

COVID-19 Results Briefing

Brazil

April 8, 2022

This document contains summary information on the latest projections from the IHME model on COVID-19 in Brazil. The model was run on April 7, 2022, with data through April 4, 2022.

Current situation

- Daily infections in the last week decreased to 248,000 per day on average compared to 299,000 the week before (Figure 1.1). Daily hospital census in the last week (through April 4) decreased to 5,000 per day on average compared to 5,600 the week before.
- Daily reported cases in the last week decreased to 23,000 per day on average compared to 31,000 the week before (Figure 2.1).
- Reported deaths due to COVID-19 in the last week decreased to 200 per day on average compared to 230 the week before (Figure 3.1).
- Total deaths due to COVID-19 in the last week decreased to 230 per day on average compared to 270 the week before (Figure 3.1). This makes COVID-19 the number four cause of death in Brazil 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 no states (Figure 4.1).
- The daily rate of total deaths due to COVID-19 is greater than 4 per million in no states (Figure 4.2).
- We estimate that 79% of people in Brazil 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 two states. (Figure 7.1).
- The infection-detection rate in Brazil was close to 6% 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). We estimate that the Alpha variant is circulating in four states, that the Beta variant is circulating in no states, that the Delta variant is circulating in 27 states, that the Gamma variant is circulating in 27 states, and that the Omicron variant is circulating in 27 states.

Trends in drivers of transmission

- Mobility last week was 6% higher than the pre-COVID-19 baseline (Figure 11.1). Mobility was lower than 15% of baseline in one state.
- As of April 4, in the COVID-19 Trends and Impact Survey, 48% of people self-report that they always wore a mask when leaving their home compared to 48% last week (Figure 13.1).
- There were 49 diagnostic tests per 100,000 people on April 4 (Figure 15.1).
- As of April 4, 10 states have reached 70% or more of the population who have received at least one vaccine dose, and seven states have reached 70% or more of the population who are fully vaccinated (Figure 17.1). 71% of people in Brazil have received at least one vaccine dose, and 67% are fully vaccinated.
- In Brazil, 88.5% 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. This is down by 0.1 percentage points from last week. The proportion of the population who are open to receiving a COVID-19 vaccine ranges from 70% in Amapá to 99% in São Paulo (Figure 19.1).
- In our current reference scenario, we expect that 153.4 million people will be vaccinated with at least one dose by August 1 (Figure 20.1). We expect that 67% 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 rise to 367,590 by July 30, 2022 (Figure 22.1).
- Daily estimated infections in the **80% mask use scenario** will decline to 87,990 by May 17, 2022 (Figure 22.1).
- Daily estimated infections in the **third dose scenario** will rise to 248,390 by August 1, 2022 (Figure 22.1).

Cases

- Daily estimated cases in the **reference scenario** will rise to 26,680 by July 27, 2022 (Figure 22.2).
- Daily estimated cases in the **80% mask use scenario** will decline to 6,340 by May 25, 2022 (Figure 22.2).
- Daily estimated cases in the **third dose scenario** will decline to 9,730 by May 8, 2022 (Figure 22.2).

Hospitalizations

- Daily hospital census in the **reference scenario** will rise to 6,070 by August 1, 2022 (Figure 22.3).
- Daily hospital census in the **80% mask use scenario** will decline to 1,370 by May 29, 2022 (Figure 22.3).
- Daily hospital census in the **third dose scenario** will decline to 2,100 by May 13, 2022 (Figure 22.3).

Deaths

- In our **reference scenario**, our model projects 676,000 cumulative reported deaths due to COVID-19 on August 1. This represents 15,000 additional deaths from April 4 to August 1. Daily reported COVID-19 deaths in the **reference scenario** will decline to 90 by May 17, 2022 (Figure 22.4).
- Under our **reference scenario**, our model projects 791,000 cumulative total deaths due to COVID-19 on August 1. This represents 17,000 additional deaths from April 4 to August 1 (Figure 22.5).
- In our **80% mask use scenario**, our model projects 669,000 cumulative reported deaths due to COVID-19 on August 1. This represents 7,900 additional deaths from April 4 to August 1. Daily reported COVID-19 deaths in the **80% mask use scenario** will decline to 40 by June 8, 2022 (Figure 22.4).

- In our **third dose scenario**, our model projects 671,000 cumulative reported deaths due to COVID-19 on August 1. This represents 11,000 additional deaths from April 4 to August 1. Daily reported COVID-19 deaths in the **third dose scenario** will decline to 60 by May 23, 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, six 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

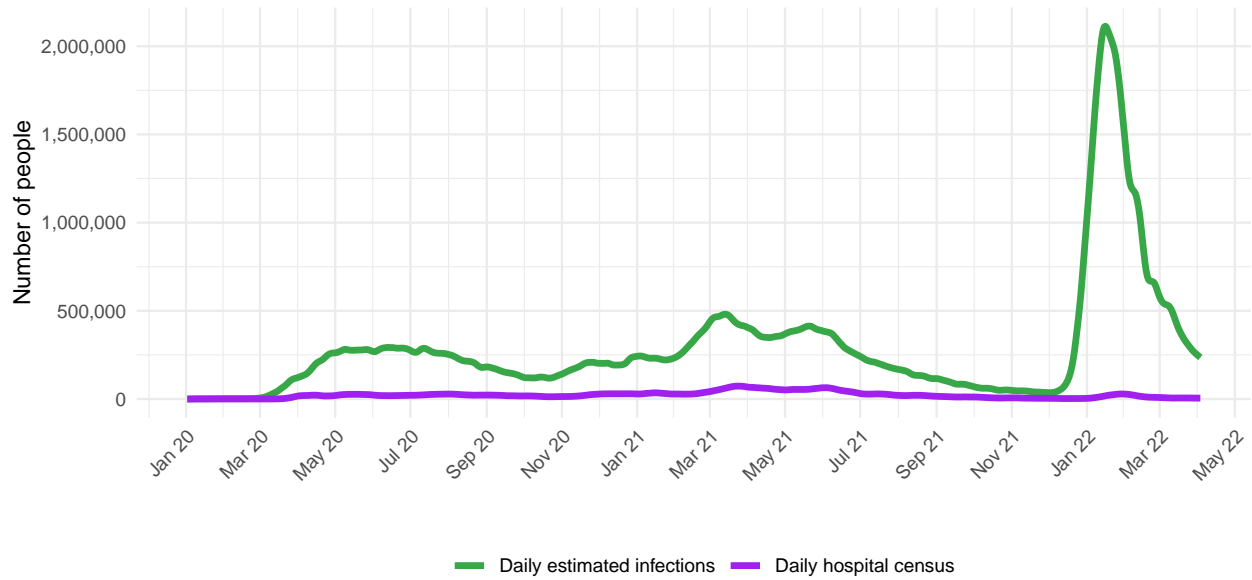


Figure 2.1: Reported daily COVID-19 cases, moving average

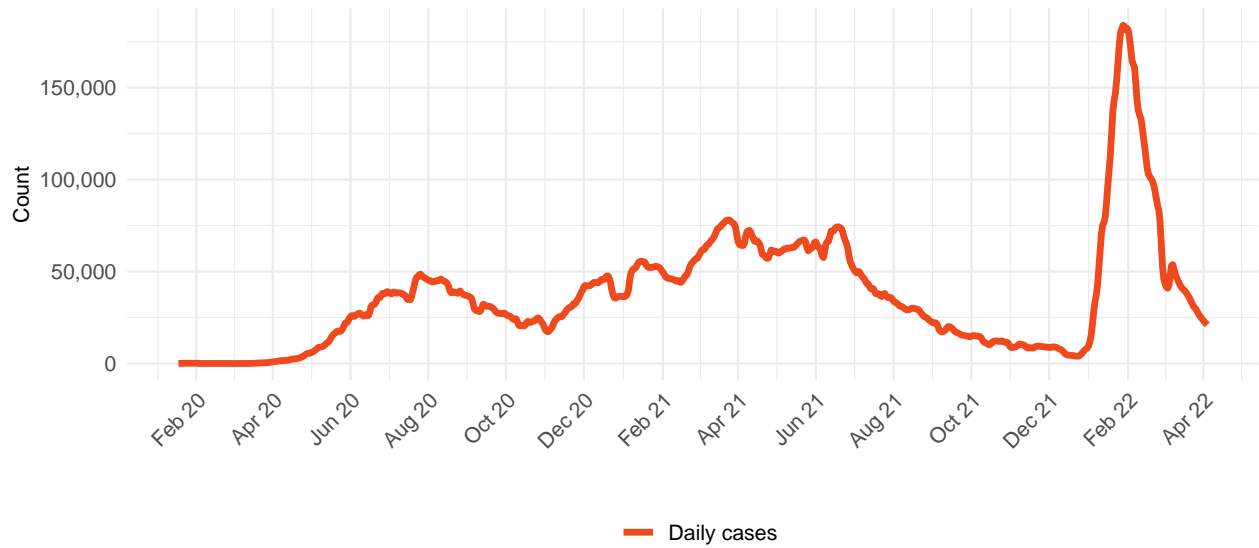
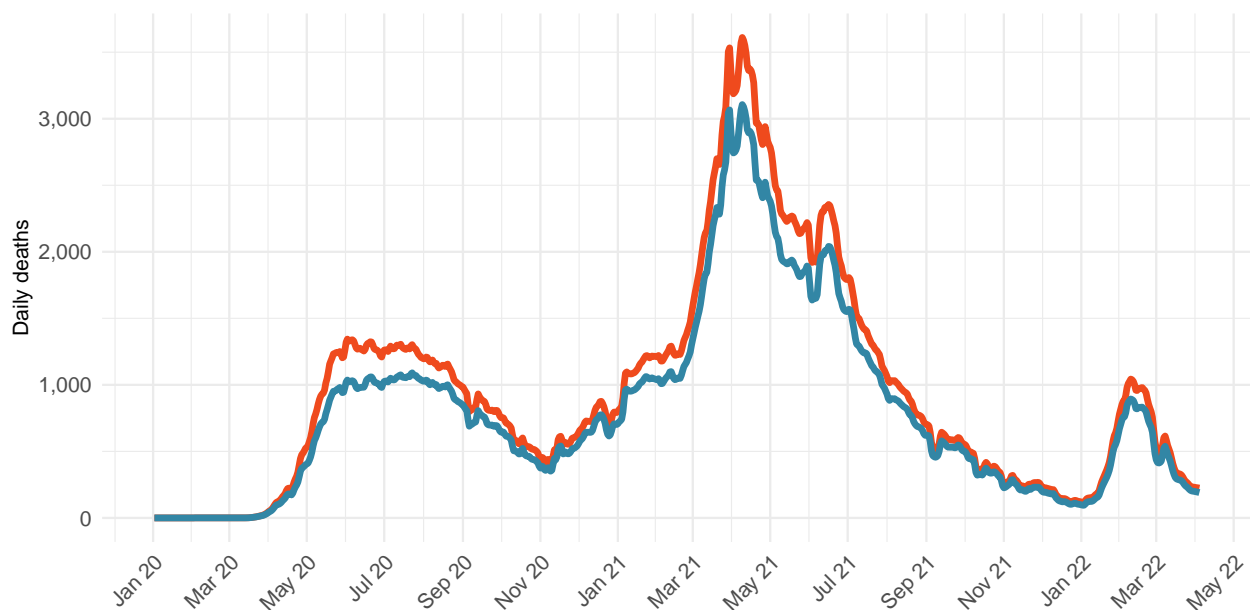


Table 1: Ranking of total deaths due to COVID-19 among the leading causes of mortality this week, assuming uniform deaths of non-COVID causes throughout the year

Cause name	Weekly deaths	Ranking
Ischemic heart disease	3,293	1
Stroke	2,519	2
Lower respiratory infections	1,705	3
COVID-19	1,602	4
Chronic obstructive pulmonary disease	1,321	5
Interpersonal violence	1,267	6
Diabetes mellitus	1,257	7
Alzheimer's disease and other dementias	1,050	8
Road injuries	856	9
Chronic kidney disease	814	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

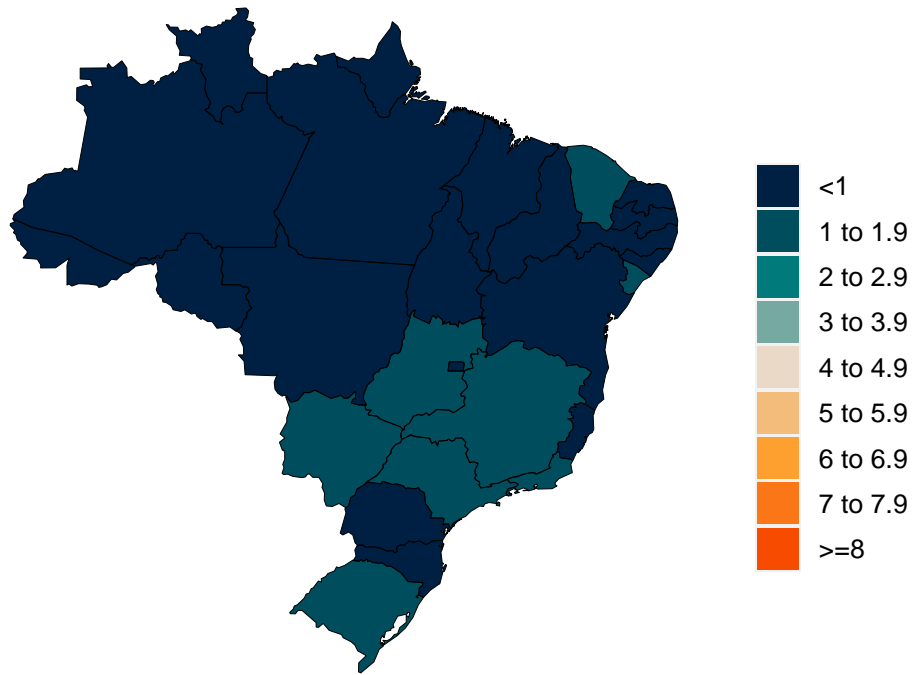
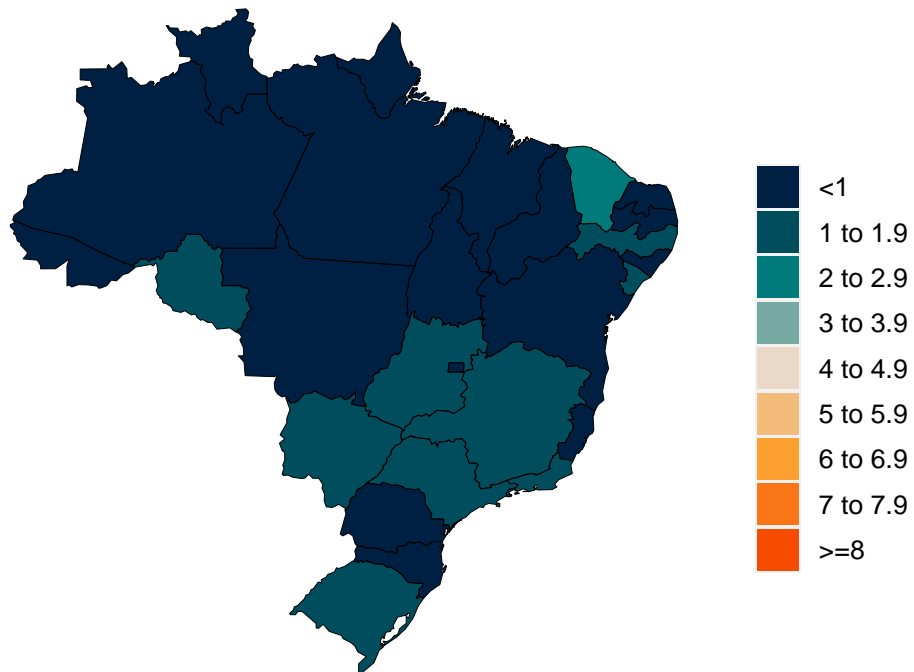


Figure 4.2: Daily total COVID-19 death rate per 1 million



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

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

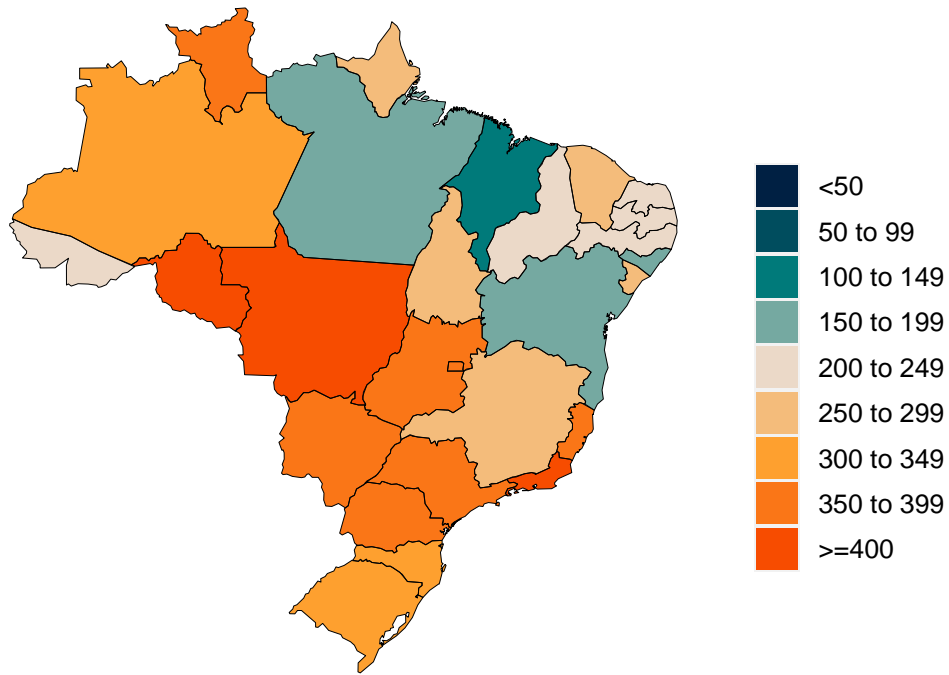


Figure 5.2: Total cumulative COVID-19 deaths per 100,000

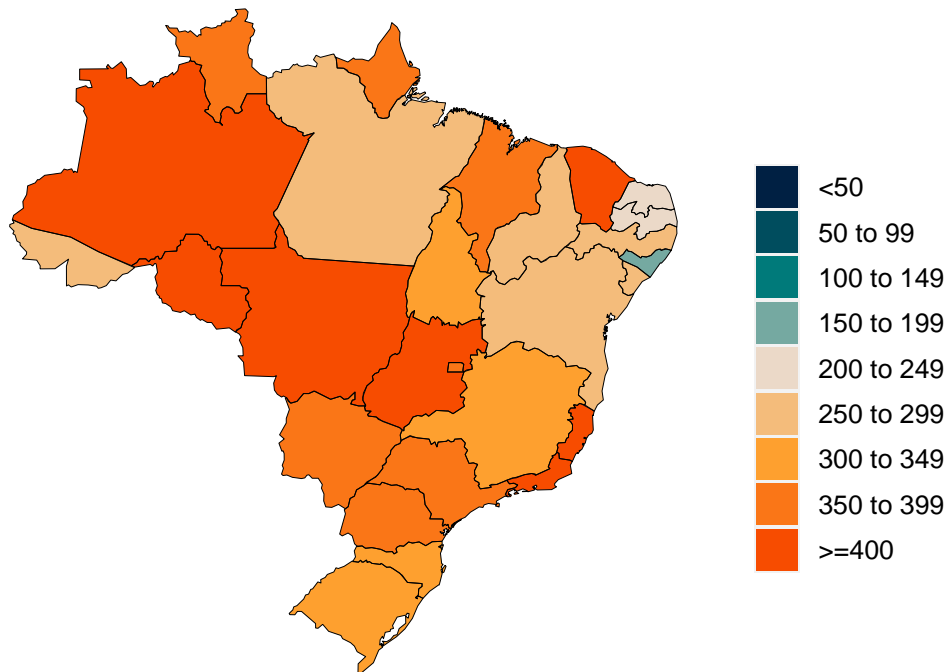


Figure 6.1: Estimated percent of the population infected with COVID-19 on April 4, 2022

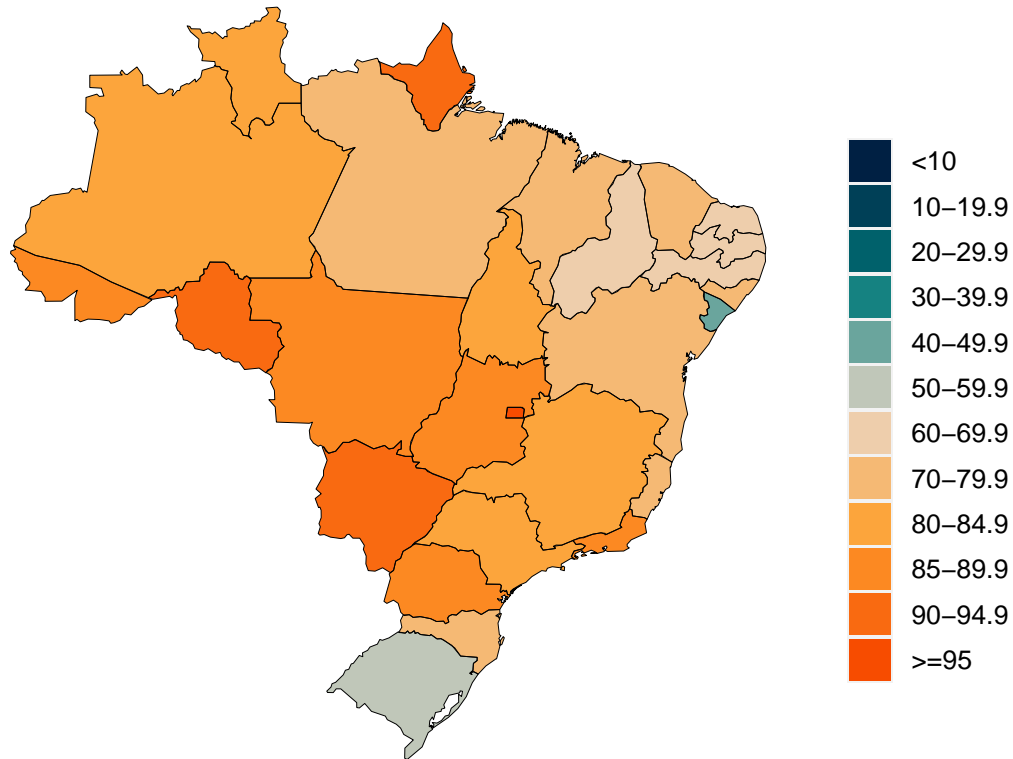


Figure 7.1: Mean effective R on March 24, 2022. Effective R less than 1 means that transmission should decline, all other things being held the same. The estimate of effective R is based on the combined analysis of deaths, case reporting, and hospitalizations where available. Current reported cases reflect infections 11-13 days prior, so estimates of effective R can only be made for the recent past.

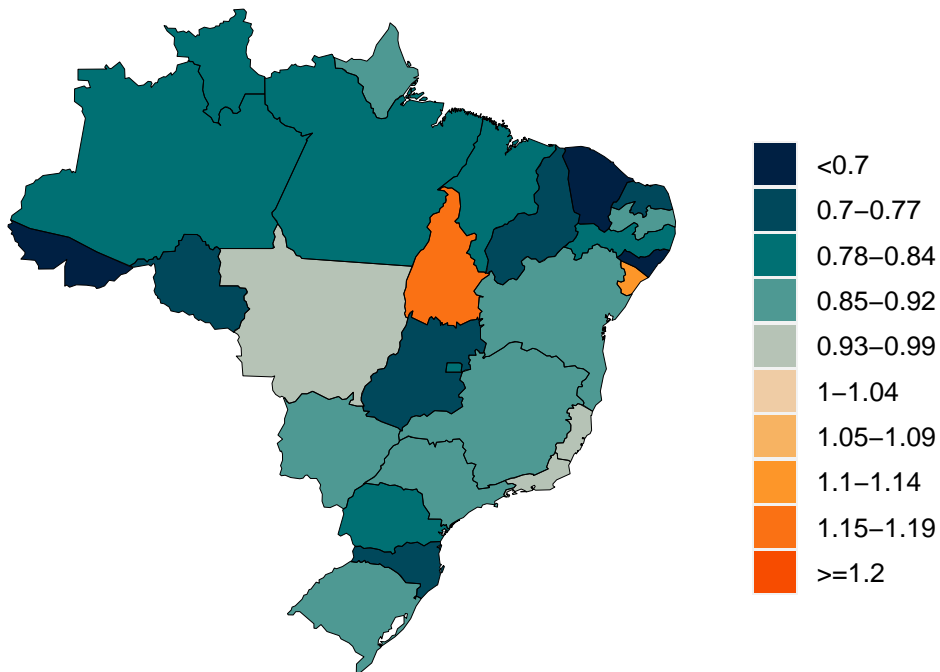
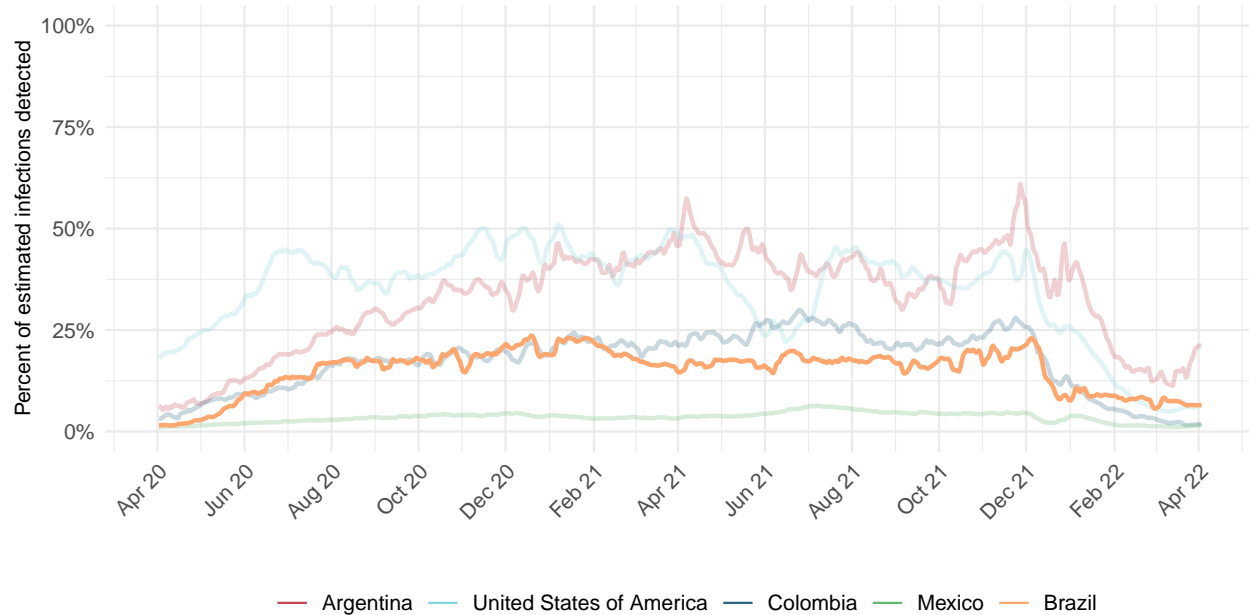


Figure 8.1: Percent of estimated COVID-19 infections detected. This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model. Due to measurement errors in cases and testing rates, the infection-detection rate can exceed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

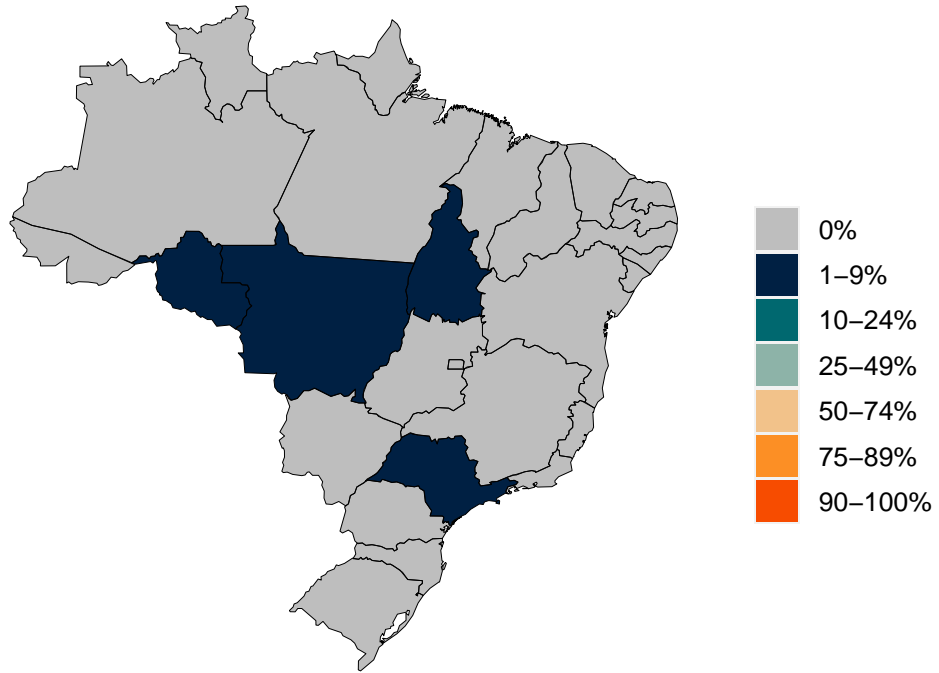


Figure 9.2: Estimated percent of new infections that are Beta variant

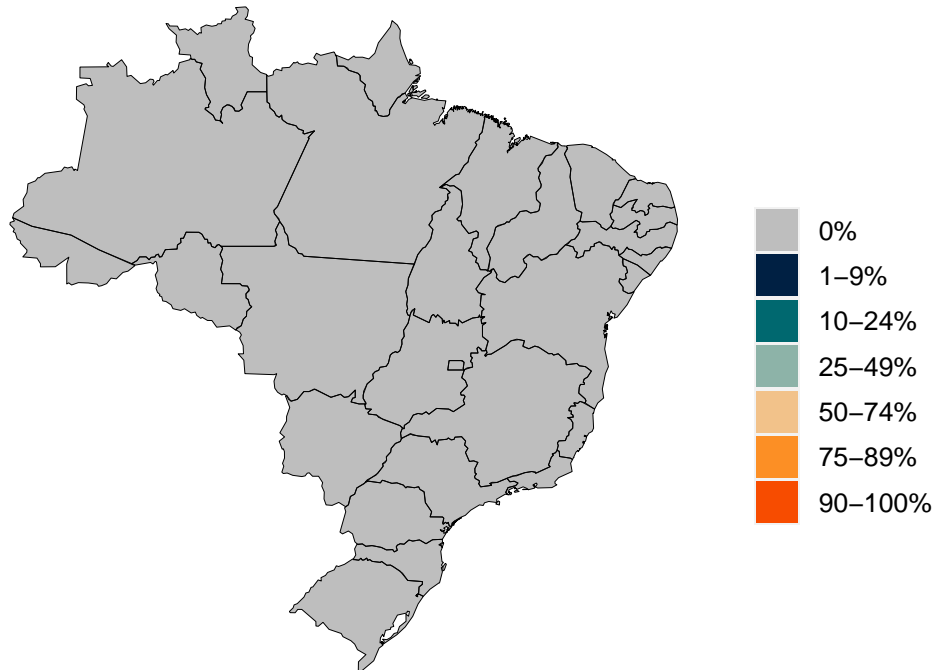


Figure 9.3: Estimated percent of new infections that are Delta variant

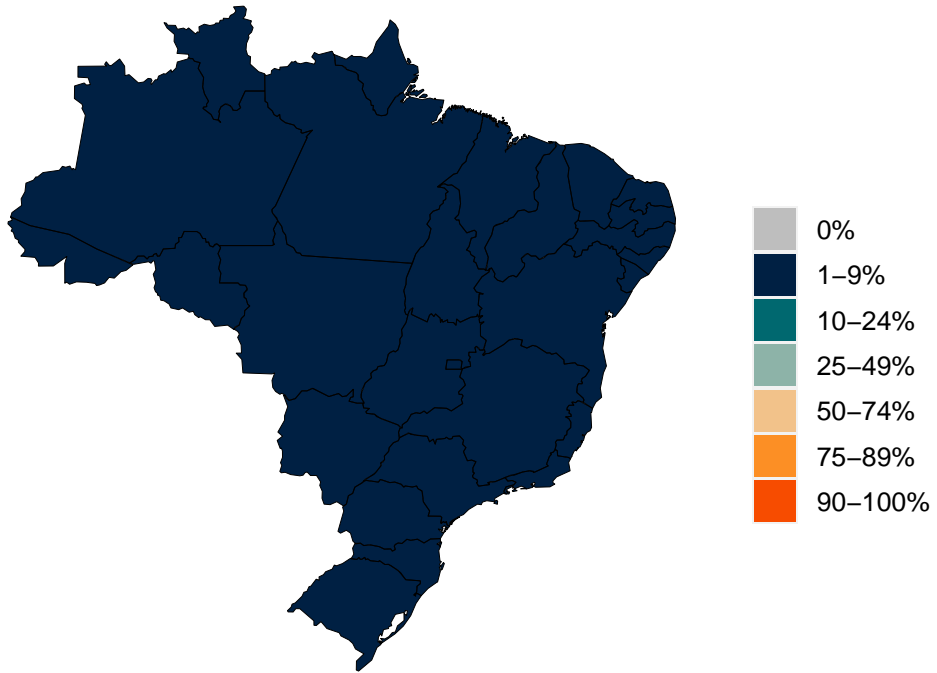


Figure 9.4: Estimated percent of new infections that are Gamma variant

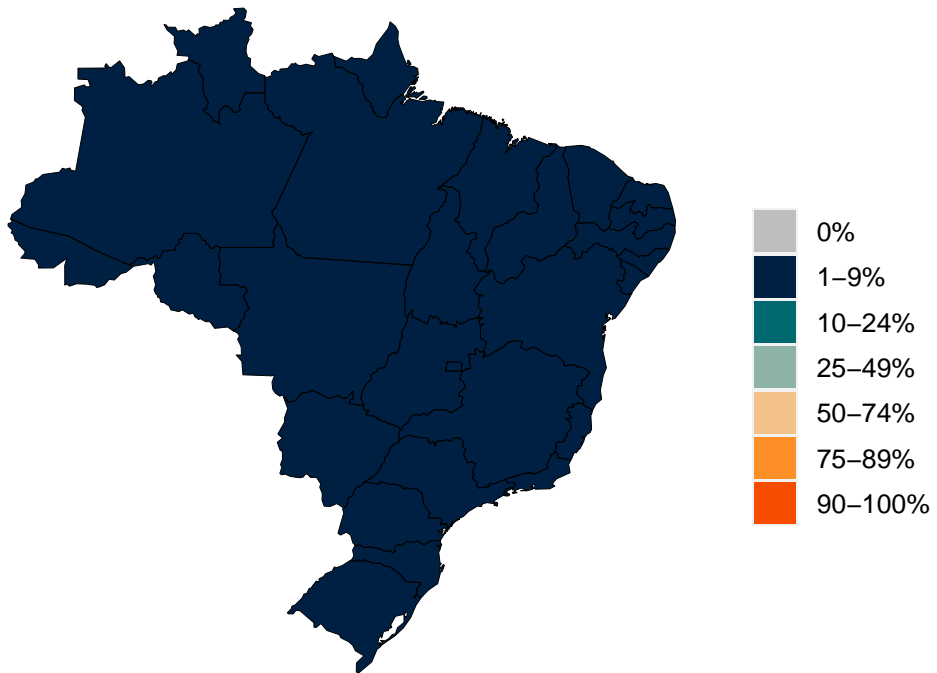


Figure 9.5: Estimated percent of new infections that are Omicron variant

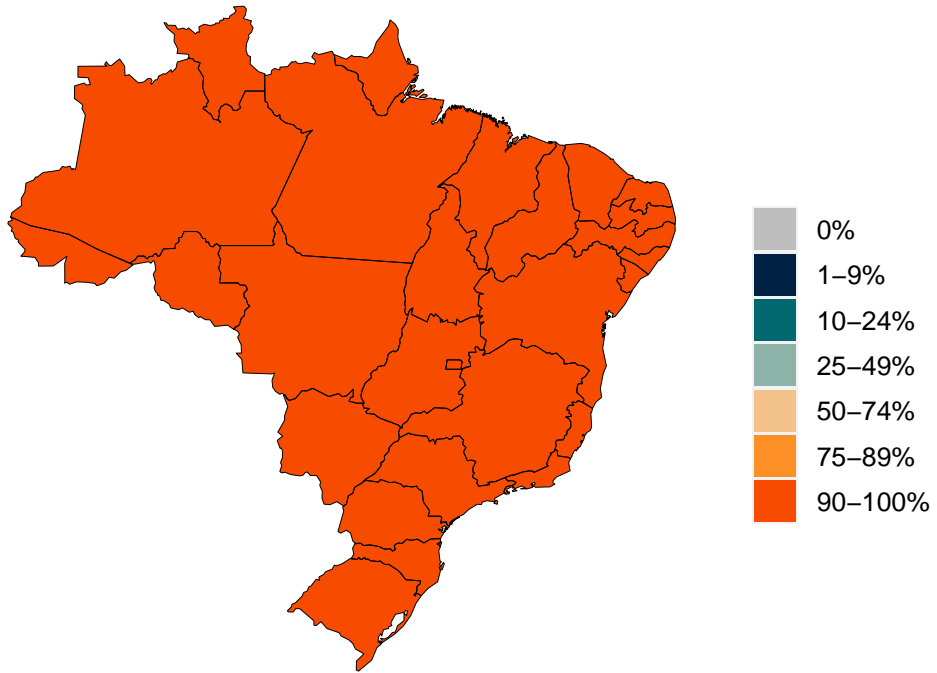
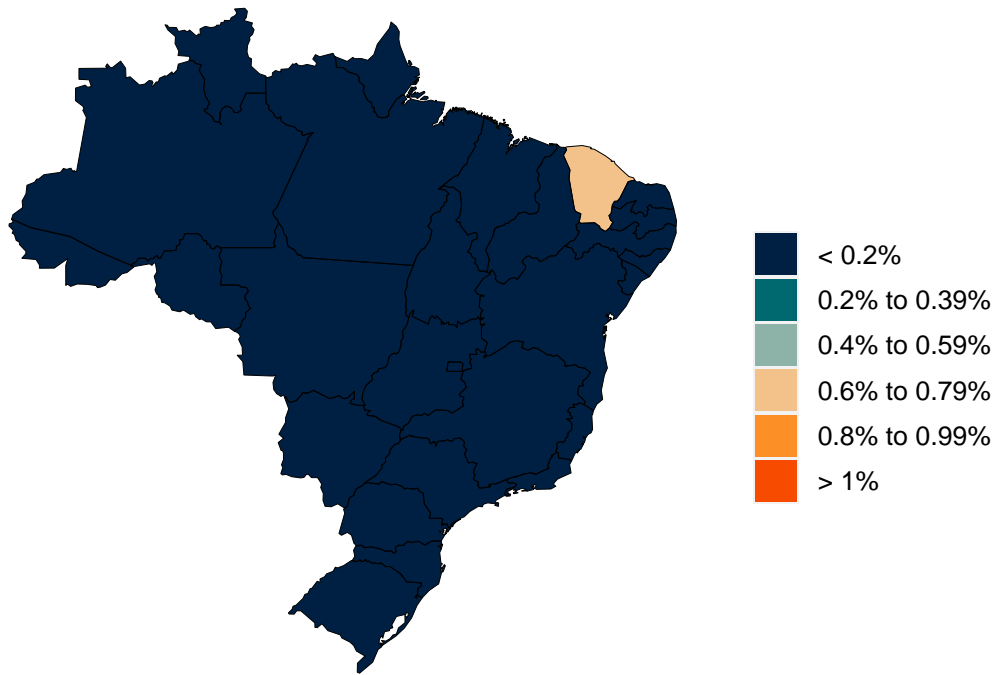


Figure 10.1: Infection-fatality rate on April 4, 2022. This is estimated as the ratio of COVID-19 deaths to estimated daily COVID-19 infections.



Critical drivers

Table 2: Current mandate implementation

	Primary school closure	Secondary school closure	Higher school closure	Entry restrictions for some non-residents	Entry restrictions for all non-residents	Individual movements restricted	Curfew for businesses	Individual curfew	Gathering limit: 6 indoor, 10 outdoor	Gathering limit: 10 indoor, 25 outdoor	Gathering limit: 25 indoor, 50 outdoor	Gathering limit: 50 indoor, 100 outdoor	Gathering limit: 100 indoor, 250 outdoor	Restaurants closed	Bars closed	Restaurants / bars closed	Restaurants / bars curbside only	Gyms, pools, other leisure closed	Non-essential retail closed	Non-essential retail curbside only	Non-essential workplaces closed	Stay home order	Stay home fine	Mask mandate	Mask mandate fine	
Acre																										
Alagoas																										
Amapá																										
Amazonas																										
Bahia																										
Ceará																										
Distrito Federal																										
Espírito Santo																										
Goiás																										
Maranhão																										
Mato Grosso																										
Mato Grosso do Sul																										
Minas Gerais																										
Paraná																										
Paraíba																										
Pará																										
Pernambuco																										
Piauí																										
Rio Grande do Norte																										
Rio Grande do Sul																										
Rio de Janeiro																										
Rondônia																										
Roraima																										
Santa Catarina																										
Sergipe																										
São Paulo																										
Tocantins																										

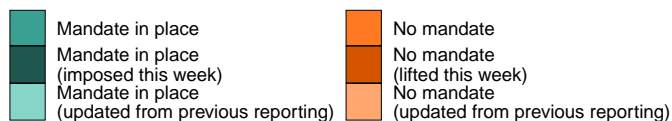


Figure 11.1: Trend in mobility as measured through smartphone app use, compared to January 2020 baseline

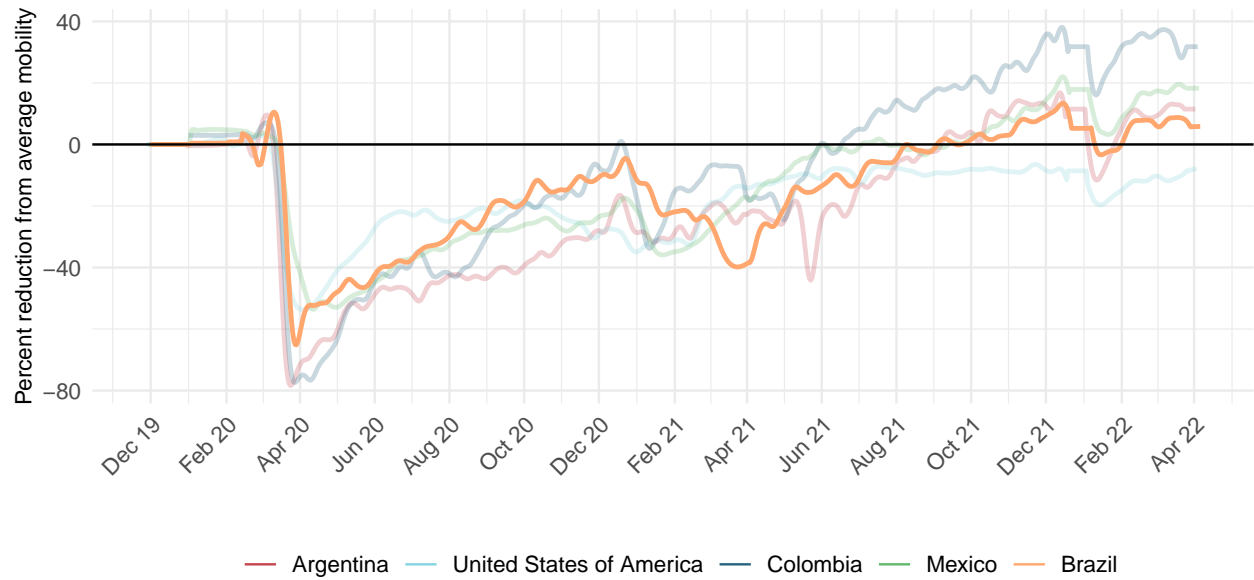


Figure 12.1: Mobility level as measured through smartphone app use, compared to January 2020 baseline (percent) on April 4, 2022

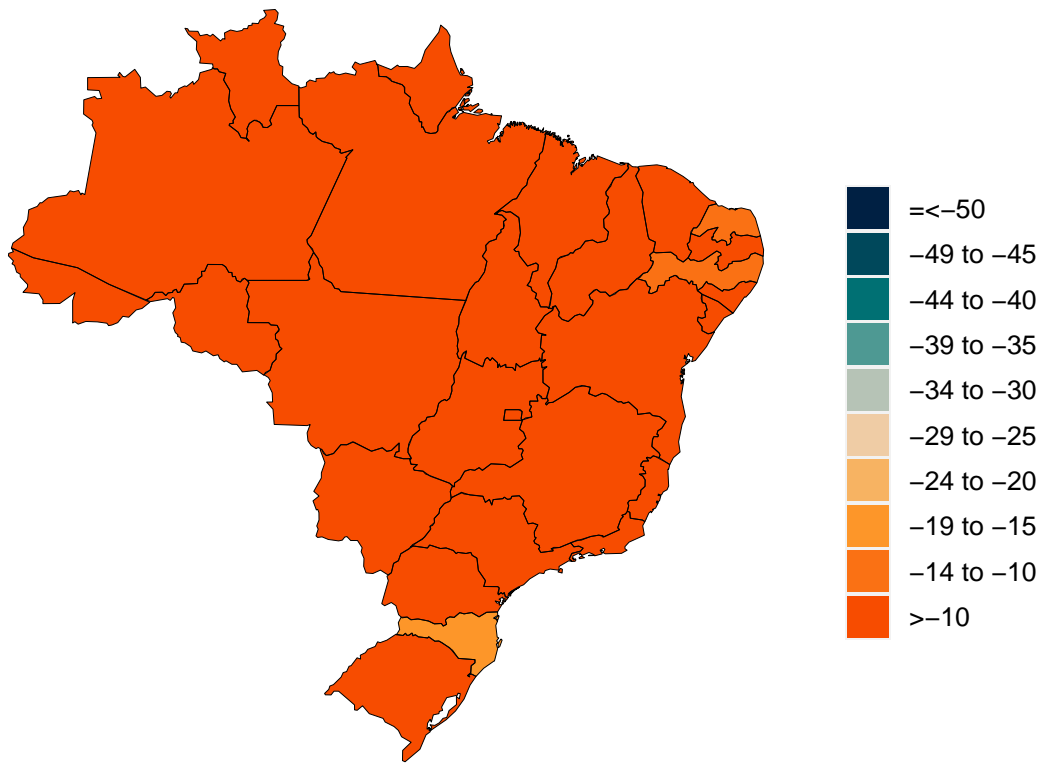


Figure 13.1: Trend in the proportion of the population reporting always wearing a mask when leaving home

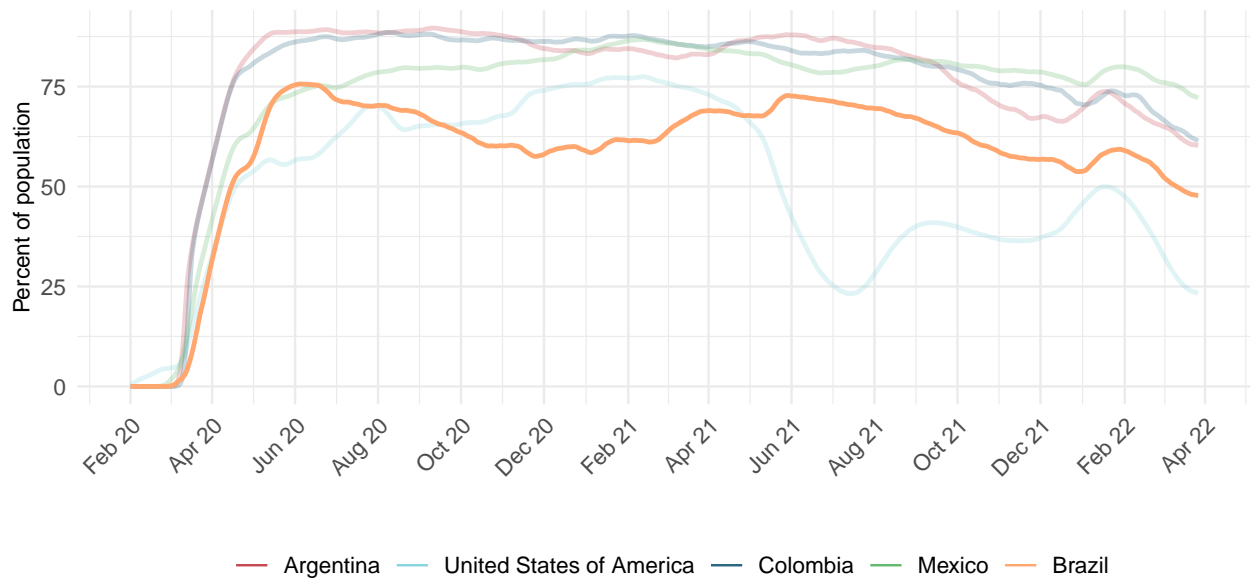


Figure 14.1: Proportion of the population reporting always wearing a mask when leaving home on April 4, 2022

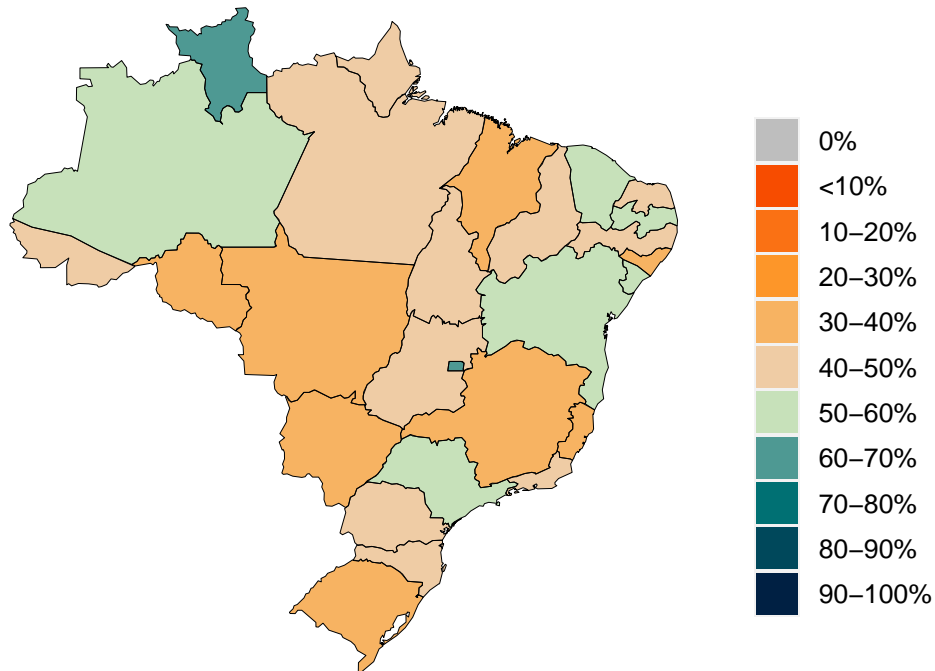


Figure 15.1: Trend in COVID-19 diagnostic tests per 100,000 people

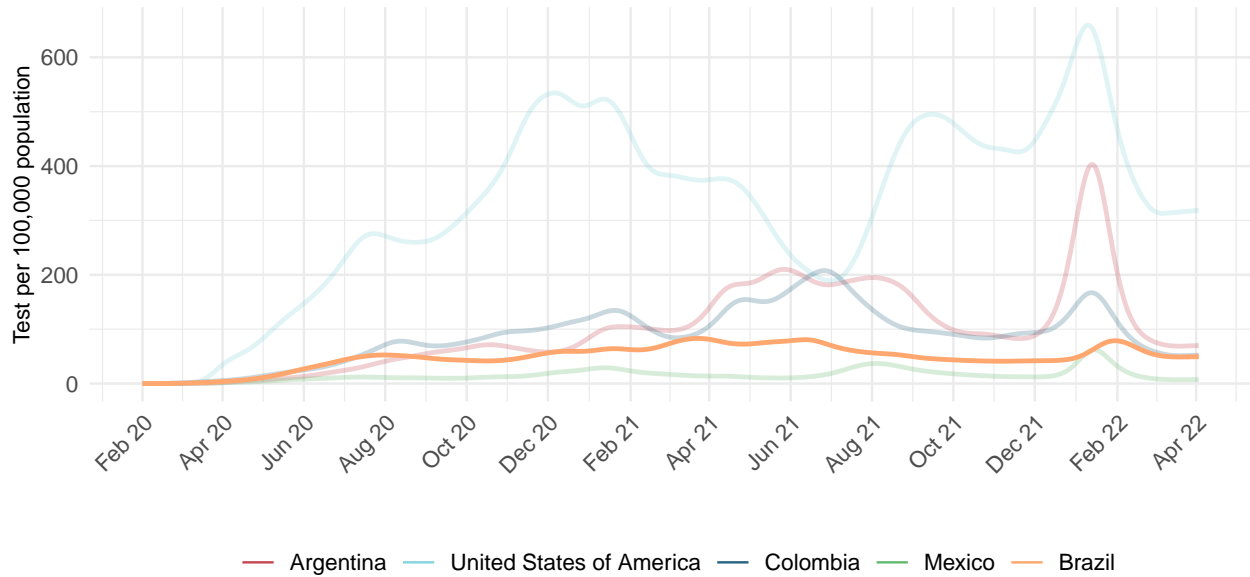


Figure 16.1: COVID-19 diagnostic tests per 100,000 people on April 4, 2022

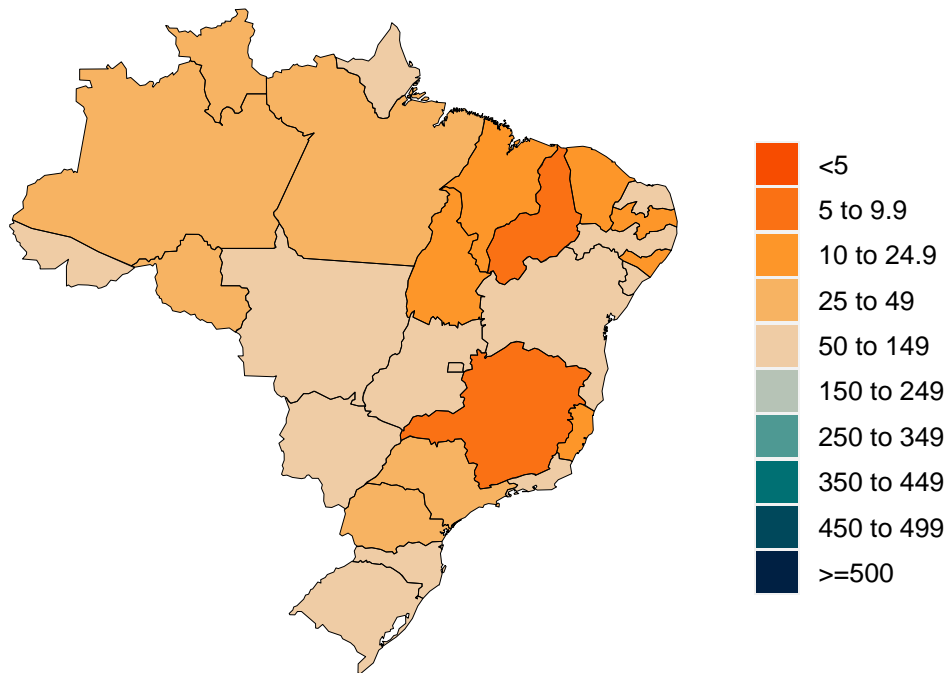


Table 3: Estimates of vaccine effectiveness for specific vaccines used in the model at preventing severe disease and infection. We use data from clinical trials directly, where available, and make estimates otherwise. More information can be found on our [website](#).

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

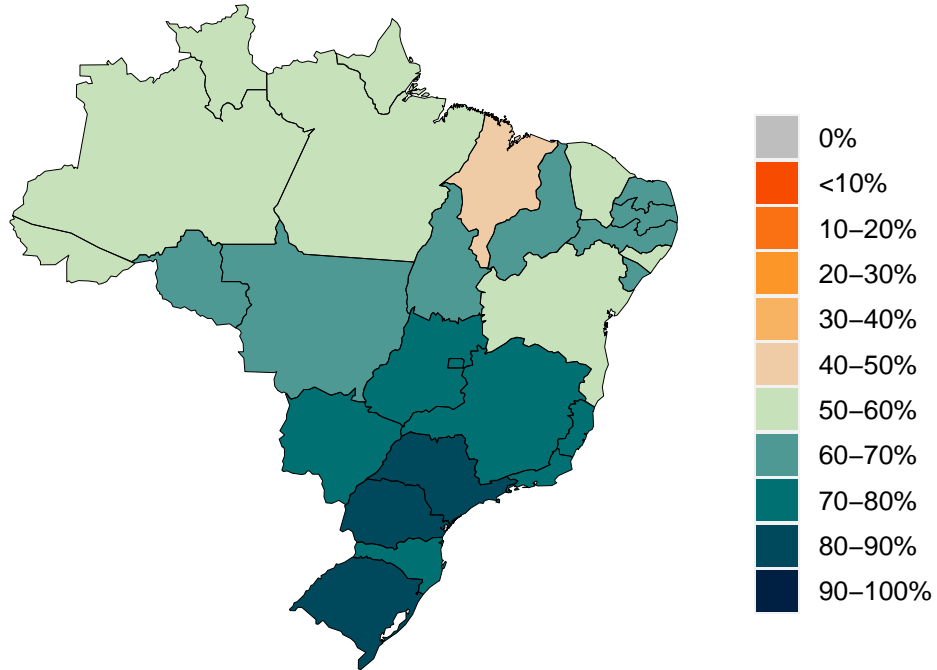


Figure 17.2: Percent of the population fully vaccinated against SARS-CoV-2

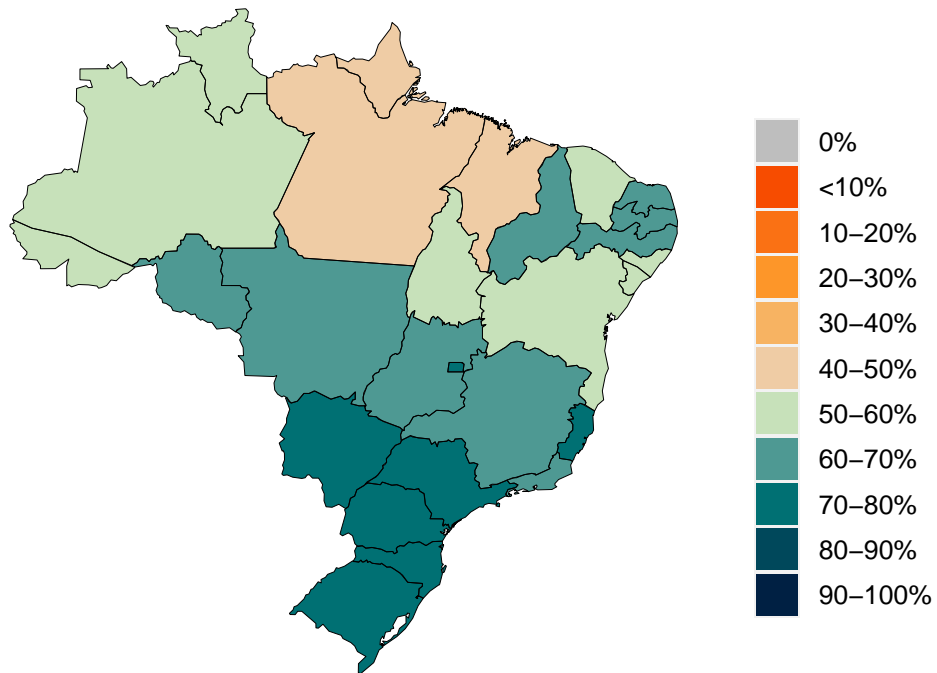


Figure 18.1: Trend in the estimated proportion of the population that is 12 years and older that has been vaccinated or would definitely receive the COVID-19 vaccine if available. Note that vaccine acceptance is calculated using survey data from the 18+ population.

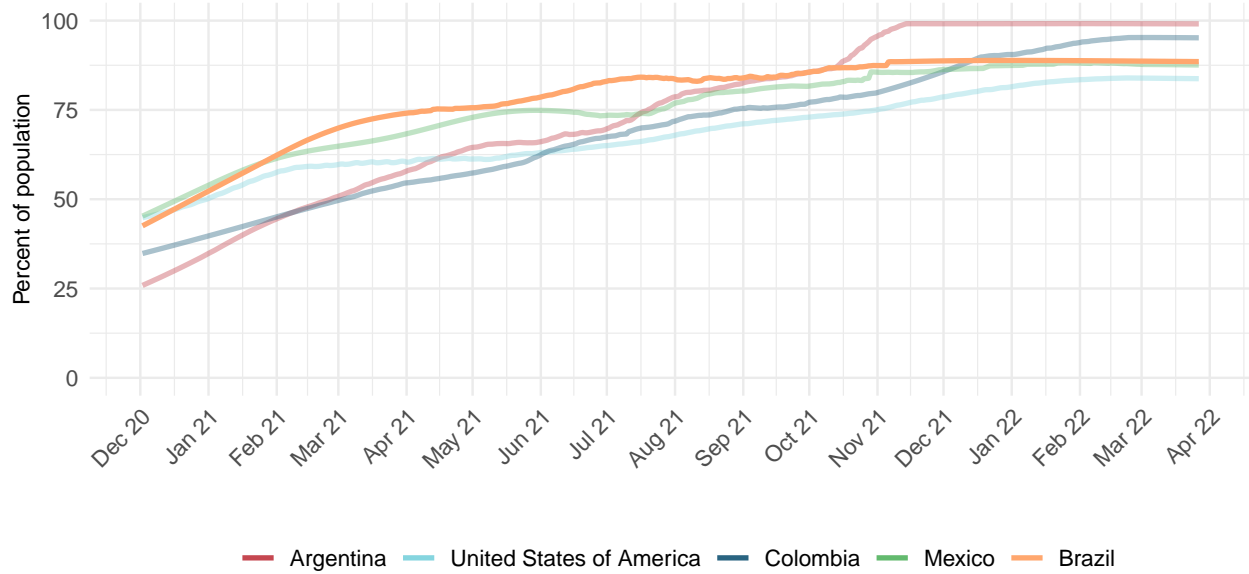


Figure 19.1: Estimated proportion of the population that is 12 years and older that has been vaccinated or would definitely receive the COVID-19 vaccine if available. Note that vaccine acceptance is calculated using survey data from the 18+ population.

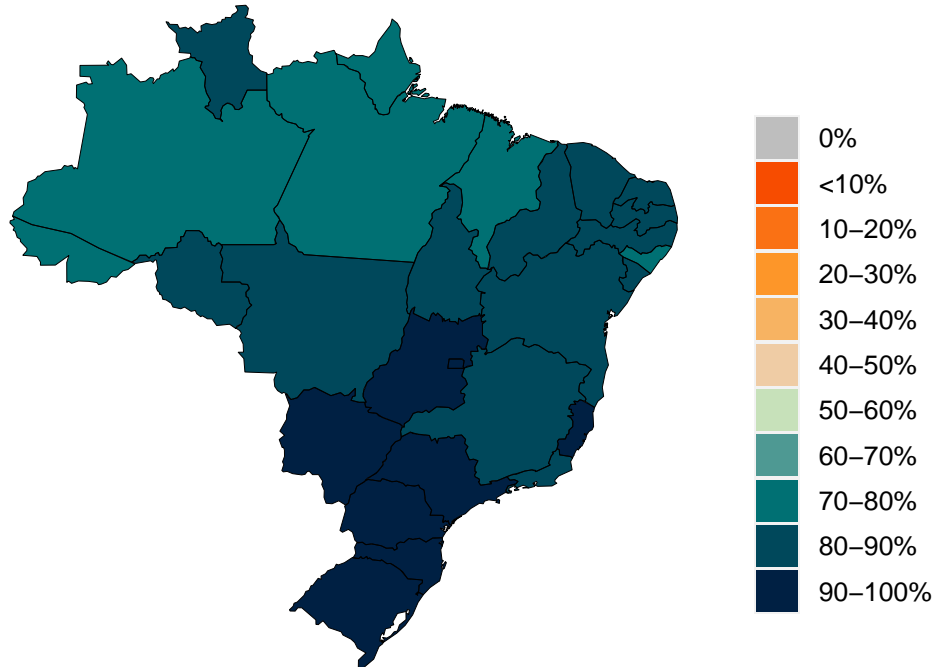


Figure 20.1: Percent of people who receive at least one dose of a COVID-19 vaccine and those who are fully vaccinated

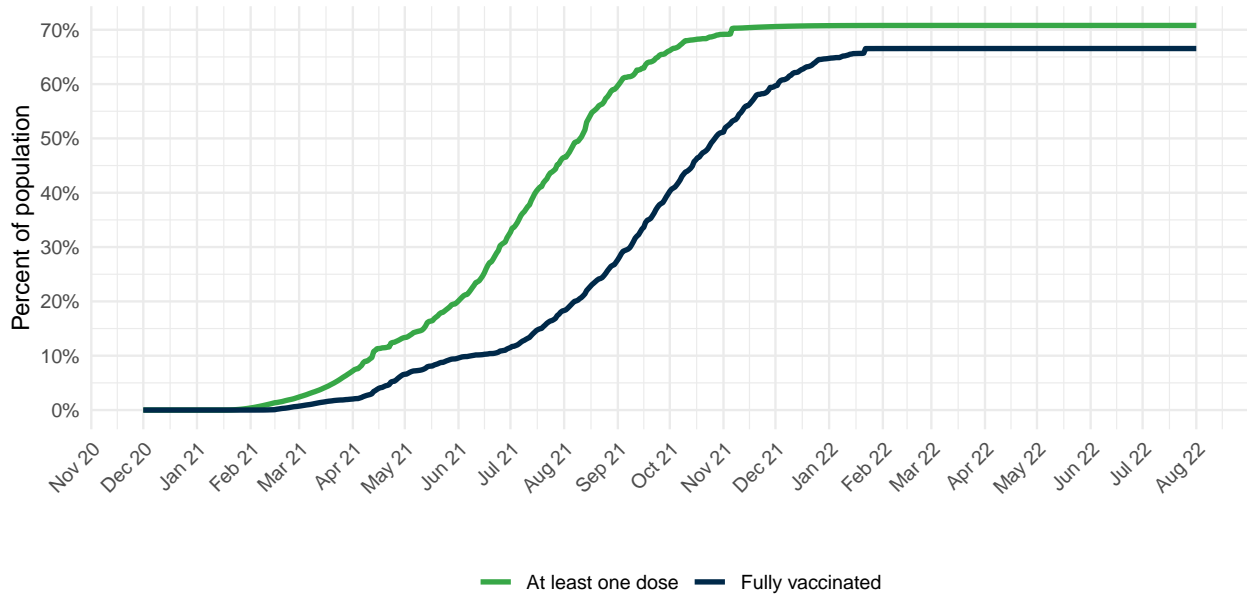
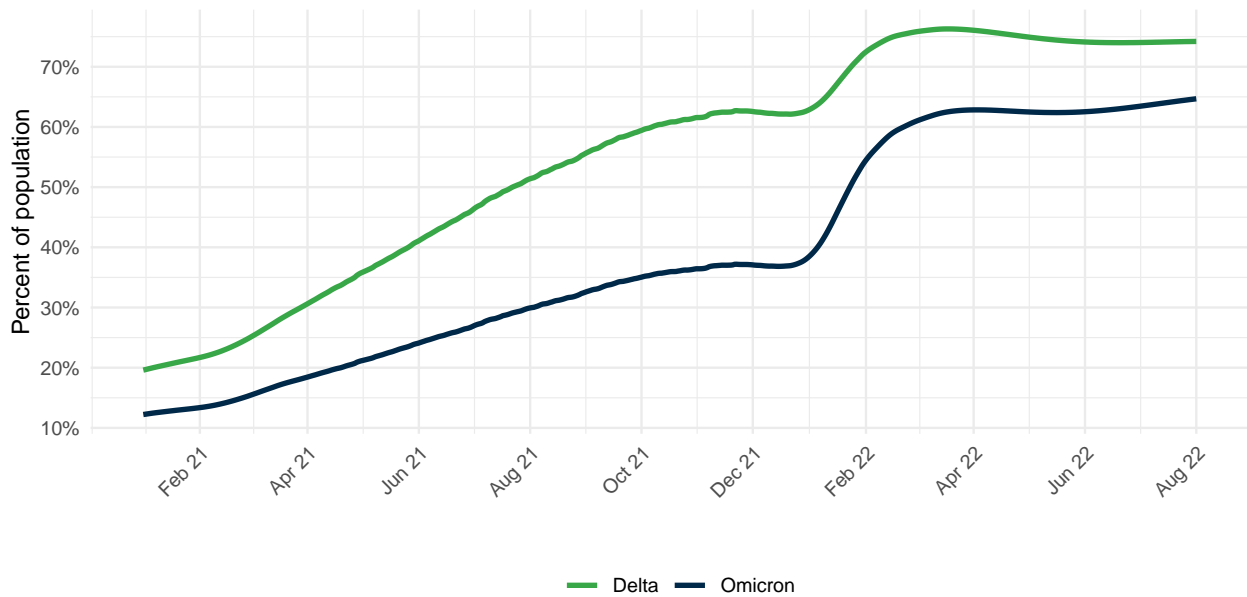


Figure 21.1: Percent of people who are immune to Delta or Omicron. Immunity is based on protection due to prior vaccination and infection(s). Moreover, variant-specific immunity is also based on variant-variant specific protection.



Projections and scenarios

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

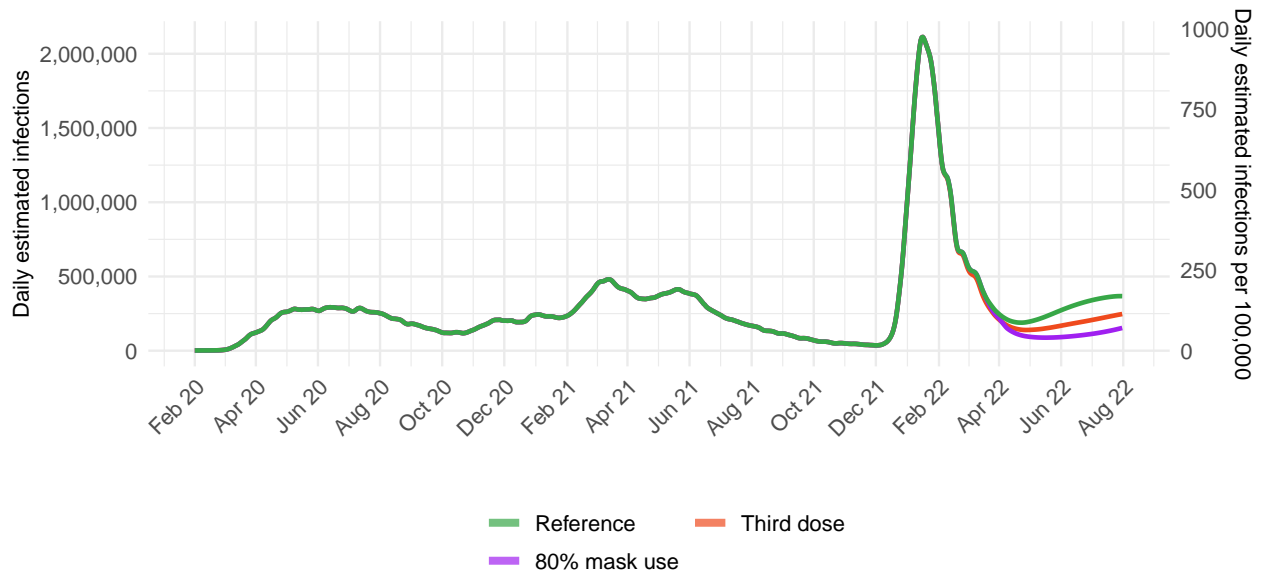


Figure 22.2: Daily COVID-19 reported cases until August 01, 2022 for three scenarios

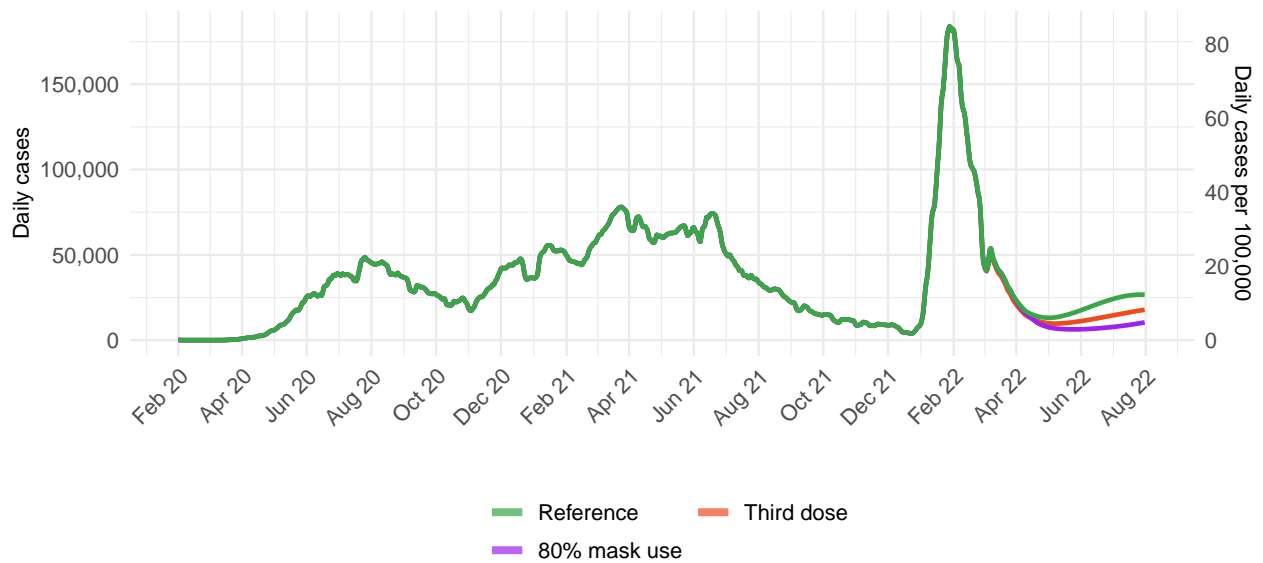


Figure 22.3: Daily COVID-19 hospital census until August 01, 2022 for three scenarios

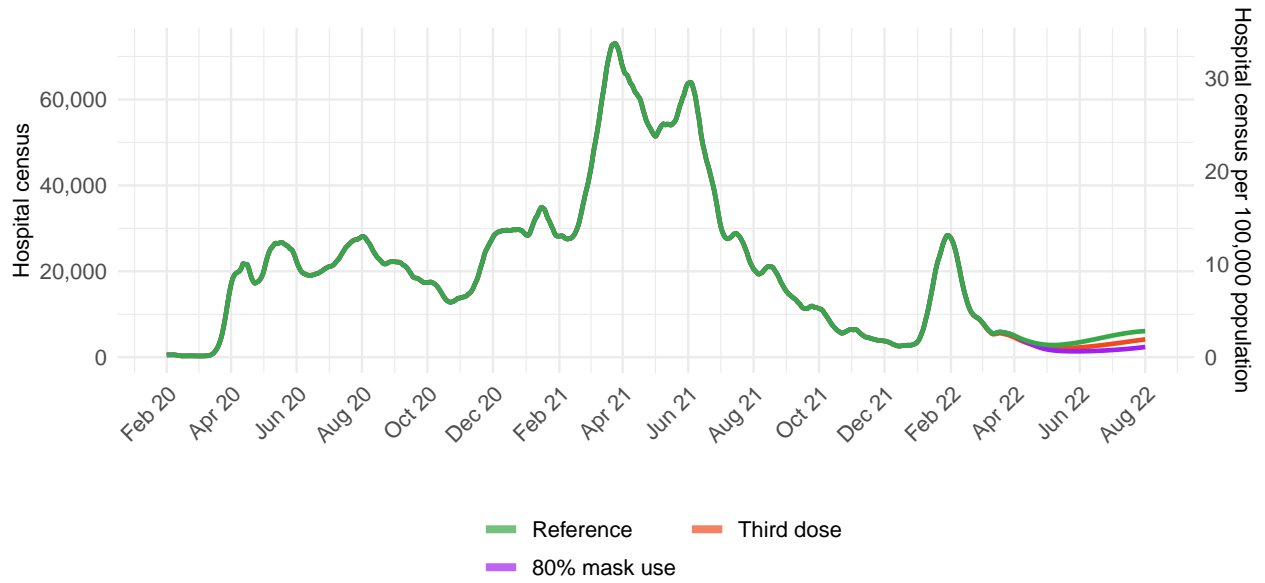


Figure 22.4: Reported daily COVID-19 deaths per 100,000

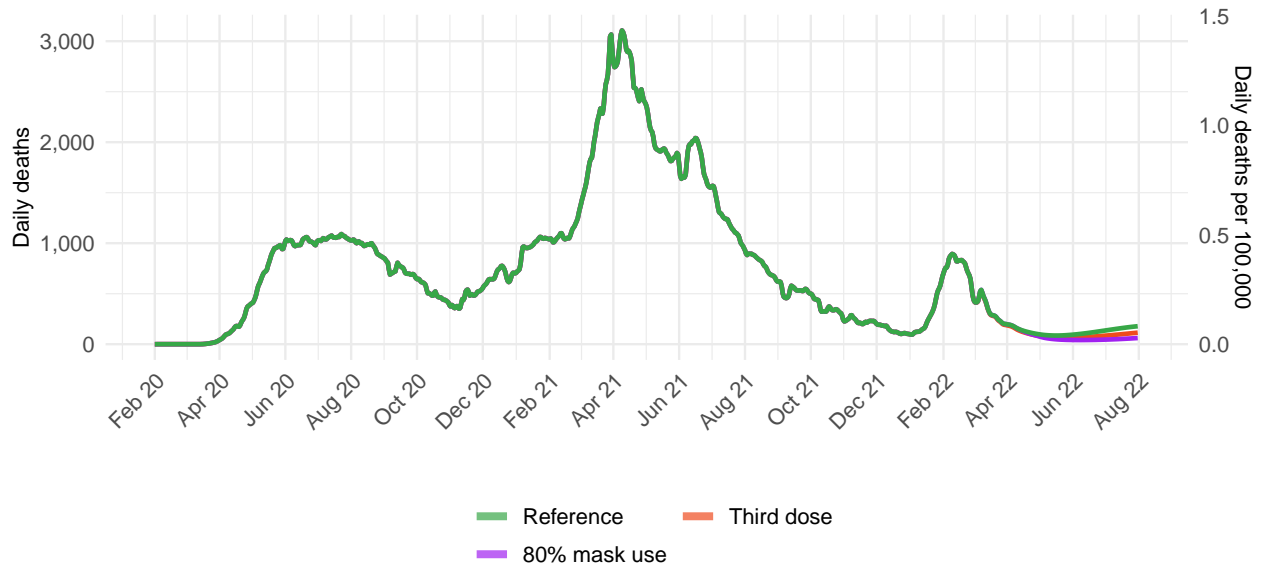


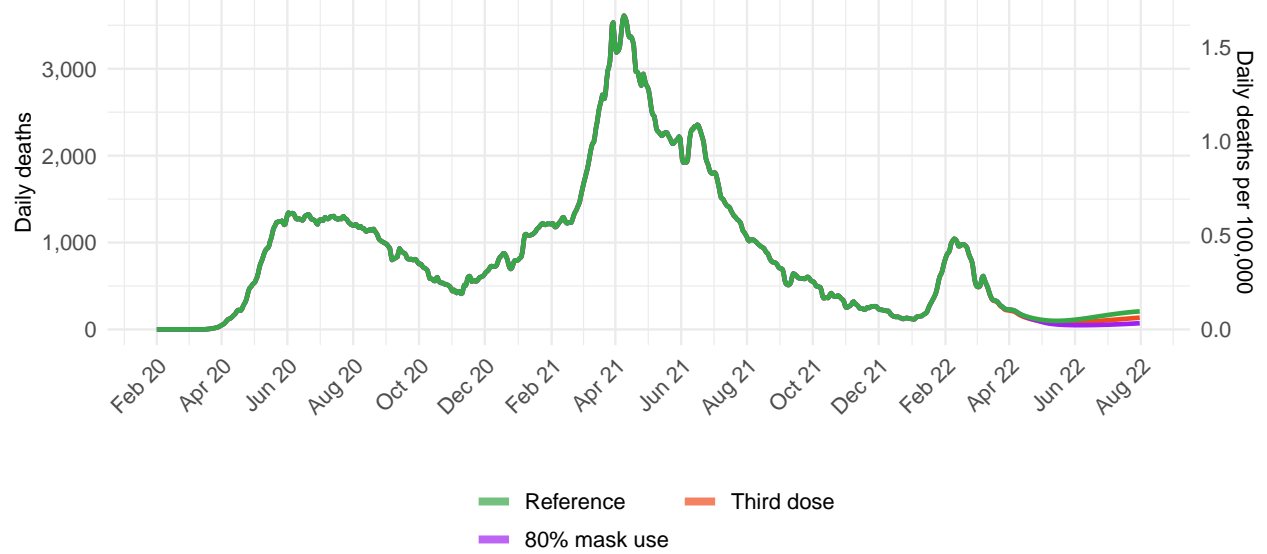
Figure 22.5: Total daily COVID-19 deaths per 100,000

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]. Daily deaths from other modeling groups are smoothed to remove inconsistencies with rounding. Regional values are aggregates from available locations in that region.

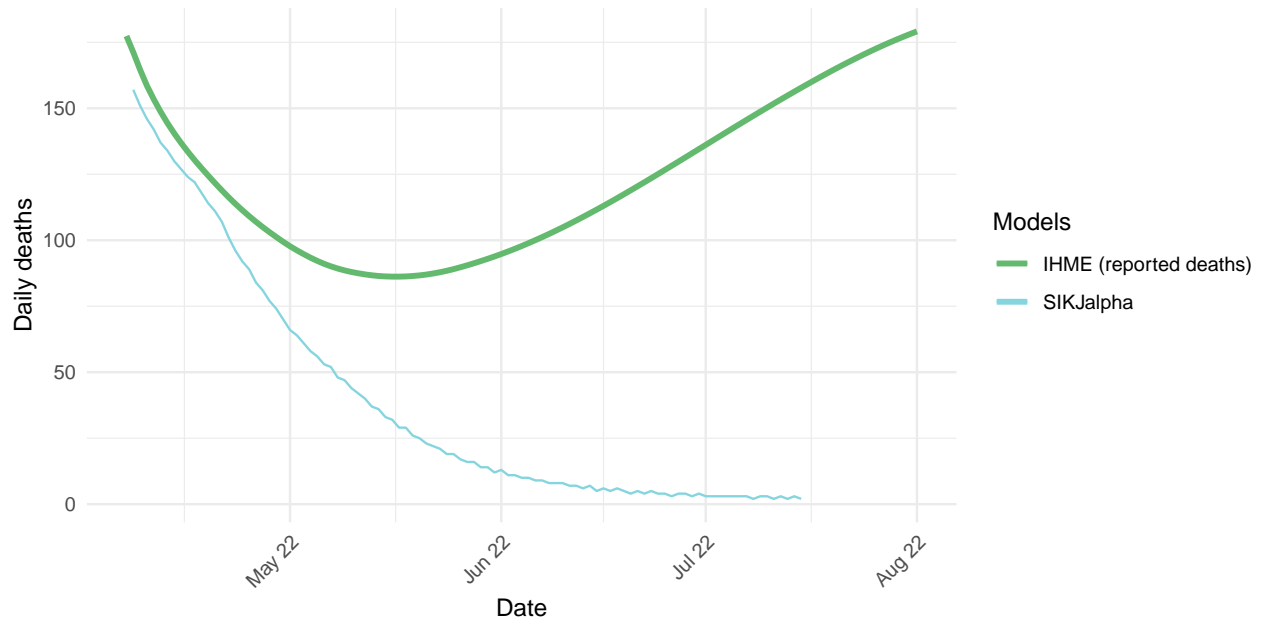


Figure 24.1: The estimated inpatient hospital usage is shown over time. The percent of hospital beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of beds occupied by COVID-19 patients. Less than 5% is considered *low stress*, 5-9% is considered *moderate stress*, 10-19% is considered *high stress*, and 20% or greater is considered *extreme stress*.

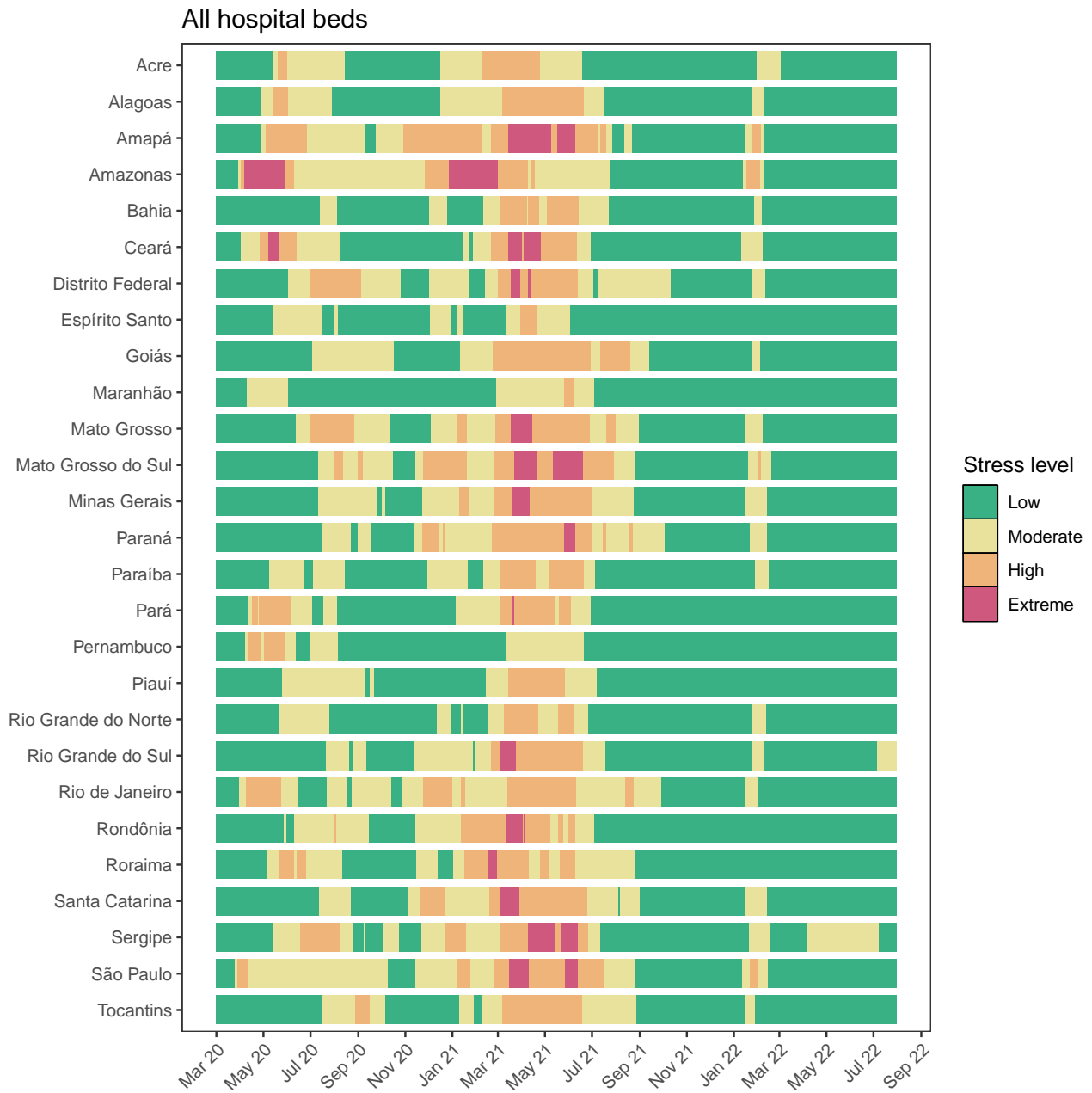
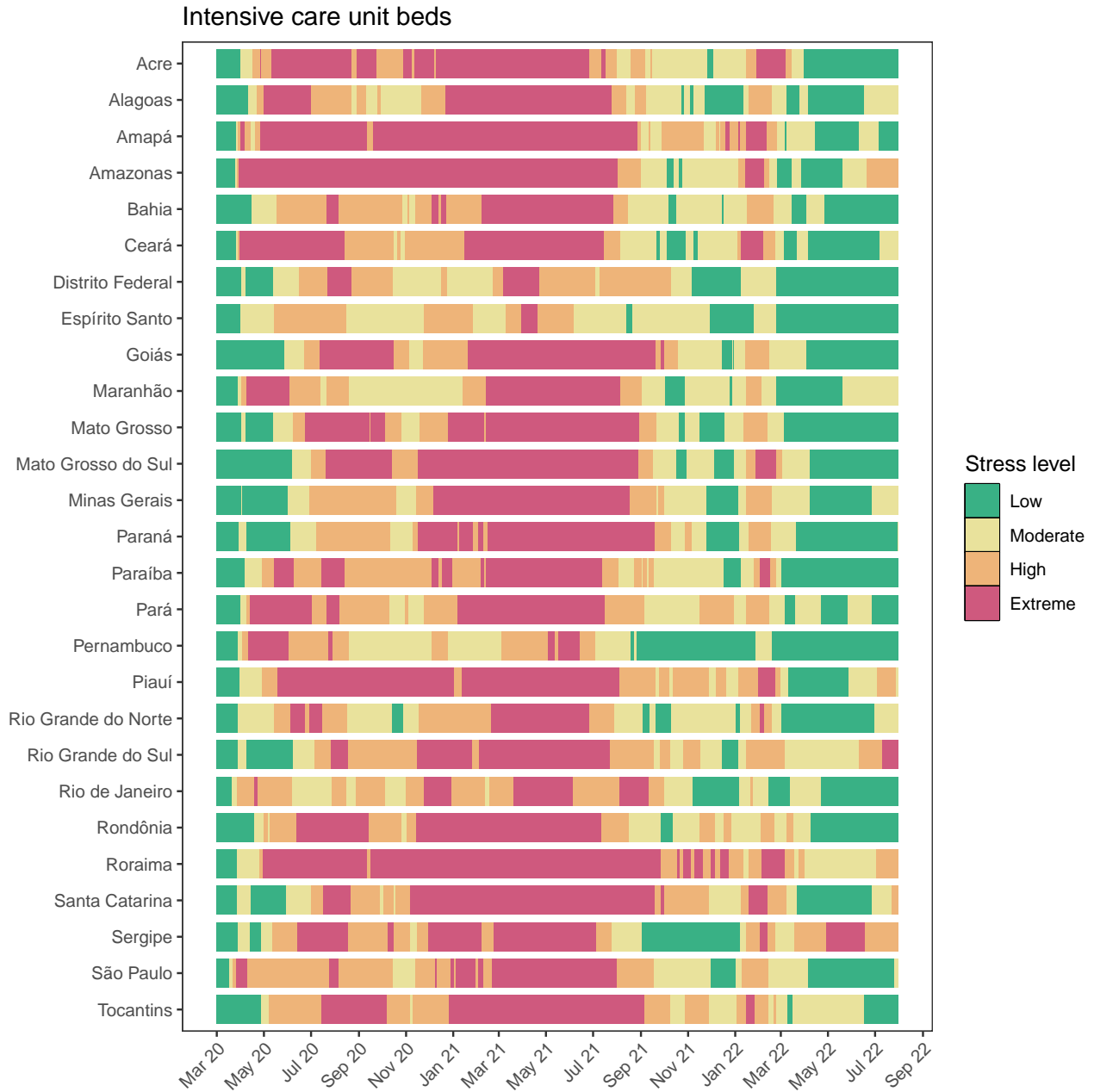


Figure 25.1: The estimated intensive care unit (ICU) usage is shown over time. The percent of ICU beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of ICU beds occupied by COVID-19 patients. Less than 10% is considered *low stress*, 10-29% is considered *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>.