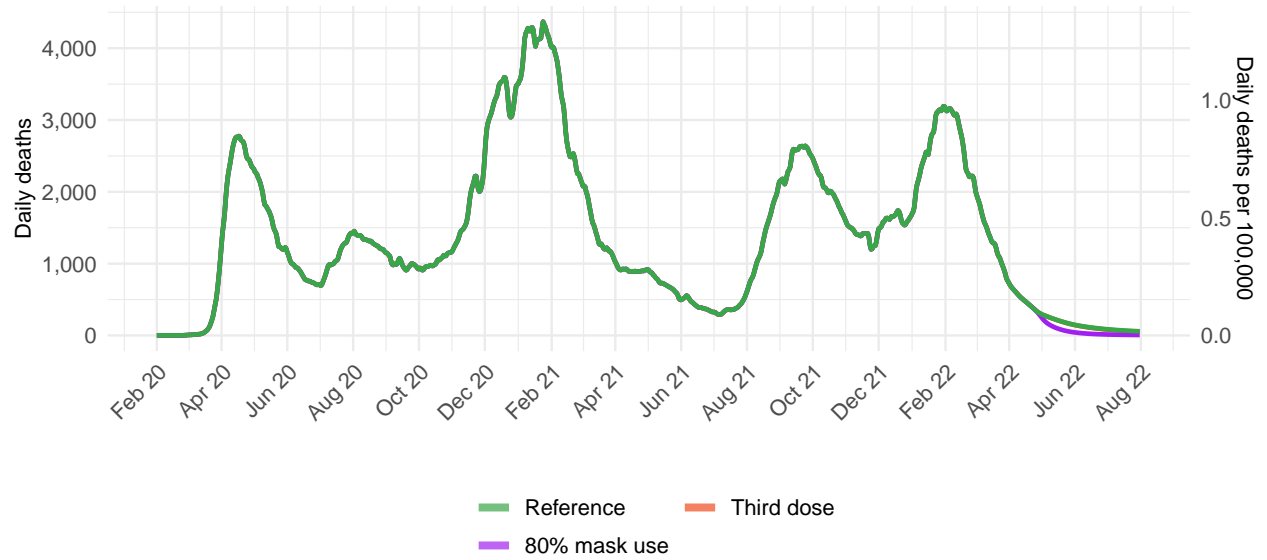


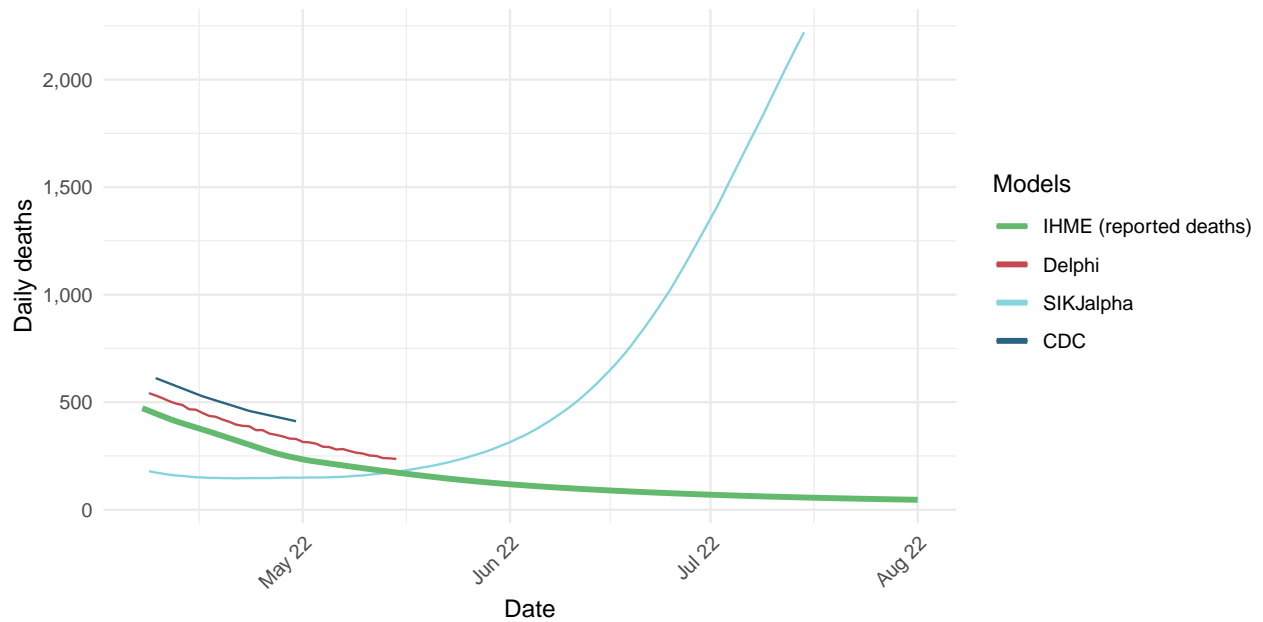
Figure 22.3: Daily COVID-19 hospital census until August 01, 2022 for three scenarios



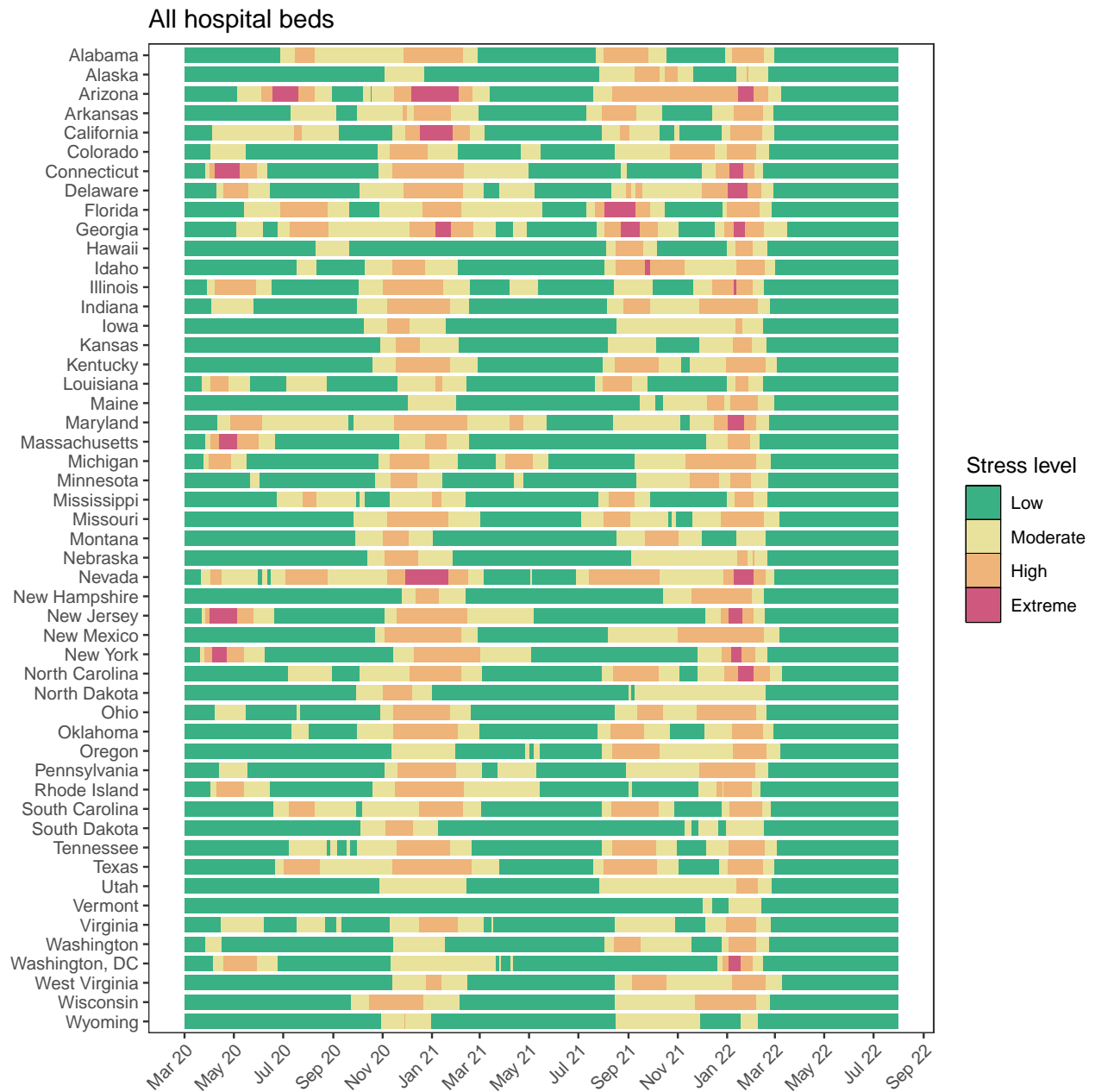
**Figure 22.4: Reported daily COVID-19 deaths per 100,000**

**Figure 22.5: Total daily COVID-19 deaths per 100,000**

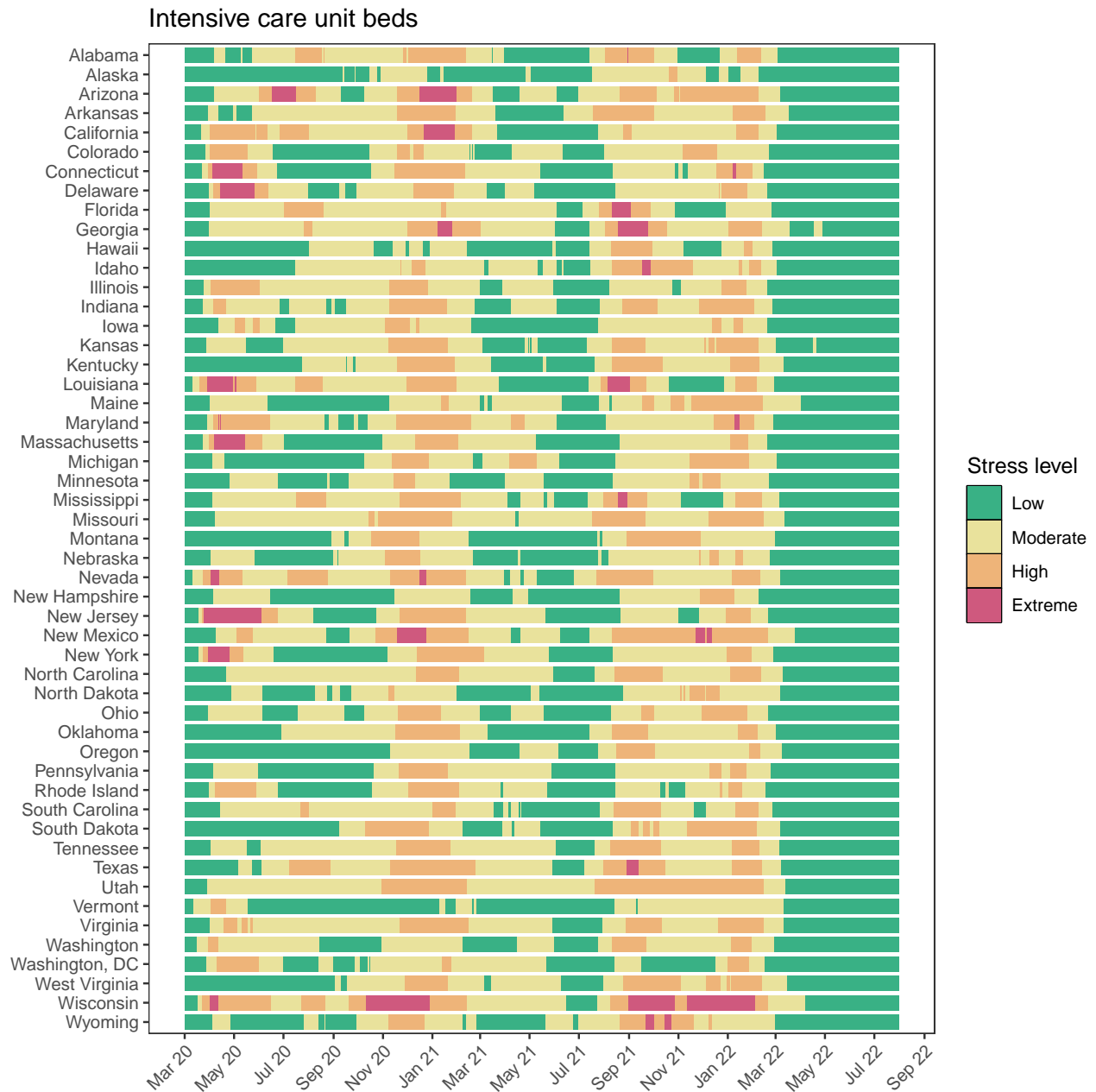
**Figure 23.1: Comparison of reference model projections with other COVID modeling groups.** For this comparison, we are including projections of daily COVID-19 deaths from other modeling groups when available, last model update in brackets: Delphi from the Massachusetts Institute of Technology ([Delphi](#)) [April 7, 2022], the SI-KJalpha model from the University of Southern California ([SIKJalpha](#)) [April 7, 2022], and the CDC Ensemble Model ([CDC](#)) [April 4, 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 24.1: 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 25.1: 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>.