

COVID-19 Results Briefing

Brazil

September 15, 2021

This document contains summary information on the latest projections from the IHME model on COVID-19 in Brazil. The model was run on September 14, 2021, with data through September 12, 2021.

Current situation

- Daily infections in the last week decreased to 43,500 per day on average compared to 49,400 the week before (Figure 1). Daily hospital census in the last week (through September 12) decreased to 8,600 per day on average compared to 10,000 the week before.
- Daily reported cases in the last week decreased to 18,000 per day on average compared to 21,100 the week before (Figure 2).
- Reported deaths due to COVID-19 in the last week decreased to 460 per day on average compared to 560 the week before (Figure 3).
- Excess deaths due to COVID-19 in the last week decreased to 540 per day on average compared to 670 the week before (Figure 3). This makes COVID-19 the number 1 cause of death in Brazil this week (Table 1). Estimated excess daily deaths due to COVID-19 in the past week were 1.2 times larger than the reported number of deaths.
- The daily reported COVID-19 death rate is greater than 4 per million in Goiás, and Rio de Janeiro (Figure 4).
- The daily rate of excess deaths due to COVID-19 is greater than 4 per million in Goiás, and Rio de Janeiro (Figure 4).
- We estimate that 39% of people in Brazil have been infected as of September 13 (Figure 6).
- Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 1 states (Figure 7).
- The infection-detection rate in Brazil was close to 34% on September 13 (Figure 8).
- Based on the GISAID and various national databases, combined with our variant spread model, we estimate the current prevalence of variants of concern (Figure 9). We estimate that the Beta variant is circulating in no states, that the Delta variant is circulating in 27 states, and that the Gamma variant is circulating in 22 states.

Trends in drivers of transmission

- Mobility last week was 1% higher than the pre-COVID-19 baseline (Figure 11). Mobility was near baseline (within 10%) in 23 states. Mobility was lower than 30% of baseline in no locations.
- As of September 13, in the COVID-19 Trends and Impact Survey, 67% of people self-report that they always wore a mask when leaving their home compared to 67% last week (Figure 13).
- There were 71 diagnostic tests per 100,000 people on September 13 (Figure 15).
- As of September 13, 4 states have reached 70% or more of the population who have received at least one vaccine dose and no states have reached 70% or more of the population who are fully vaccinated (Figure 17).
- In Brazil, 84.1% of adults say they would accept or would probably accept a vaccine for COVID-19. This is down by 0.7 percentage points from last week. The proportion of the population who are open to receiving a COVID-19 vaccine ranges from 72% in Pará to 90% in São Paulo (Figure 19).
- In our current reference scenario, we expect that 150.8 million people will be vaccinated with at least one dose by January 1 (Figure 20).
- In our current reference scenario, we expect that by January 1, 63% of people will be immune to non-escape variants and 55% of people will be immune to escape variants (Figure 21).

Projections

- In our **reference scenario**, which represents what we think is most likely to happen, our model projects 611,000 cumulative reported deaths due to COVID-19 on January 1. This represents 25,000 additional deaths from September 13 to January 1. Daily reported deaths will decline to 140 on January 1, 2022 (Figure 22).
- Under our **reference scenario**, our model projects 771,000 cumulative excess deaths due to COVID-19 on January 1. This represents 31,000 additional deaths from September 13 to January 1 (Figure 22).
- If **universal mask coverage (95%)** were attained in the next week, our model projects 7,700 fewer cumulative reported deaths compared to the reference scenario on January 1.
- Under our **worse scenario**, our model projects 675,000 cumulative reported deaths on January 1, an additional 64,000 deaths compared to our reference scenario. Daily reported deaths in the **worse scenario** will rise to 1,370 by December 10, 2021 (Figure 22).
- Daily infections in the **reference scenario** will decline to 15,070 on January 1, 2022 (Figure 23). Daily infections in the **worse scenario** will rise to 169,020 by November 18, 2021 (Figure 23).
- Daily cases in the **reference scenario** will decline to 6,000 on January 1, 2022 (Figure 24). Daily cases in the **worse scenario** will rise to 62,320 by November 30, 2021 (Figure 24).
- Daily hospital census in the **reference scenario** will decline to 2,340 on January 1, 2022 (Figure 25). Daily hospital census in the **worse scenario** will rise to 27,540 by November 29, 2021 (Figure 25).
- Figure 26 compares our reference scenario forecasts to other publicly archived models. Forecasts are widely divergent.
- At some point from September through January 1, 0 states will have high or extreme stress on hospital beds (Figure 27). At some point from September through January 1, 8 states will have high or extreme stress on intensive care unit (ICU) capacity (Figure 28).

Model updates

No model updates

Figure 1. Daily COVID-19 hospital census and infections

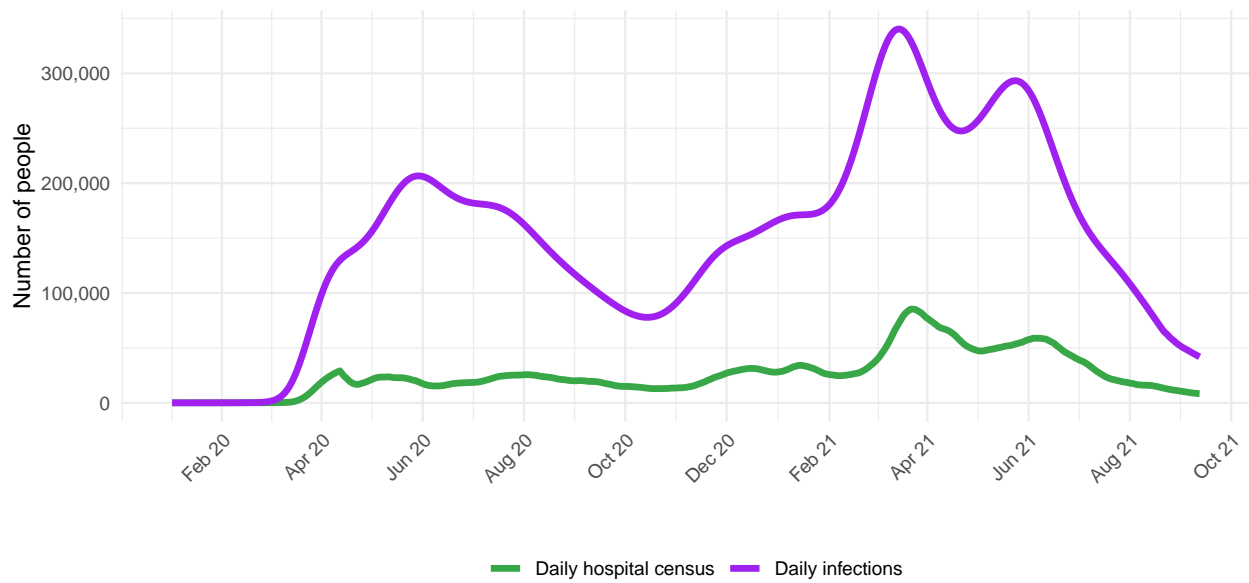


Figure 2. Reported daily COVID-19 cases, moving average

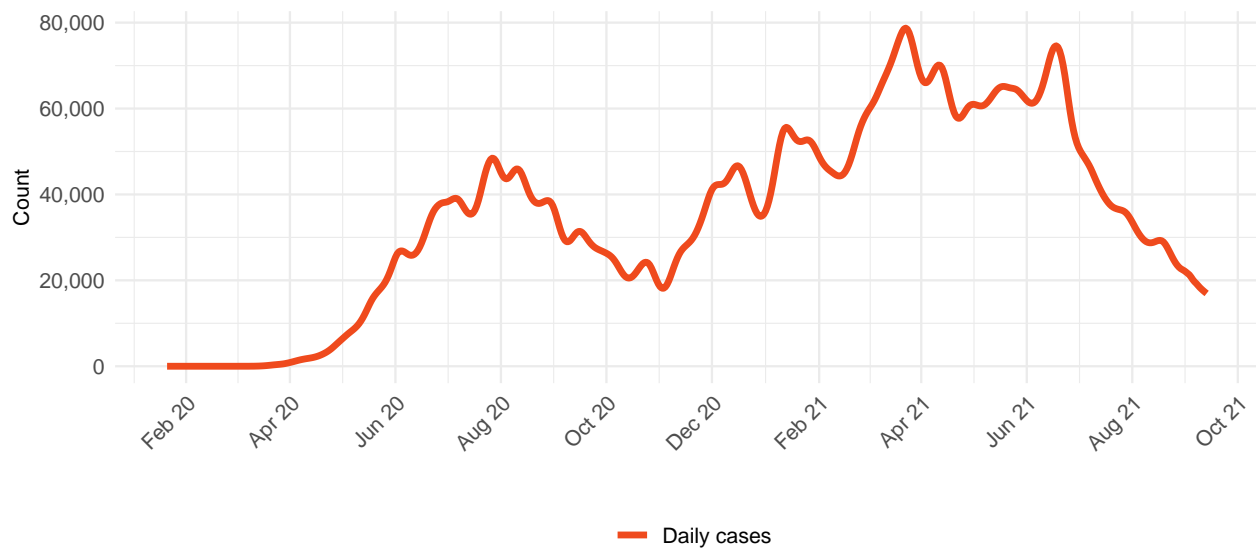


Table 1. Ranking of excess deaths due to COVID-19 among the leading causes of mortality this week, assuming uniform deaths of non-COVID causes throughout the year

Cause name	Weekly deaths	Ranking
COVID-19	3,789	1
Ischemic heart disease	3,293	2
Stroke	2,519	3
Lower respiratory infections	1,705	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. Smoothed trend estimate of reported daily COVID-19 deaths (blue) and excess daily deaths due to COVID-19 (orange)

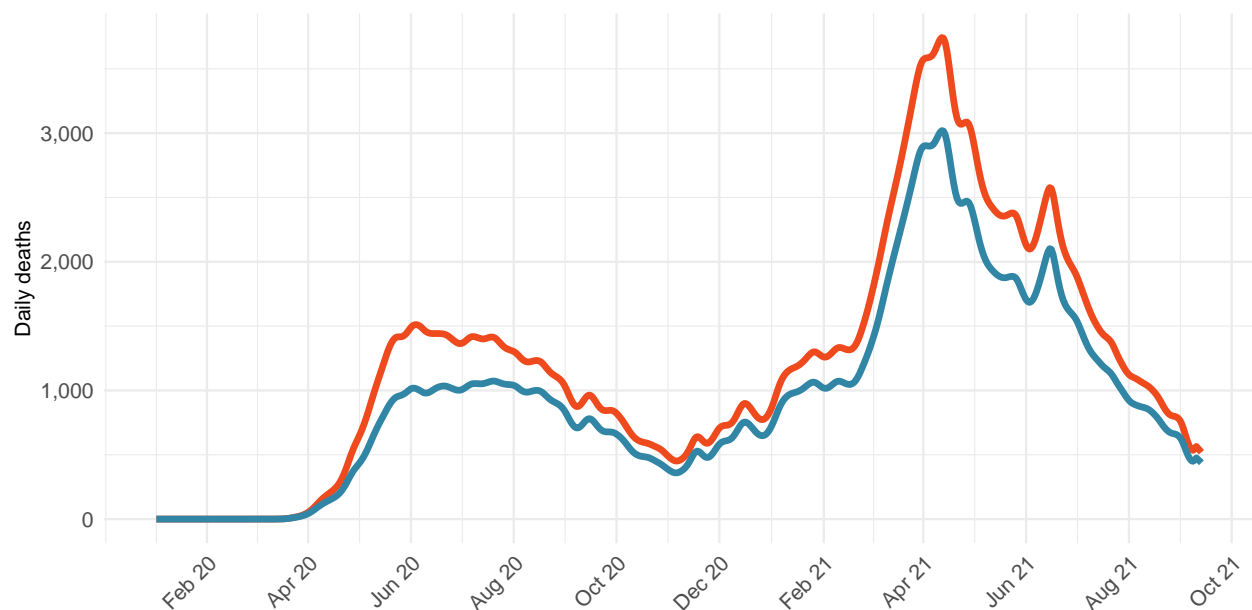
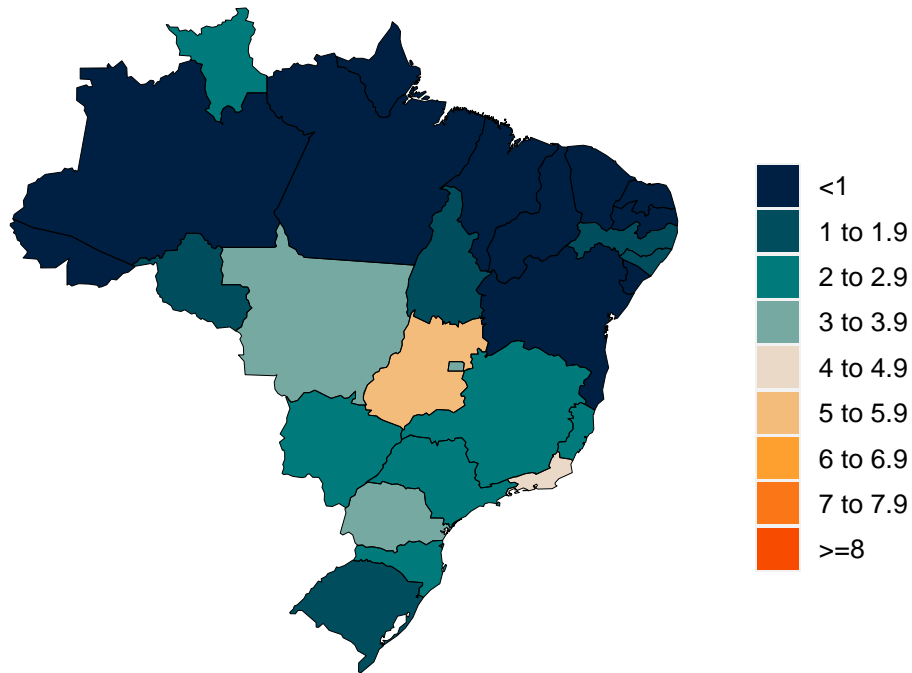


Figure 4. Daily COVID-19 death rate per 1 million on September 13, 2021

A. Daily reported COVID-19 death rate per 1 million



B. Daily excess COVID-19 death rate per 1 million

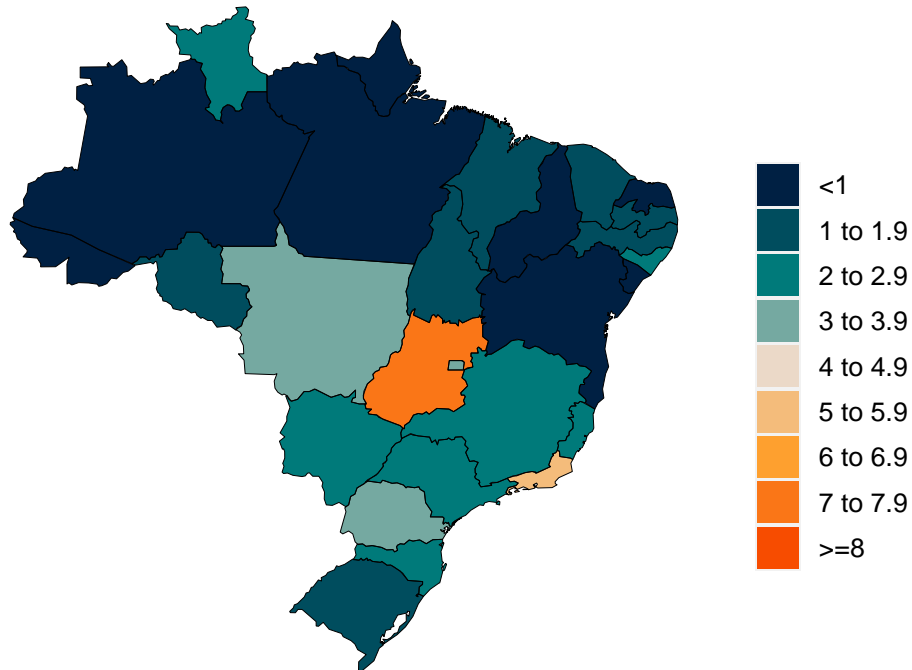
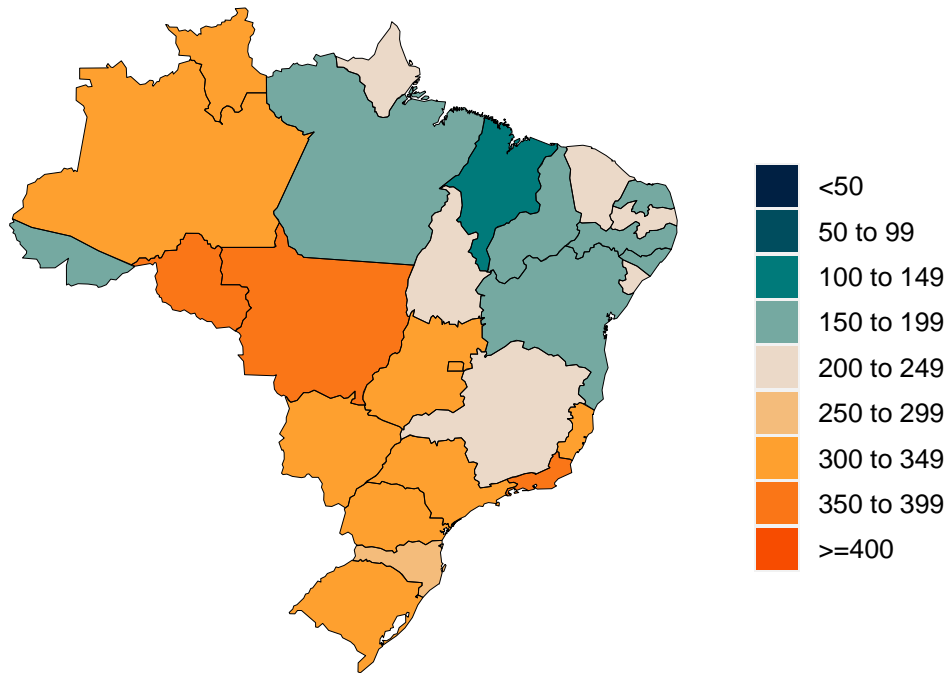


Figure 5. Cumulative COVID-19 deaths per 100,000 on September 13, 2021

A. Reported cumulative COVID-19 deaths per 100,000



B. Excess cumulative COVID-19 deaths per 100,000

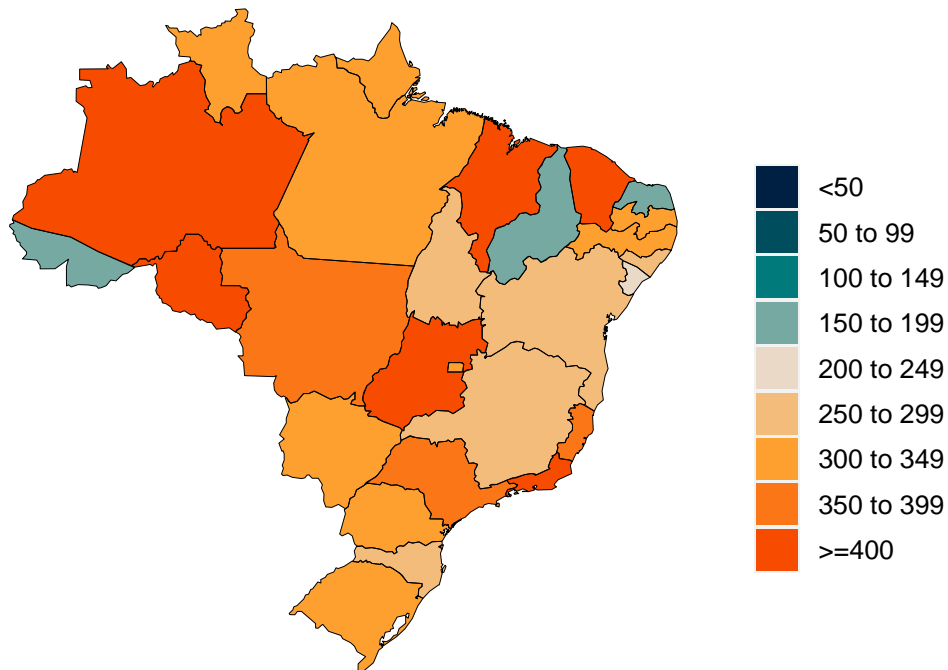


Figure 6. Estimated percent of the population infected with COVID-19 on September 13, 2021

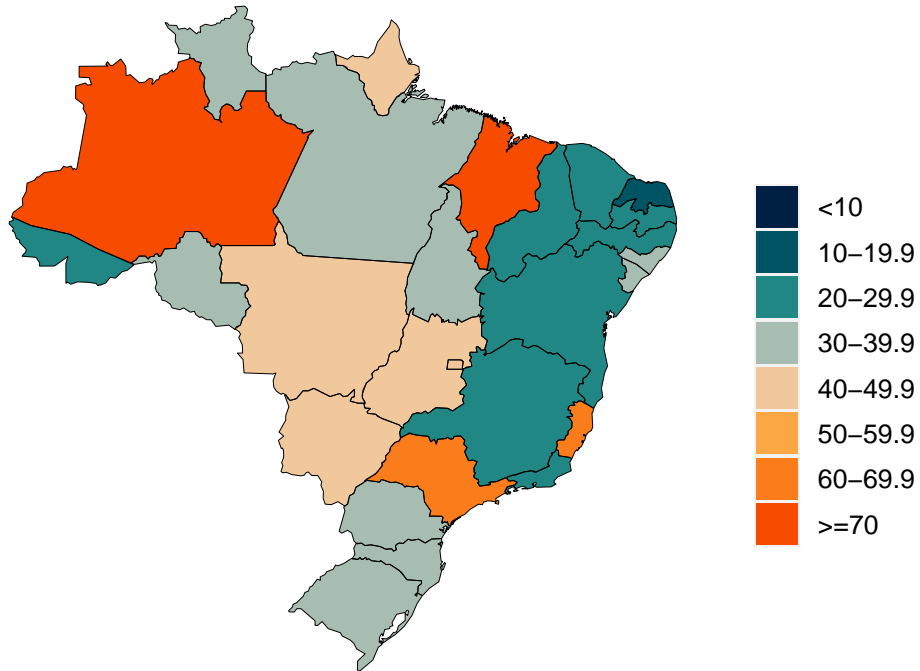


Figure 7. Mean effective R on September 2, 2021. Effective R less than 1 means that transmission should decline, all other things being held the same. The estimate of effective R is based on the combined analysis of deaths, case reporting, and hospitalizations where available. Current reported cases reflect infections 11-13 days prior, so estimates of effective R can only be made for the recent past.

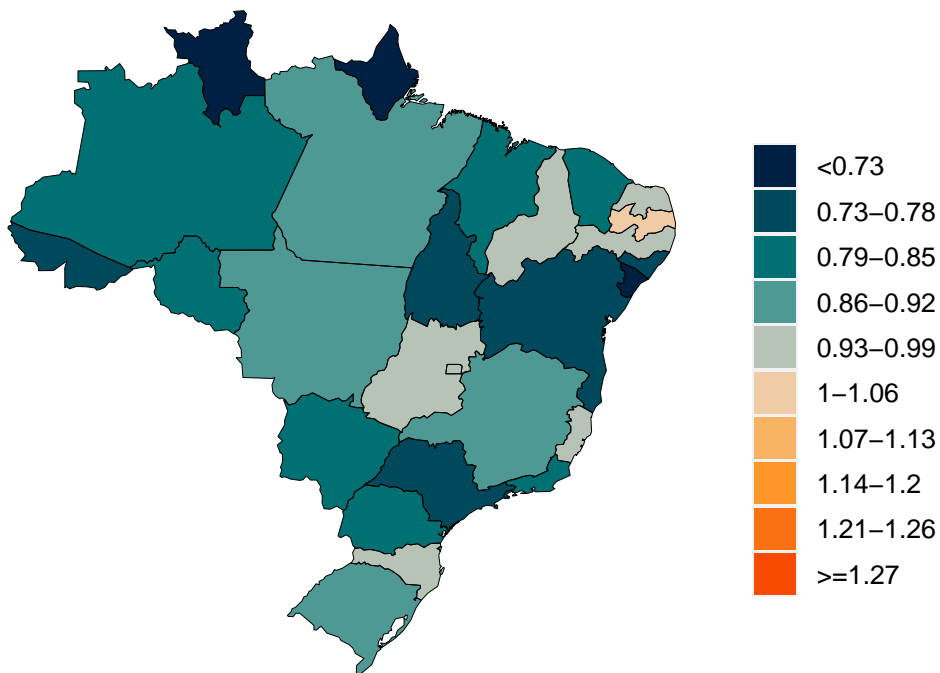


Figure 8. Percent of COVID-19 infections detected. This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model. Due to measurement errors in cases and testing rates, the infection-detection rate can exceed 100% at particular points in time.

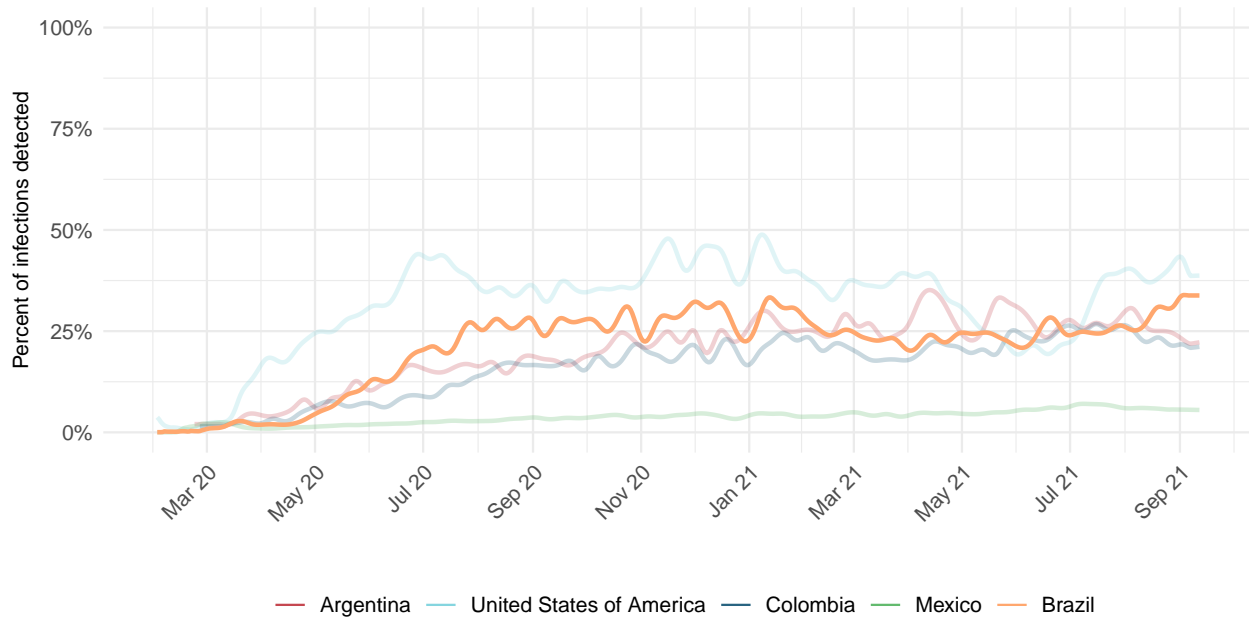
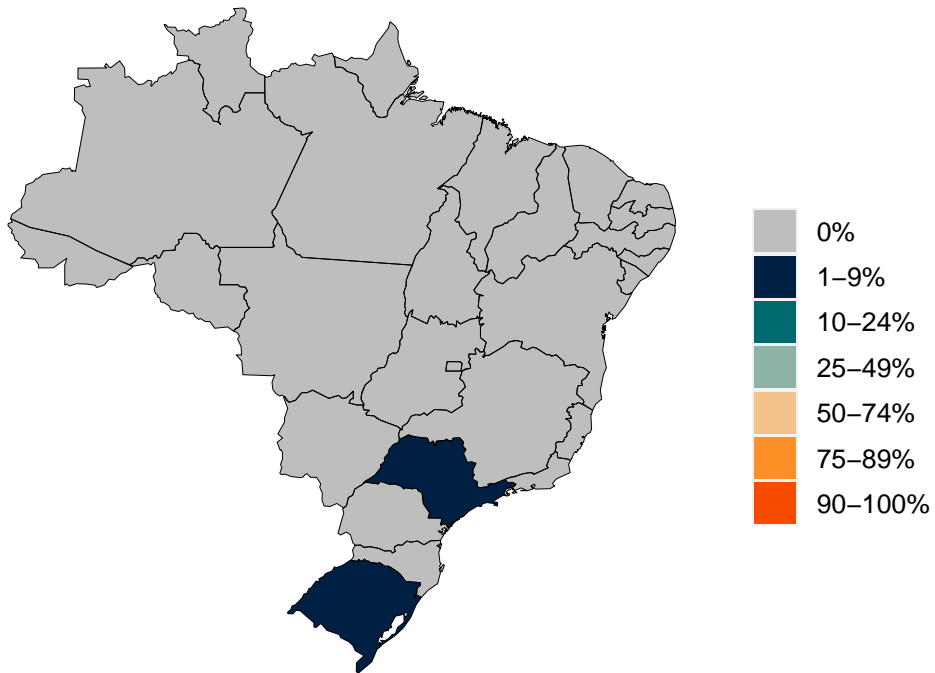
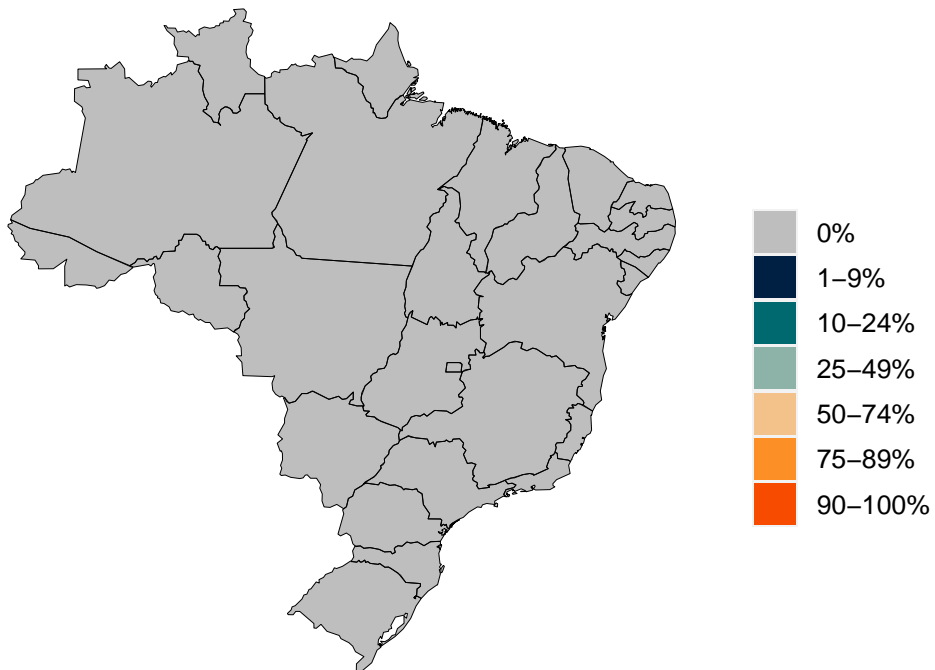


Figure 9. Estimated percent of circulating SARS-CoV-2 for primary variant families on September 13, 2021

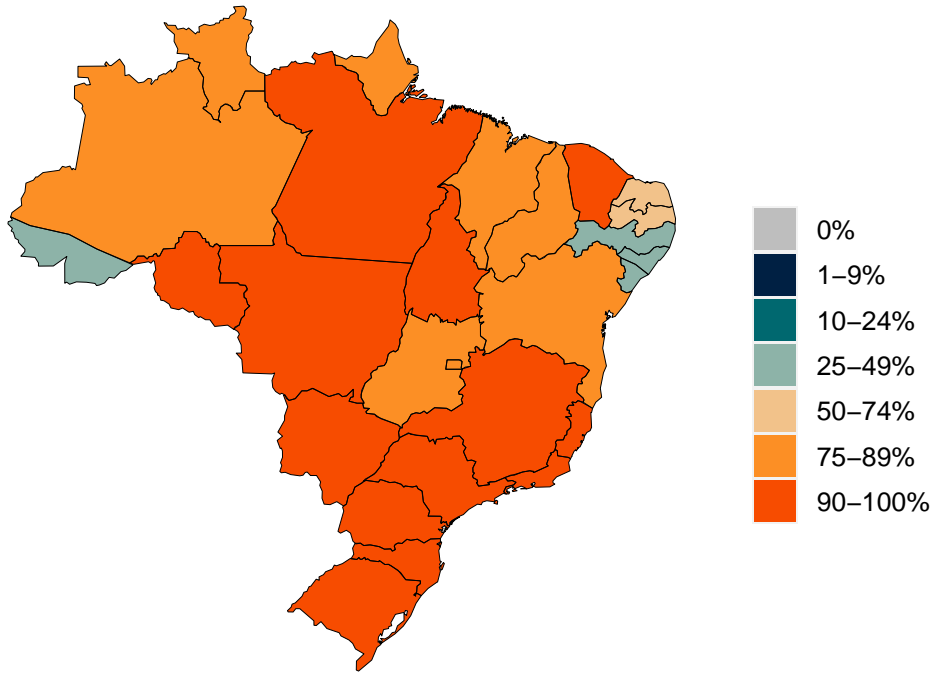
A. Estimated percent Alpha variant



B. Estimated percent Beta variant



C. Estimated percent Delta variant



D. Estimated percent Gamma variant

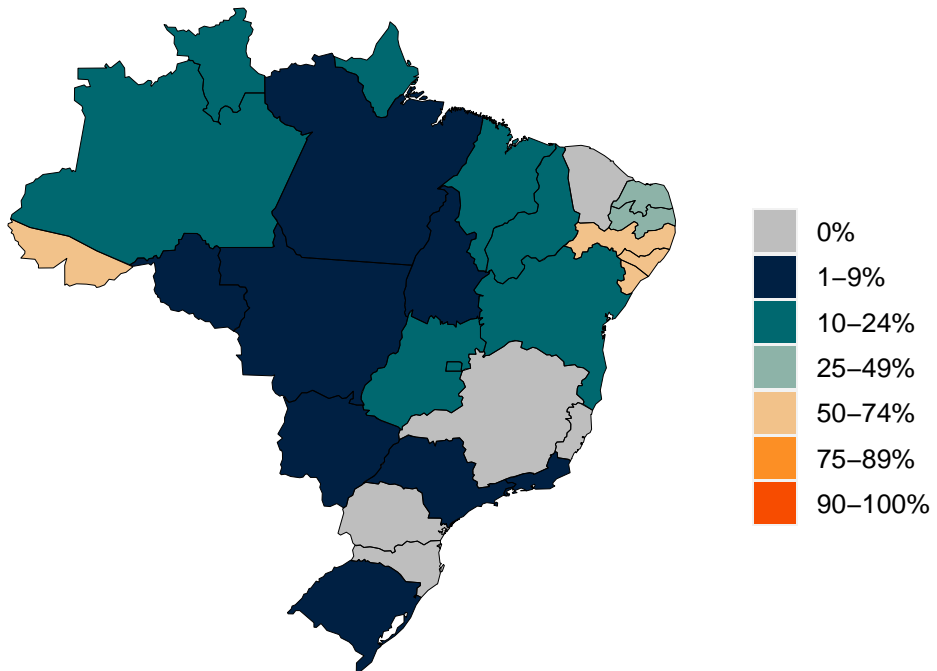


Figure 10. Infection-fatality rate on September 13, 2021. This is estimated as the ratio of COVID-19 deaths to estimated daily COVID-19 infections.

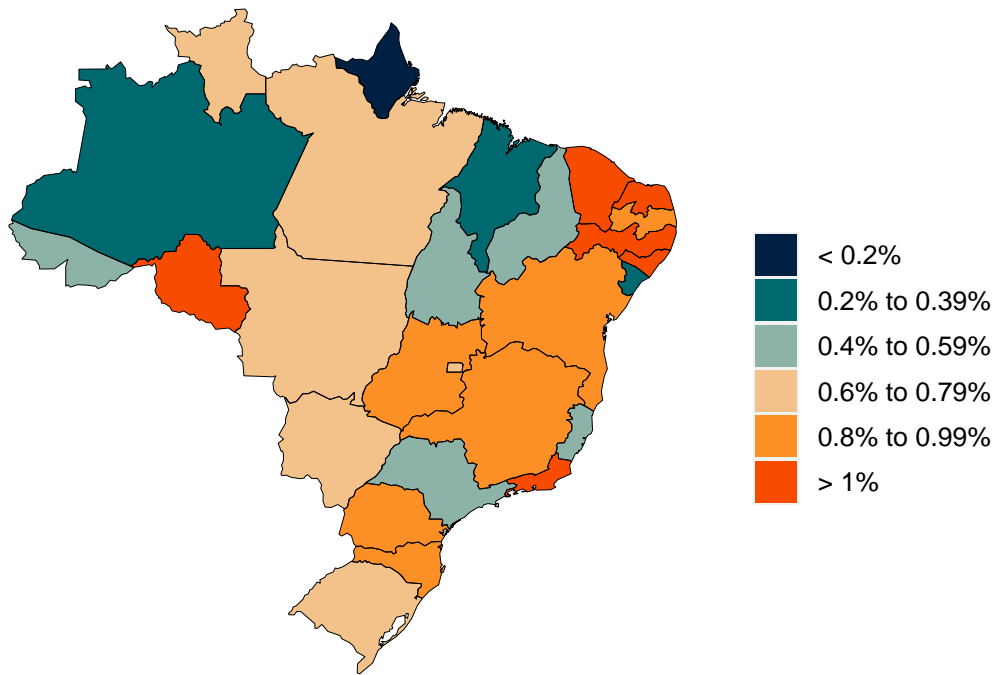


Figure 11. Trend in mobility as measured through smartphone app use, compared to January 2020 baseline

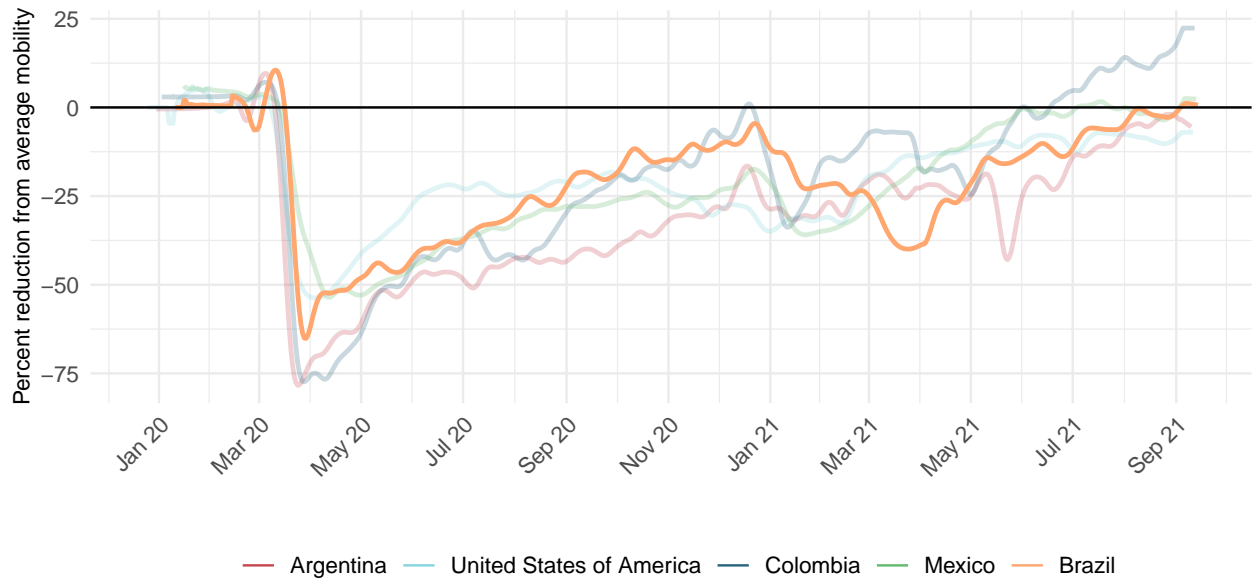


Figure 12. Mobility level as measured through smartphone app use, compared to January 2020 baseline (percent) on September 13, 2021

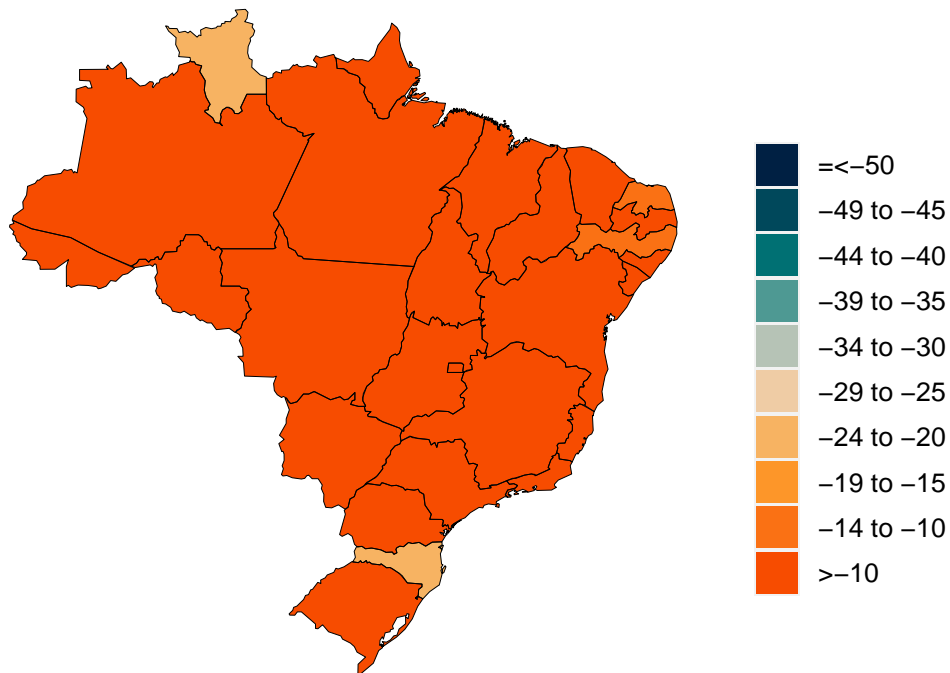


Figure 13. Trend in the proportion of the population reporting always wearing a mask when leaving home

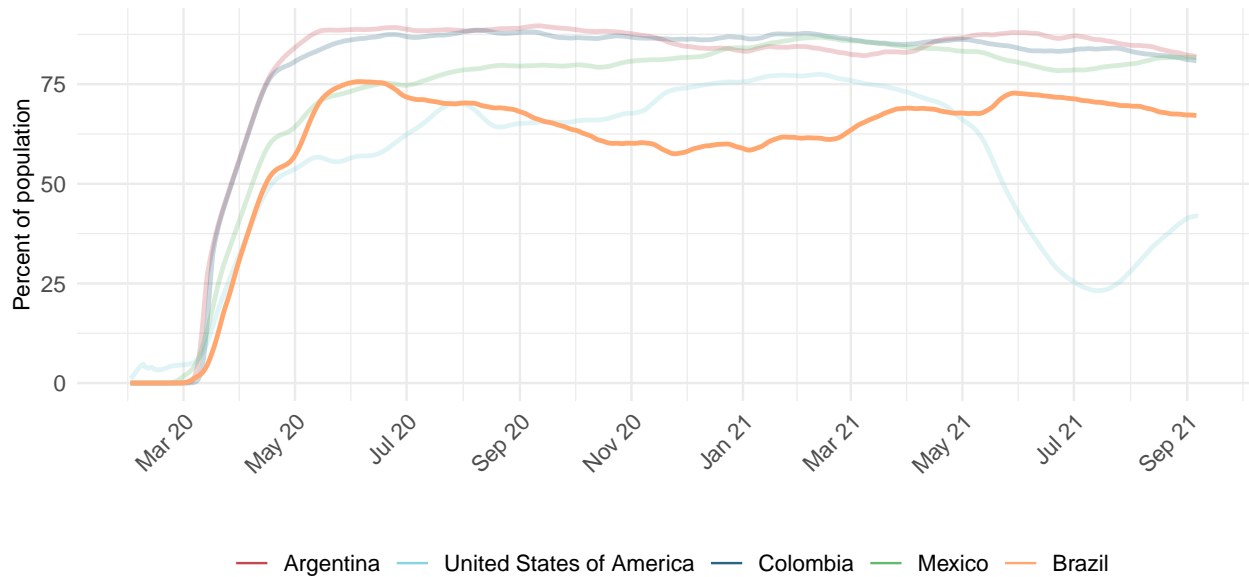


Figure 14. Proportion of the population reporting always wearing a mask when leaving home on September 13, 2021

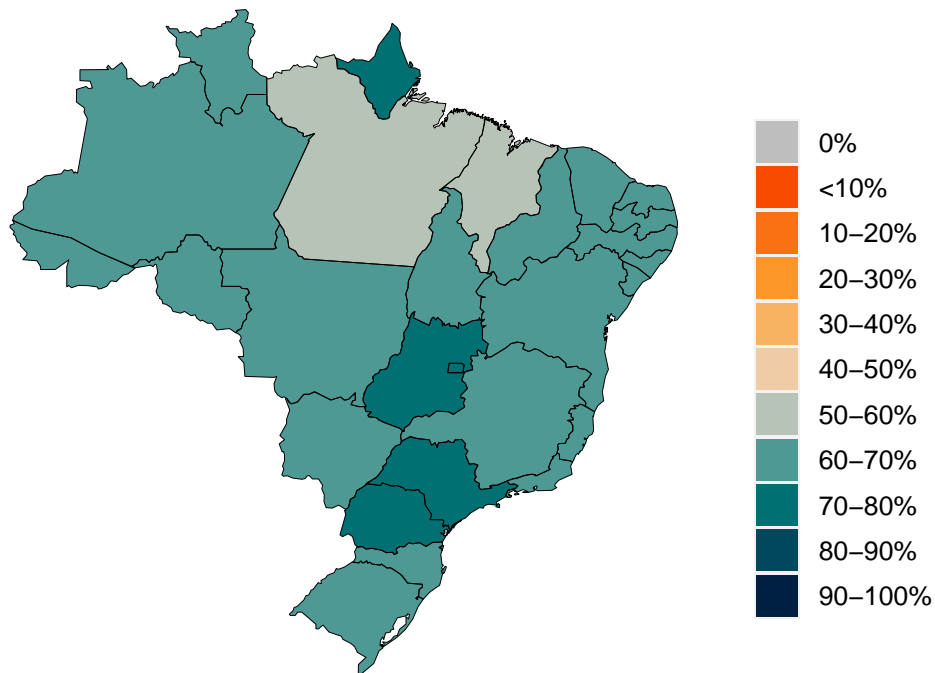


Figure 15. Trend in COVID-19 diagnostic tests per 100,000 people

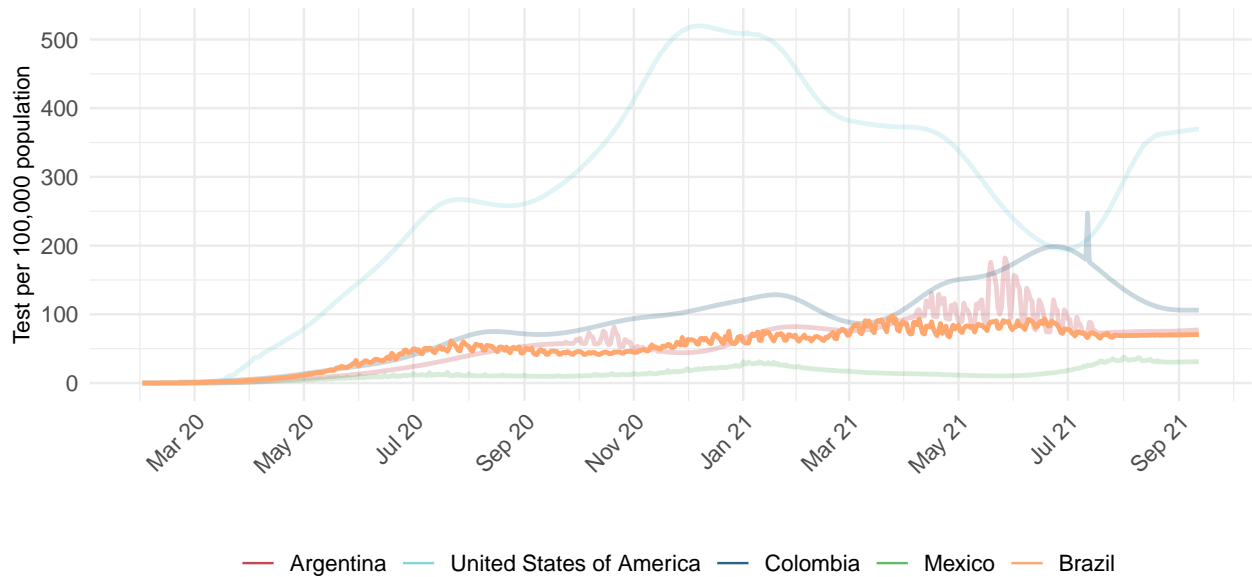


Figure 16. COVID-19 diagnostic tests per 100,000 people on September 13, 2021

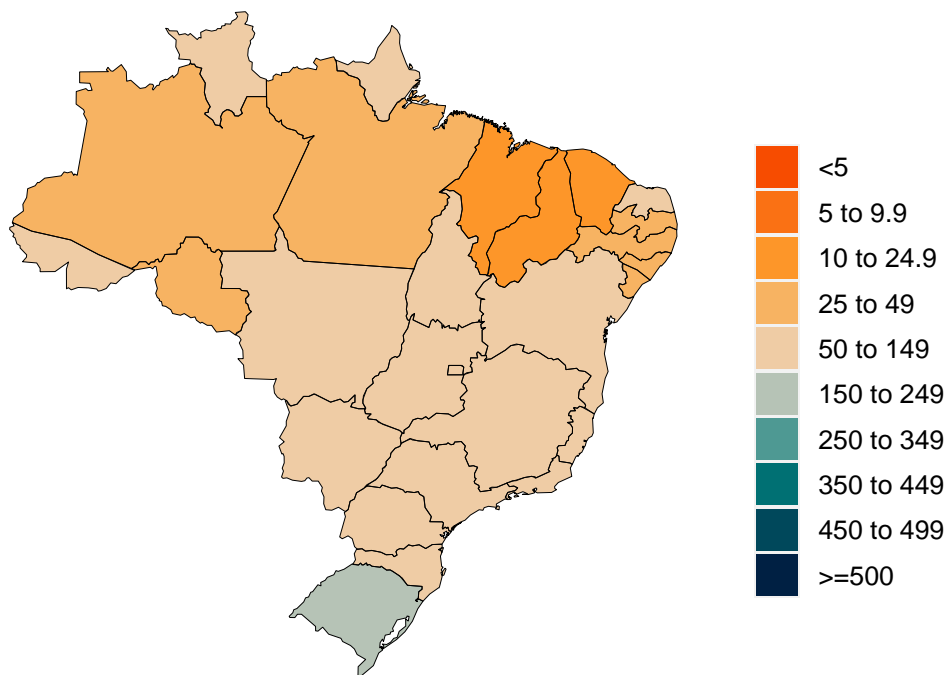
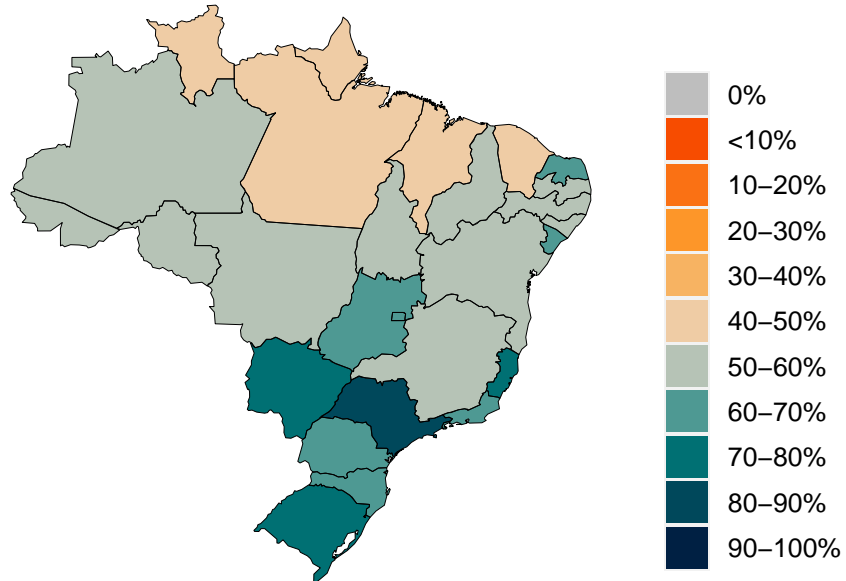


Table 3. Estimates of vaccine efficacy for specific vaccines used in the model at preventing disease and infection. The SEIR model uses variant-specific estimates of vaccine efficacy at preventing symptomatic disease and at preventing infection. We use data from clinical trials directly, where available,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

Vaccine	Efficacy at preventing disease: ancestral and Alpha	Efficacy at preventing infection: ancestral and Alpha	Efficacy at preventing disease: Beta, Delta, & Gamma	Efficacy at preventing infection: Beta, Delta, & Gamma
AstraZeneca	90%	52%	85%	49%
CoronaVac	50%	44%	43%	38%
Covaxin	78%	69%	68%	60%
Johnson & Johnson	86%	72%	60%	56%
Moderna	94%	89%	94%	80%
Novavax	89%	79%	79%	69%
Pfizer/BioNTech	94%	86%	85%	78%
Sinopharm	73%	65%	63%	56%
Sputnik-V	92%	81%	80%	70%
Tianjin	66%	58%	57%	50%
CanSino				
Other vaccines	75%	66%	65%	57%
Other vaccines (mRNA)	91%	86%	85%	78%

Figure 17. Percent of the population (A) having received at least one dose and (B) fully vaccinated against SARS-CoV-2 by September 13, 2021

A. Percent of the population having received one dose of a COVID-19 vaccine



B. Percent of the population fully vaccinated against SARS-CoV-2

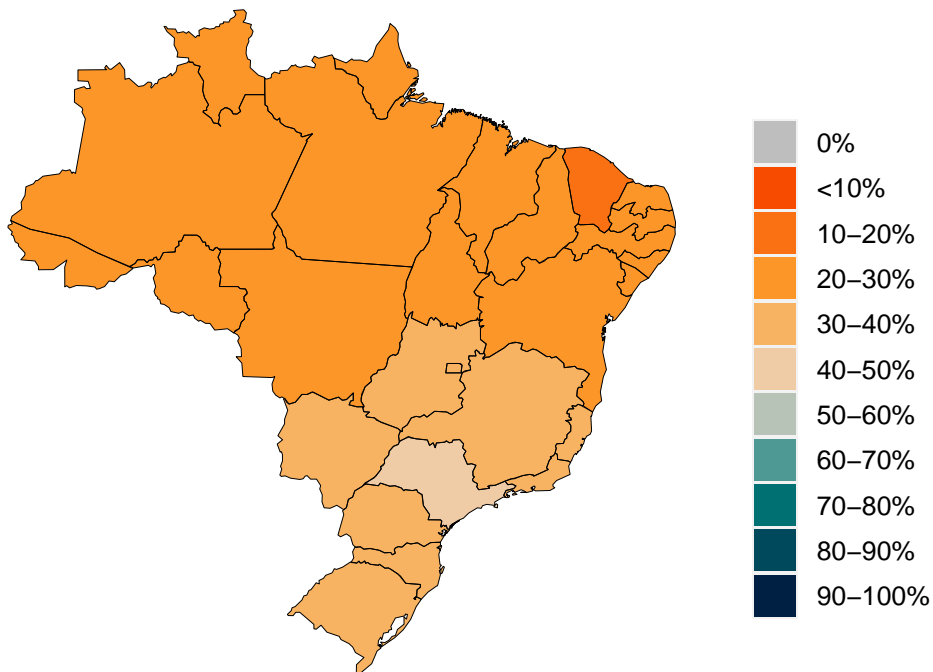


Figure 18. Trend in the estimated proportion of the adult (18+) population that have been vaccinated or would probably or definitely receive the COVID-19 vaccine if available

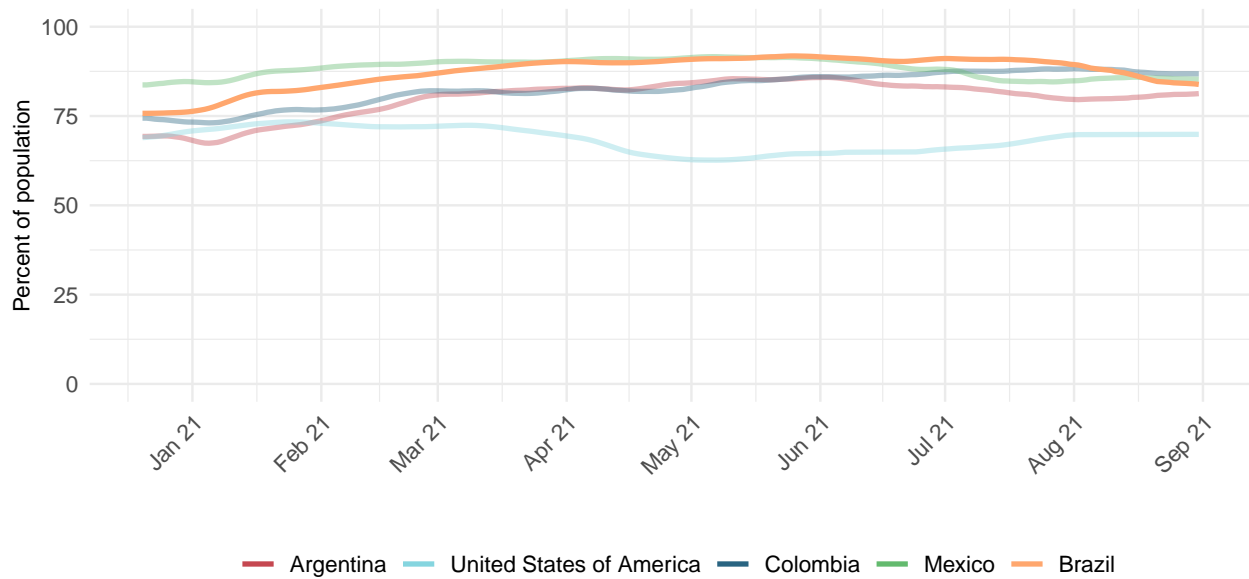


Figure 19. This figure shows the estimated proportion of the adult (18+) population that has been vaccinated or would probably or definitely receive the COVID-19 vaccine if available

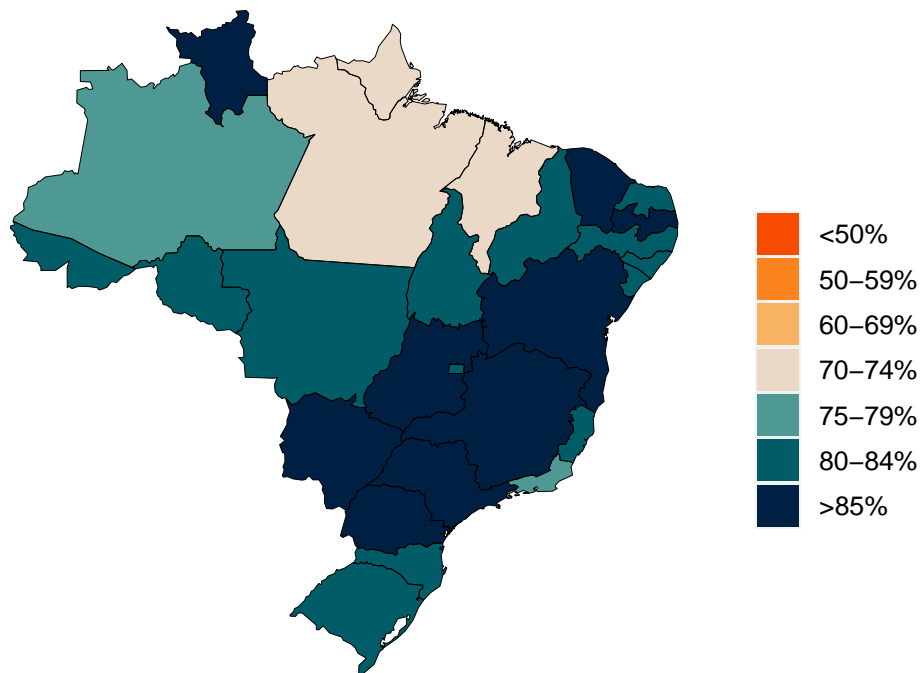


Figure 20. Percent of people who receive at least one dose of a COVID-19 vaccine and those who are fully vaccinated

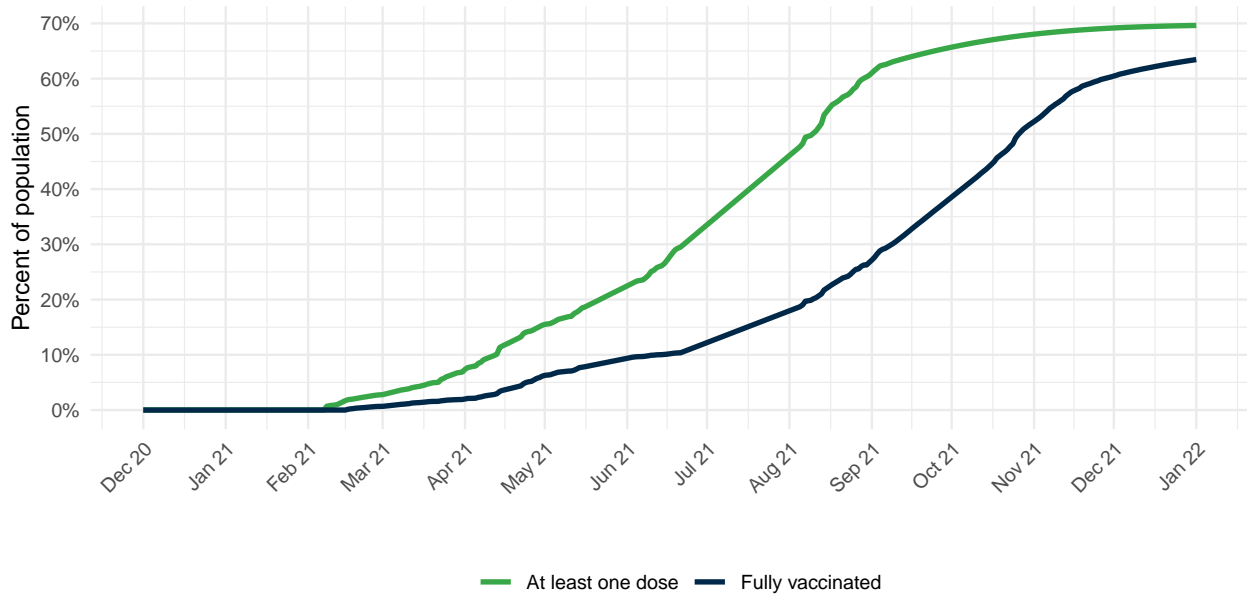
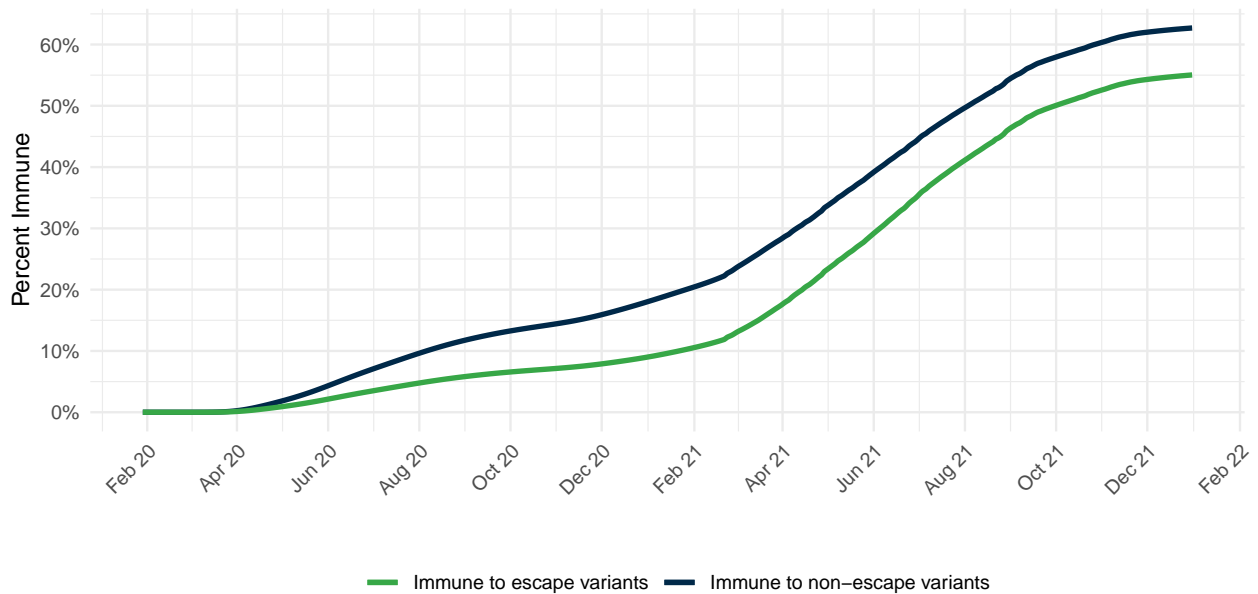


Figure 21. Percentage of people who are immune to non-escape variants and the percentage of people who are immune to escape variants



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 7 days.
- Mobility increases as vaccine coverage increases.
- Governments adapt their response by re-imposing social distancing mandates for 6 weeks whenever daily deaths reach 8 per million, unless a location has already spent at least 7 of the last 14 days with daily deaths above this rate, and not yet re-imposed social distancing mandates. In this case, the reference scenario assumes that mandates are re-imposed when daily deaths reach 15 per million.
- Variants Alpha, Beta, Gamma, and Delta continue to spread regionally and globally from locations with sufficient transmission.

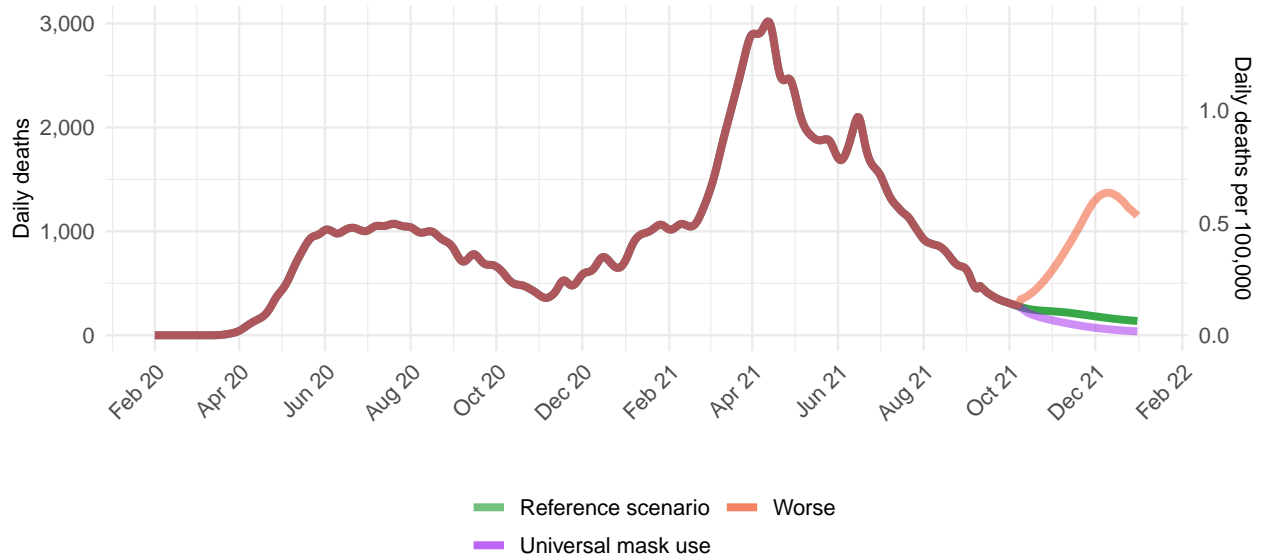
The **worse scenario** modifies the reference scenario assumption in four ways:

- 100% of vaccinated individuals stop using masks.
- Mobility increases in all locations to 25% above the pre-pandemic winter baseline, irrespective of vaccine coverage.
- Governments are more reluctant to re-impose social distancing mandates, waiting until the daily death rate reaches 15 per million, unless a location has already spent at least 7 of the last 14 days with daily deaths above this rate, and not yet re-imposed social distancing mandates. In this case, the reference scenario assumes that mandates are re-imposed when daily deaths reach 38 per million. In either case, we assume social distancing mandates remain in effect for 6 weeks.
- Variants Alpha, Beta, Gamma, and Delta spread between locations twice as fast when compared with our reference scenario.

The **universal masks scenario** makes all the same assumptions as the reference scenario but assumes all locations reach 95% mask use within 7 days.

Figure 22. Daily COVID-19 deaths until January 01, 2022 for three scenarios

A. Reported daily COVID-19 deaths per 100,000



B. Excess daily COVID-19 deaths per 100,000

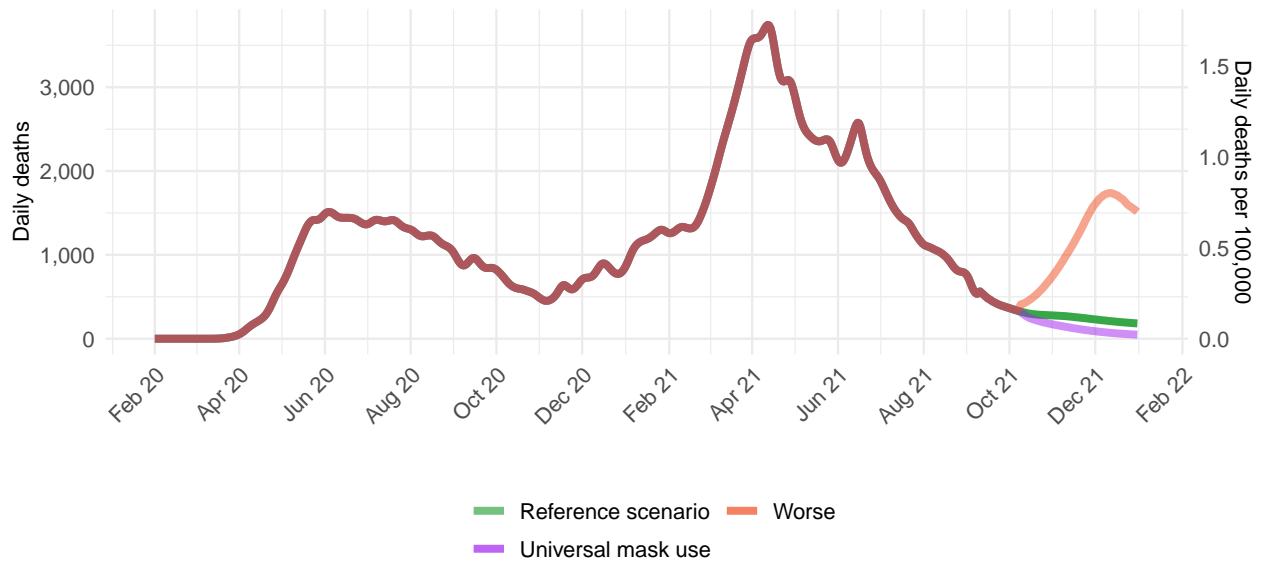


Figure 23. Daily COVID-19 infections until January 01, 2022 for three scenarios

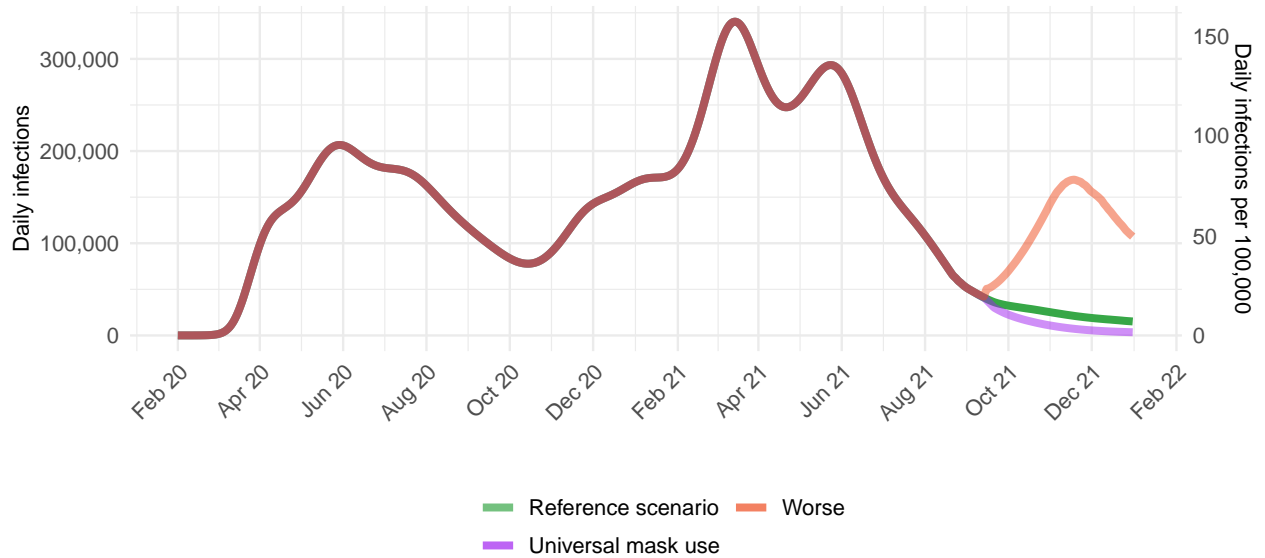


Figure 24. Daily COVID-19 reported cases until January 01, 2022 for three scenarios

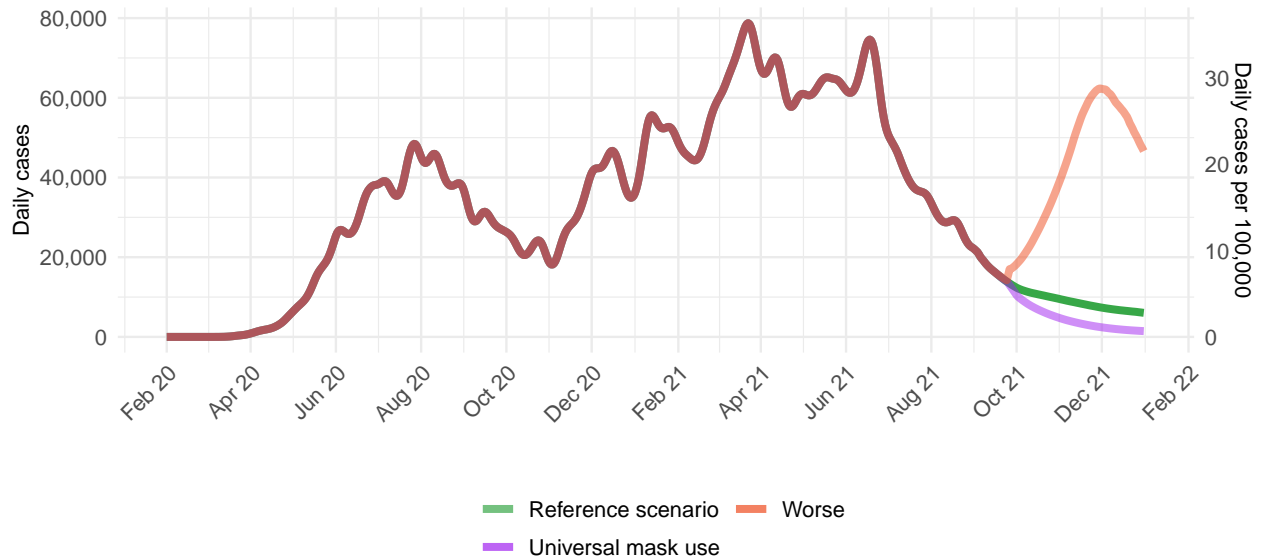


Figure 25. Daily COVID-19 hospital census until January 01, 2022 for three scenarios

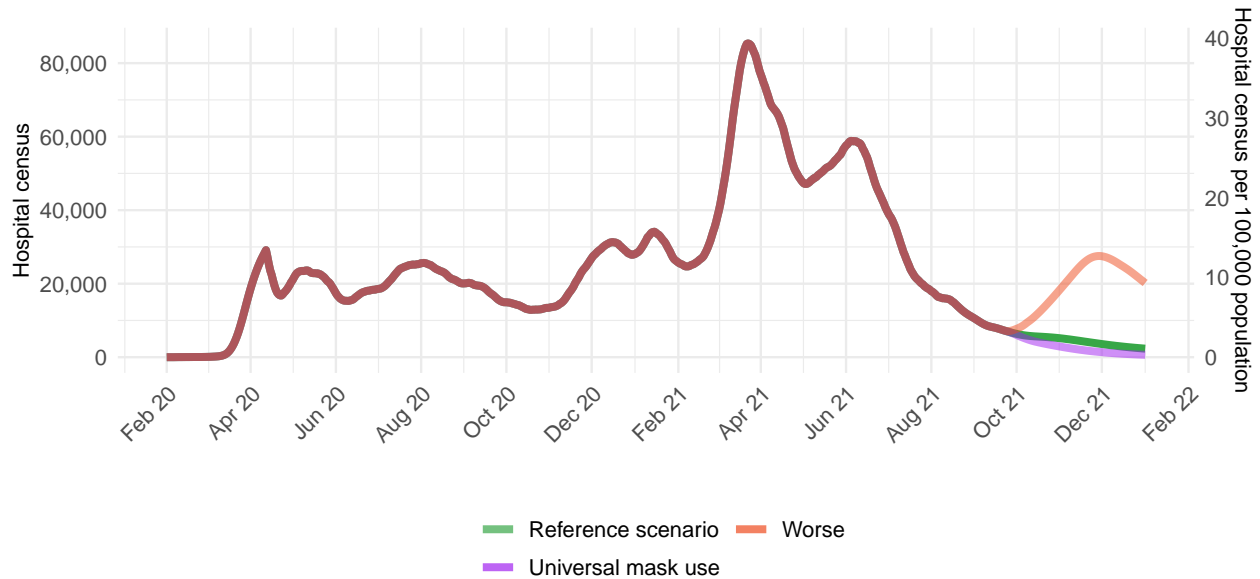


Figure 26. Comparison of reference model projections with other COVID modeling groups. For this comparison, we are including projections of daily COVID-19 deaths from other modeling groups when available: Delphi from the Massachusetts Institute of Technology ([Delphi](#)), Imperial College London ([Imperial](#)), The Los Alamos National Laboratory ([LANL](#)), and the SI-KJalpha model from the University of Southern California ([SIKJalpha](#)). Daily deaths from other modeling groups are smoothed to remove inconsistencies with rounding. Regional values are aggregates from available locations in that region.

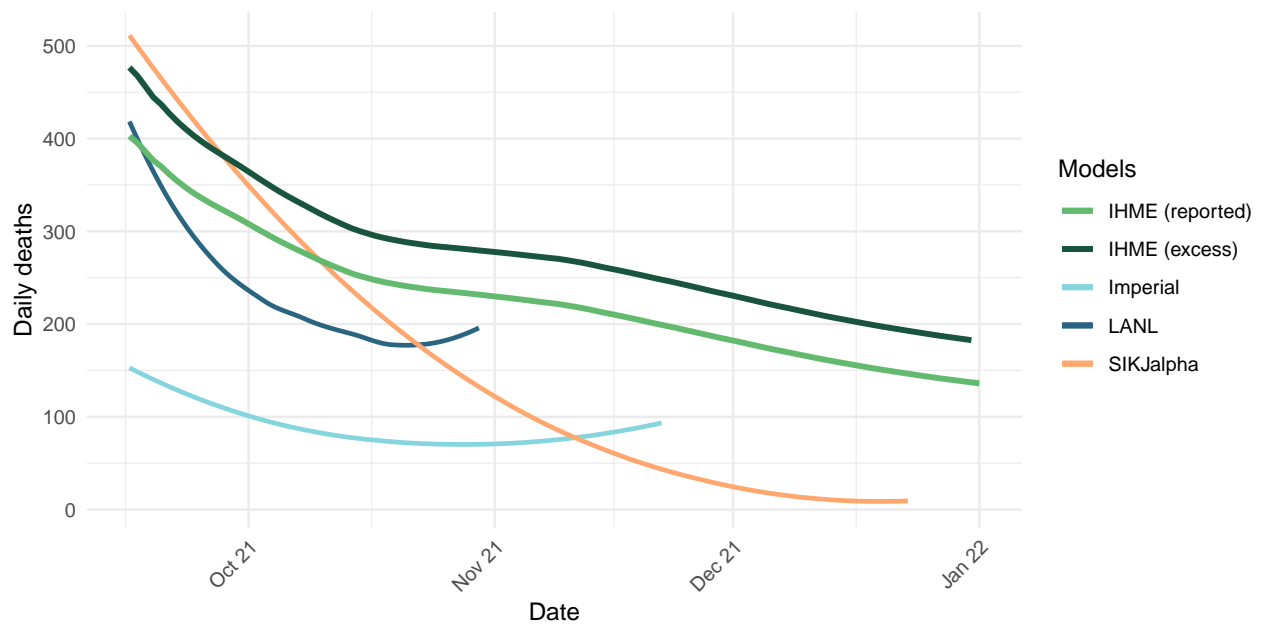
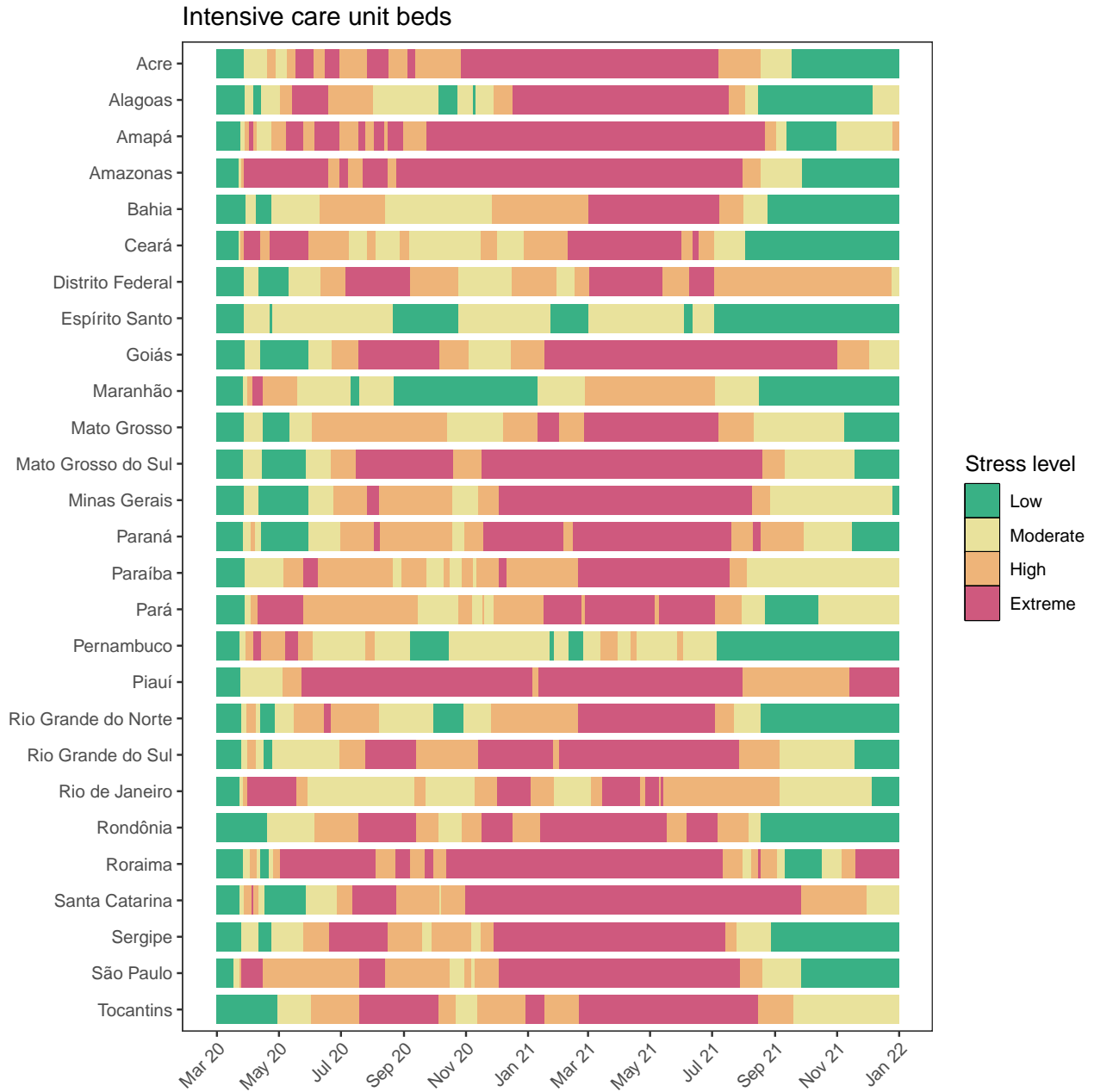


Figure 27. The estimated inpatient hospital usage is shown over time. The percent of hospital beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of beds occupied by COVID-19 patients. Less than 5% is considered *low stress*, 5-9% is considered *moderate stress*, 10-19% is considered *high stress*, and 20% or greater is considered *extreme stress*.



Figure 28. 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>.