COVID-19 Results Briefing

India

January 13, 2022

This document contains summary information on the latest projections from the IHME model on COVID-19 in India. The model was run on January 12, 2022, with data through January 10, 2022.

In 2021, India had a dramatic rise in COVID-19 cases and deaths in April and the first half of May. The cases peaked around mid-May and the deaths in late May, after which there was a decreasing trend until the recent explosion of the Omicron variant of the virus. The daily cases increased last week by 463% and daily deaths by 23% compared with the week before. Persistent measures are needed to bolster the health system to deal with such surges of COVID-19 and rapidly increase the pace of vaccination including boosters, as well as sustain effective face mask use and control social mixing through appropriate restrictions. IHME's reference scenario forecasts 3.0 million total deaths due to COVID-19 in India by May 1, 2022. An important component for successful control of COVID-19 in India over the next few months is timely reporting of genomic sequencing of an adequate number of samples of the virus from across the country, and assessing the efficacy of the available vaccines against the variants of the virus.

Current situation

- Daily infections in the last week increased to 61,327,300 per day on average compared to 29,699,800 the week before (Figure 1.1). Daily hospital census in the last week (through January 10) increased to 66,800 per day on average compared to 19,700 the week before.
- Daily reported cases in the last week increased to 129,500 per day on average compared to 23,000 the week before (Figure 2.1).
- Reported deaths due to COVID-19 in the last week increased to 91 per day on average compared to 74 the week before (Figure 3.1).
- The estimated total deaths due to COVID-19 in the last week increased to 510 per day on average compared to 380 the week before (Figure 3.1). This makes COVID-19 the number 15 cause of death in India this week (Table 1). Estimated total daily deaths due to COVID-19 in the past week were 5.5 times larger than the reported number of deaths.
- No locations had daily reported COVID-19 death rates greater than 4 per million (Figure 4.1).
- No locations had daily total COVID-19 death rates greater than 4 per million (Figure 4.2).

- We estimate that 81% of people in India have been infected at least once as of January 10 (Figure 6.1). Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 30 states and union territories (Figure 7.1).
- The infection-detection rate in India was close to 2% on January 10 (Figure 8.1).
- Based on the GISAID and various national databases, combined with our variant spread model, we estimate the current prevalence of variants of concern (Figures 9.1–9.5). We estimate that the Delta variant is circulating in 28 states and union territories, that the Gamma variant is circulating in two states and union territories and that the Omicron variant is circulating in 30 states and union territories.

Trends in drivers of transmission

- Mobility last week in India was same as the pre-COVID-19 baseline (Figure 11.1). Mobility was lower than 30% of baseline in no locations (Figure 12.1).
- There were 102 diagnostic tests per 100,000 people on January 10 (Figure 15.1).
- As of January 10, 12 states and union territories have reached 70% or more of the population who have received at least one vaccine dose, and five states and union territories have reached 70% or more of the population who are fully vaccinated (Figure 17.1).
- In India, 91% of the population that is 12 years and older say they would accept or would probably accept a vaccine for COVID-19. Note that vaccine acceptance is calculated using survey data from the 18+ population. The proportion of the population who are open to receiving a COVID-19 vaccine ranges from 78% in Jharkhand to 100% in Dadra and Nagar Haveli and Daman and Diu (Figure 19.1).

Projections

Cases

- Daily cases in the **reference scenario** will rise to 791,510 by January 21, 2022 (Figure 21.2).
- Daily cases in the **80% mask coverage scenario** will rise to 790,380 by January 21, 2022 (Figure 21.2).
- Daily cases in the **third dose scenario** will rise to 762,700 by January 21, 2022 (Figure 21.2).
- Daily cases in the **reduced vaccine hesitancy scenario** will rise to 760,840 by January 21, 2022 (Figure 21.2).

Deaths

- In our **reference scenario**, our model projects 499,000 cumulative reported deaths due to COVID-19 on May 1. This represents 18,000 additional deaths from January 10 to May 1. Daily reported COVID-19 deaths in the **reference scenario** will rise to 840 by February 1, 2022 (Figure 21.4).

- Under our **reference scenario**, our model projects 3,051,000 cumulative total deaths due to COVID-19 on May 1. This represents 132,000 additional deaths from January 10 to May 1 (Figure 24.2).
- In our **80% mask coverage scenario**, our model projects 499,000 cumulative reported deaths due to COVID-19 on May 1. This represents 18,000 additional deaths from January 10 to May 1. Daily reported COVID-19 deaths in the **80% mask coverage scenario** will rise to 840 by February 1, 2022 (Figure 21.4).
- In our **third dose scenario**, our model projects 498,000 cumulative reported deaths due to COVID-19 on May 1. This represents 17,000 additional deaths from January 10 to May 1. Daily reported COVID-19 deaths in the **third dose scenario** will rise to 760 by February 1, 2022 (Figure 21.4).
- In our **reduced vaccine hesitancy scenario**, our model projects 498,000 cumulative reported deaths due to COVID-19 on May 1. This represents 17,000 additional deaths from January 10 to May 1. Daily reported COVID-19 deaths in the **reduced vaccine hesitancy scenario** will rise to 750 by February 1, 2022 (Figure 21.4).
- Figure 22.1 compares our reference scenario forecasts to other publicly archived models. Forecasts are widely divergent.

Model updates

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

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

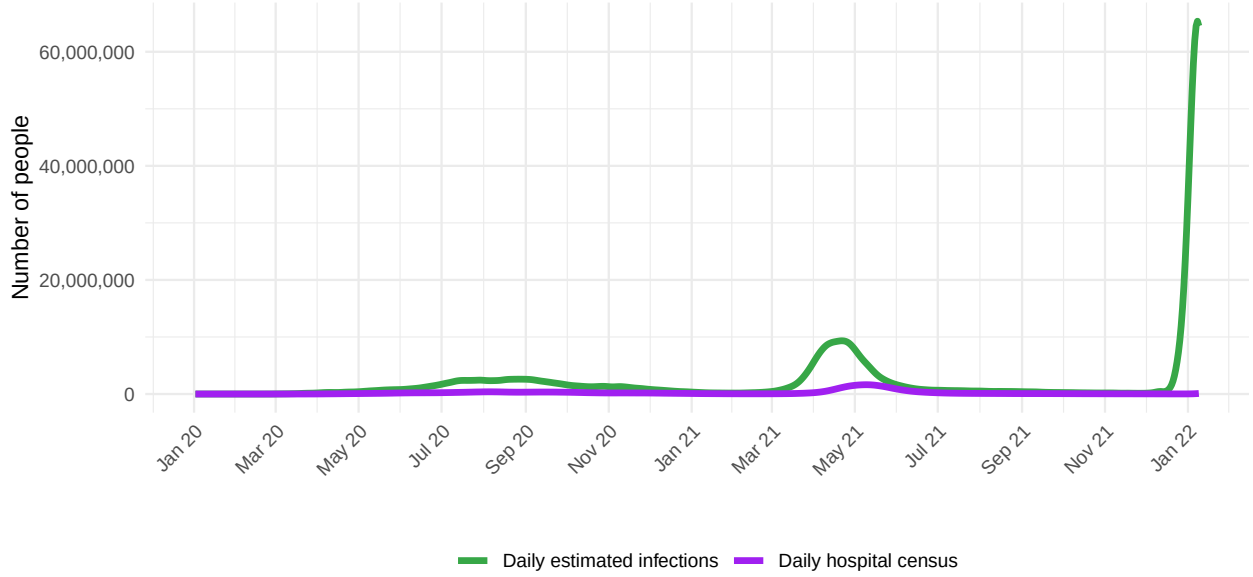


Figure 2.1. Reported daily COVID-19 cases, moving average

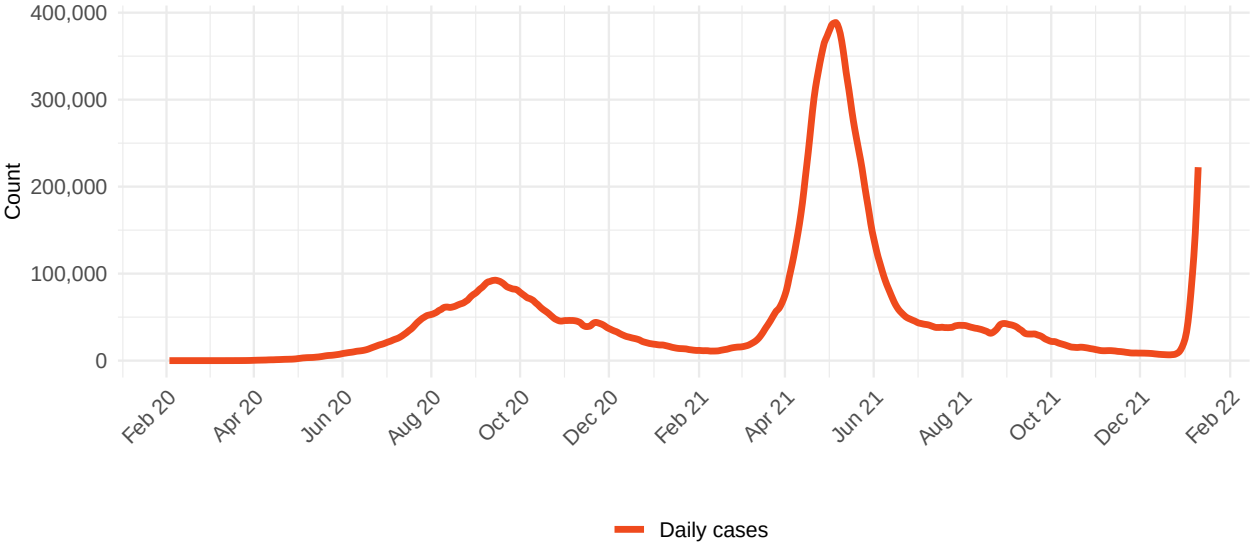
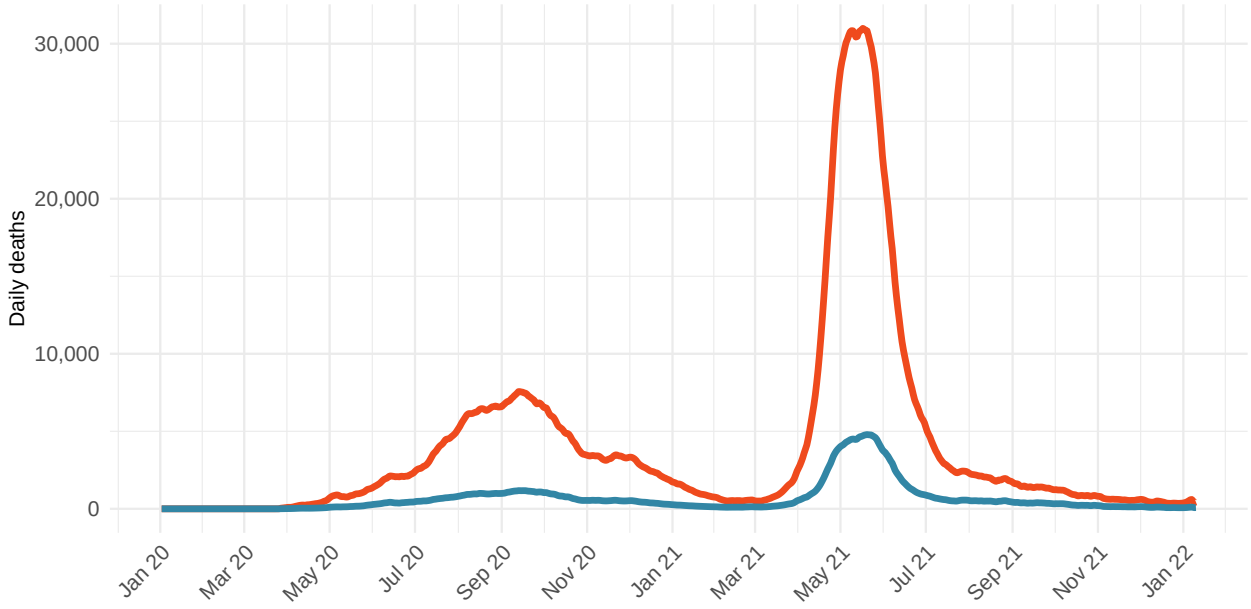


Table 1. Ranking of total deaths due to COVID-19 among the leading causes of mortality this week, assuming uniform deaths of non-COVID causes throughout the year

Cause name	Weekly deaths	Ranking
Ischemic heart disease	29,214	1
Chronic obstructive pulmonary disease	17,278	2
Stroke	13,444	3
Diarrheal diseases	12,160	4
Neonatal disorders	8,423	5
Lower respiratory infections	8,340	6
Tuberculosis	8,128	7
Diabetes mellitus	5,252	8
Cirrhosis and other chronic liver diseases	5,193	9
Falls	4,494	10
COVID-19	3,537	15

Figure 3.1. Smoothed trend estimate of reported daily COVID-19 deaths (blue) and total daily deaths due to COVID-19 (orange)



Daily COVID-19 death rate per 1 million on January 10, 2022

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

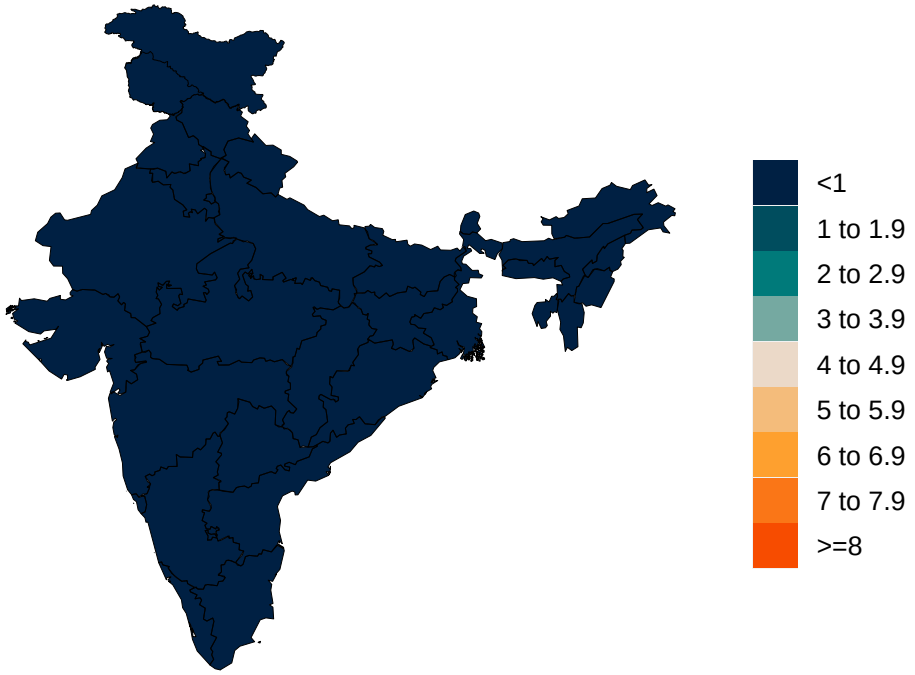
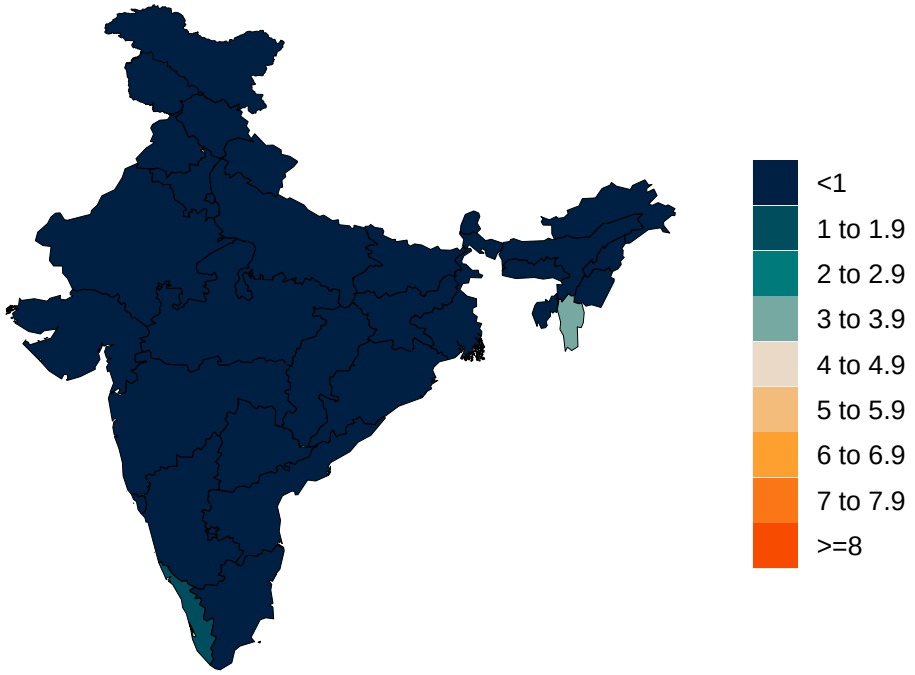


Figure 4.2 Daily total COVID-19 death rate per 1 million



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

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

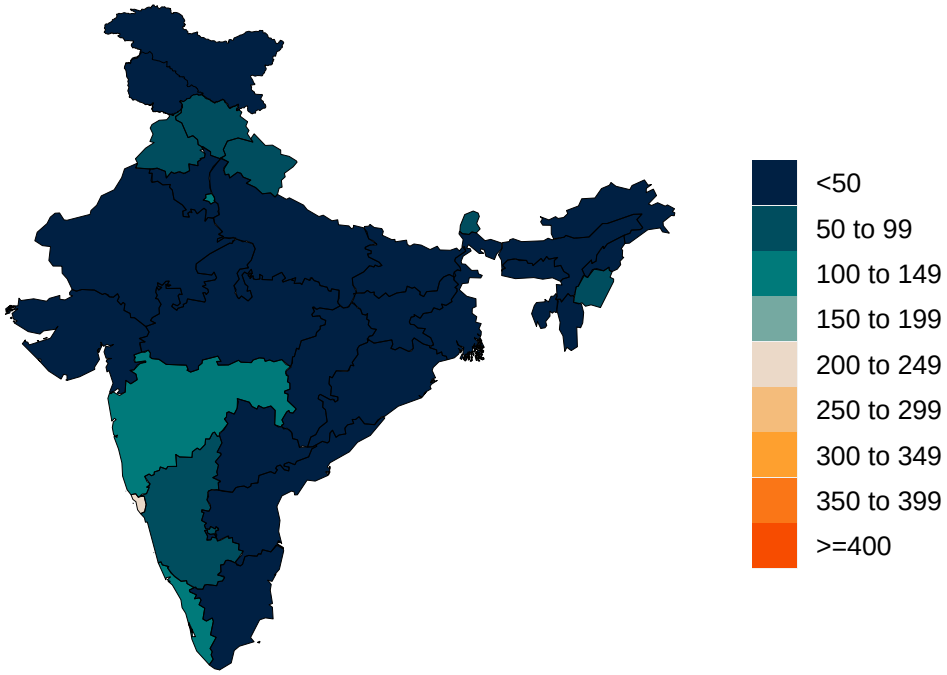


Figure 5.2 Total cumulative COVID-19 deaths per 100,000

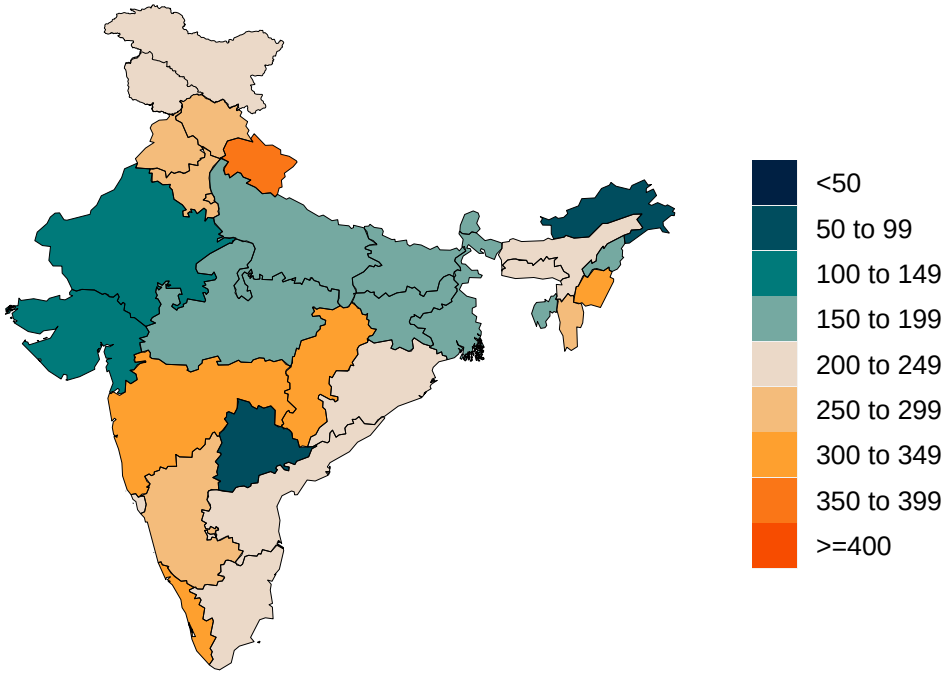


Figure 6.1. Estimated percent of the population infected with COVID-19 on January 10, 2022

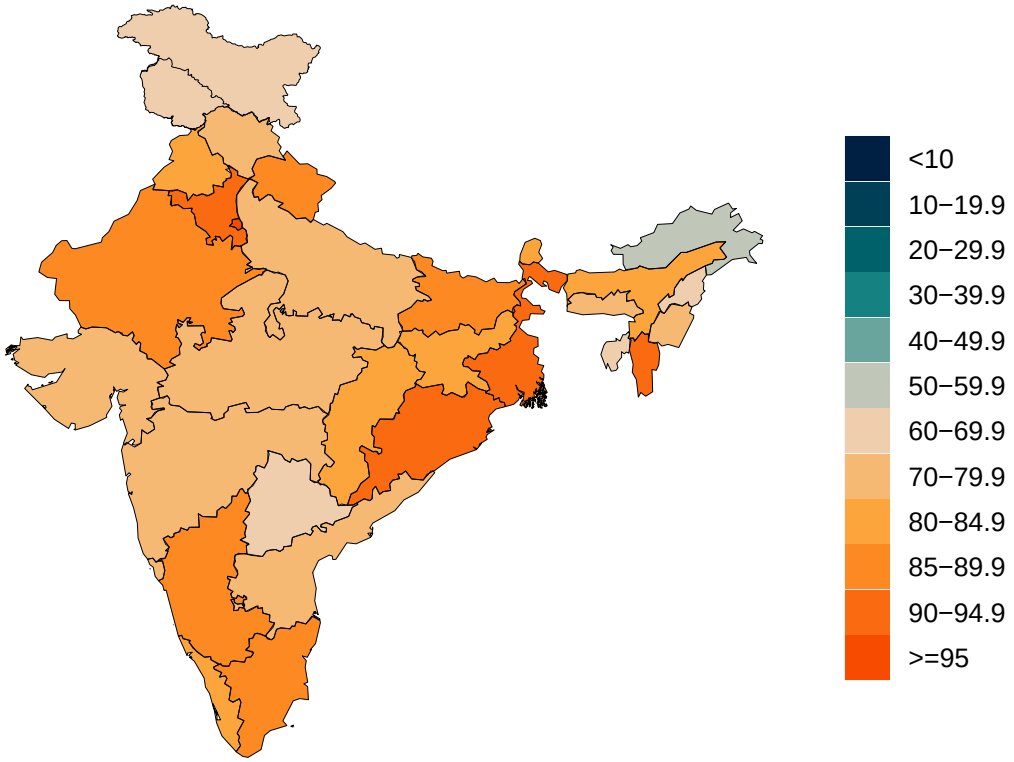


Figure 7.1. Mean effective R on December 30, 2021. Effective R less than 1 means that transmission should decline, all other things being held the same. The estimate of effective R is based on the combined analysis of deaths, case reporting, and hospitalizations where available. Current reported cases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

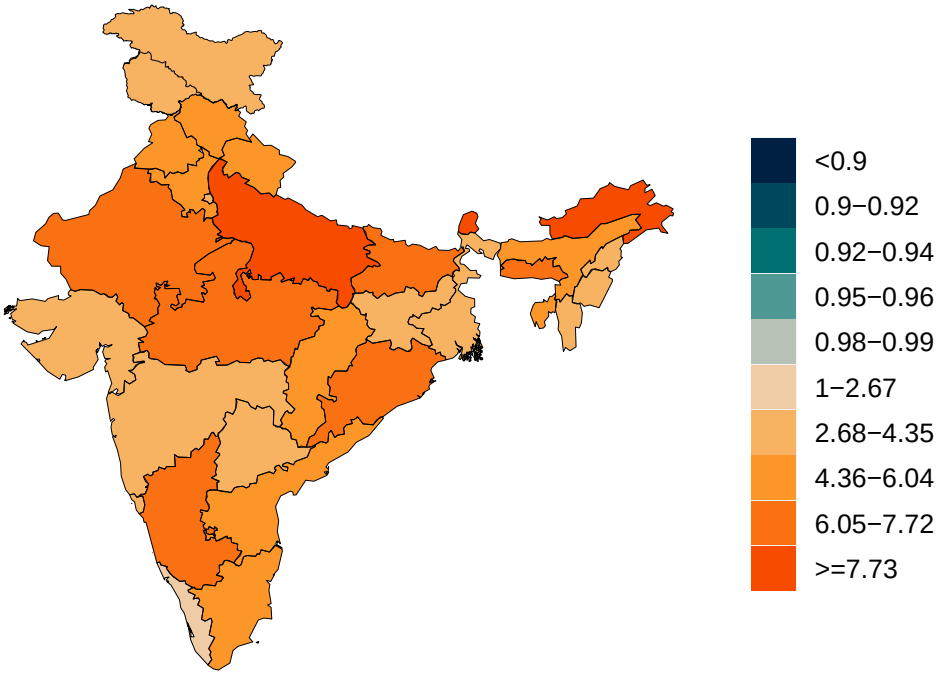
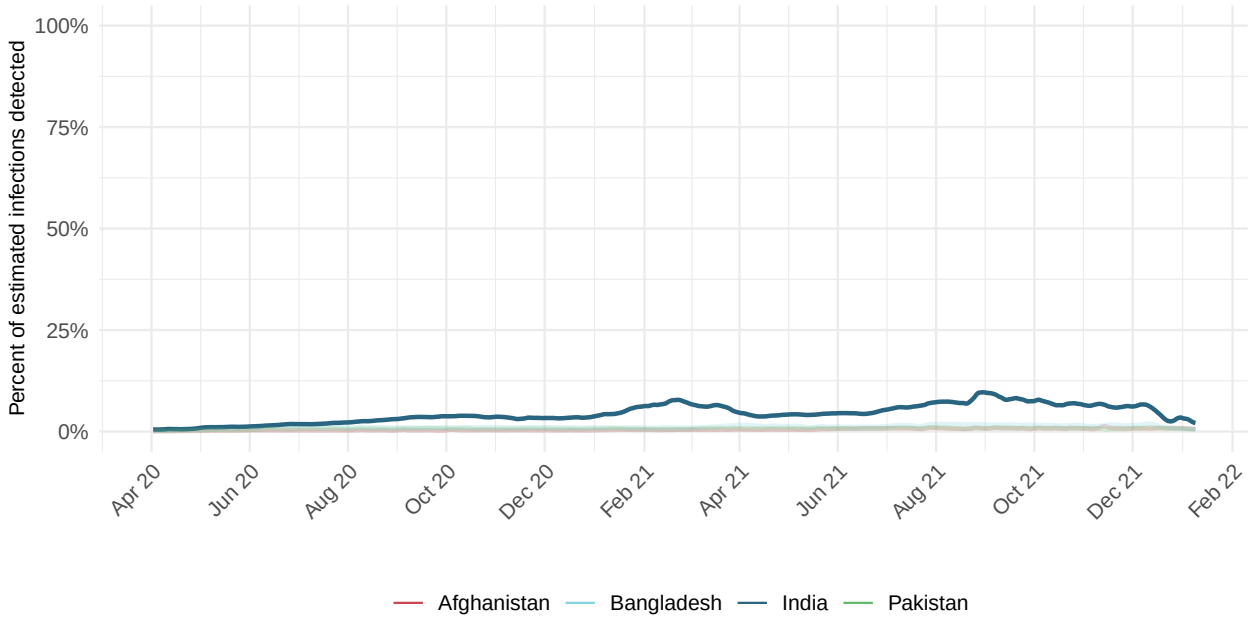


Figure 8.1. Percent of estimated COVID-19 infections detected. This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model. Due to measurement errors in cases and testing rates, the infection-detection rate can exceed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



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

Figure 9.1 Estimated percent of new infections that are Alpha variant

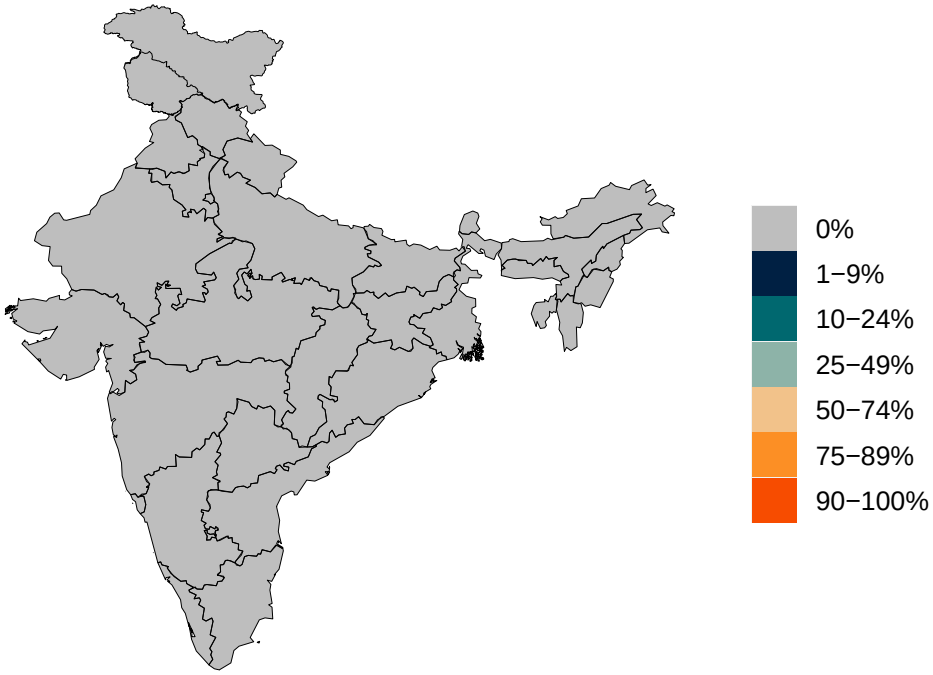


Figure 9.2 Estimated percent of new infections that are Beta variant

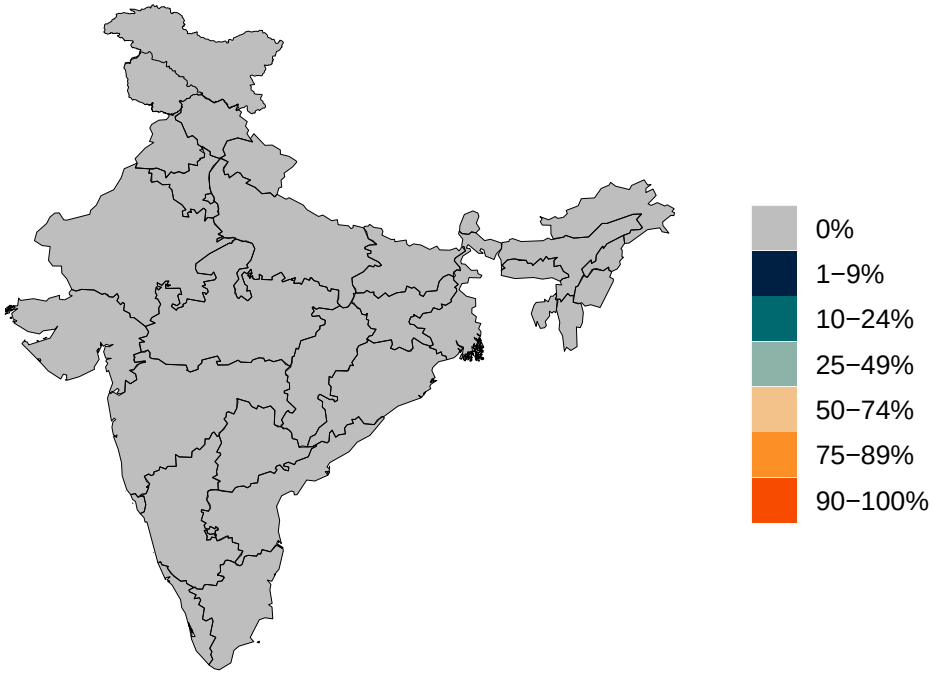


Figure 9.3 Estimated percent of new infections that are Delta variant

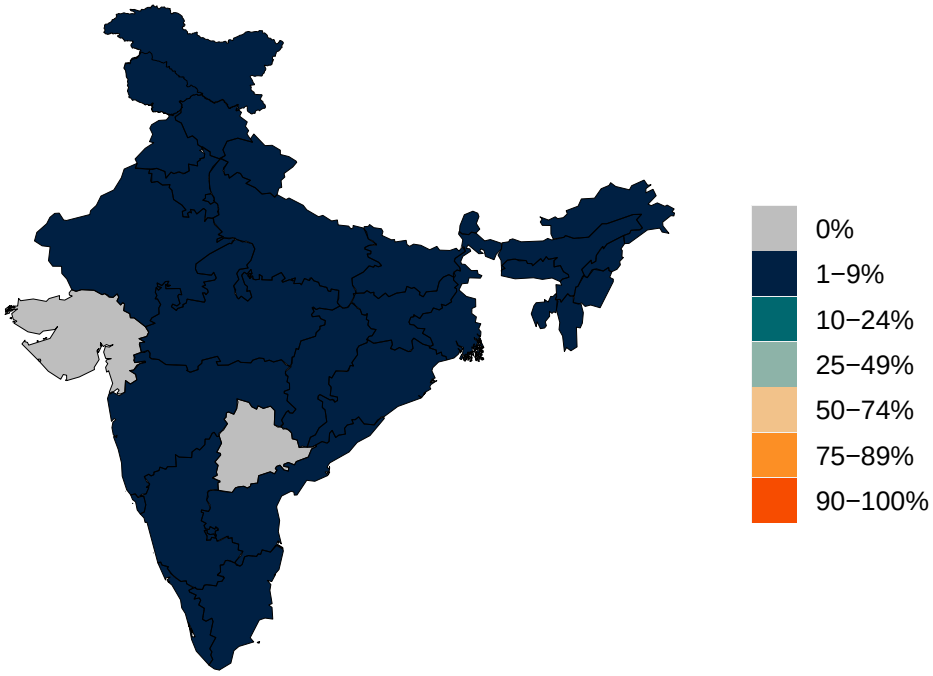


Figure 9.4 Estimated percent of new infections that are Gamma variant

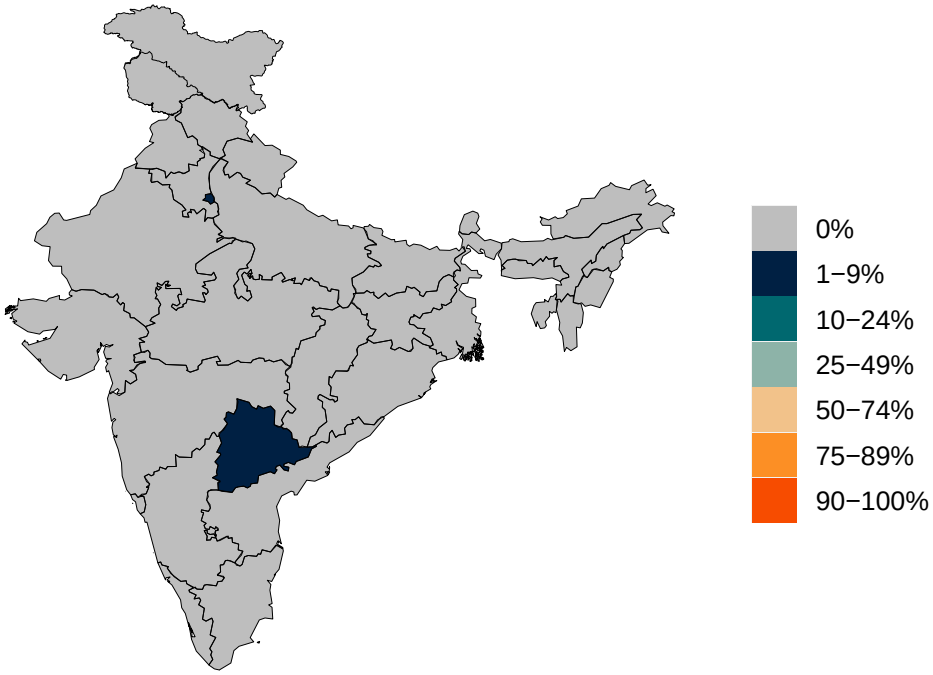


Figure 9.5 Estimated percent of new infections that are Omicron variant

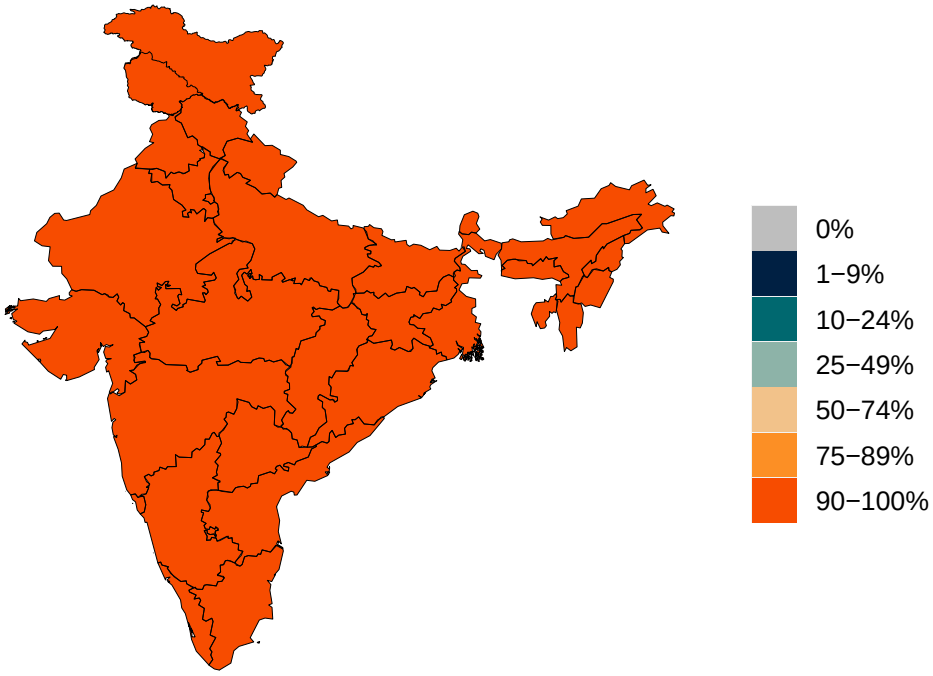
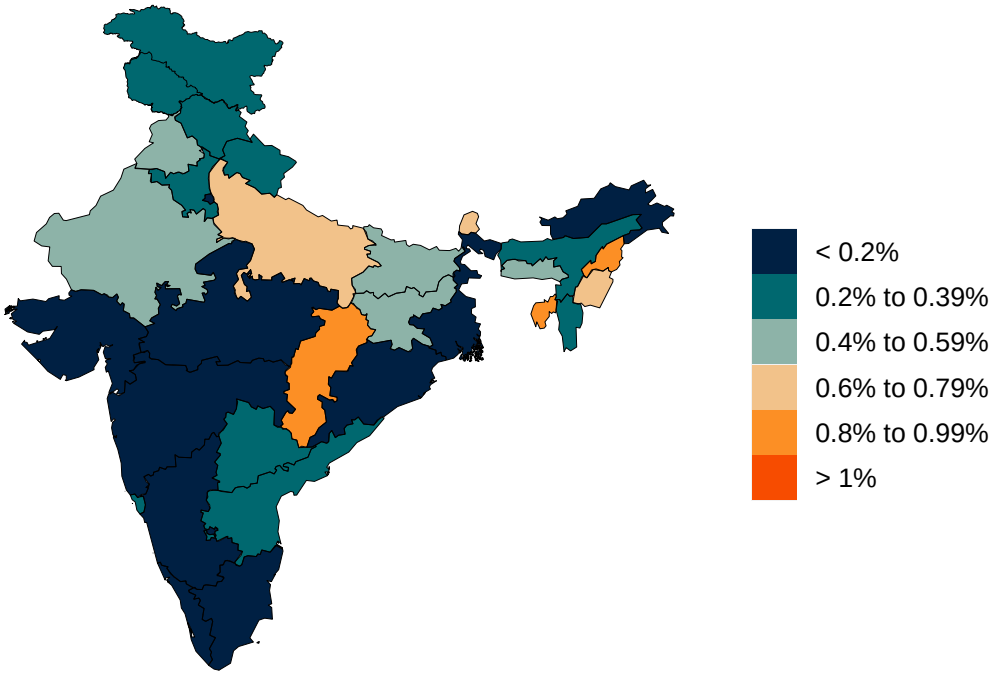


Figure 10.1. Infection-fatality rate on January 10, 2022. This is estimated as the ratio of COVID-19 deaths to estimated daily COVID-19 infections.



Critical drivers

Table 2. Current mandate implementation

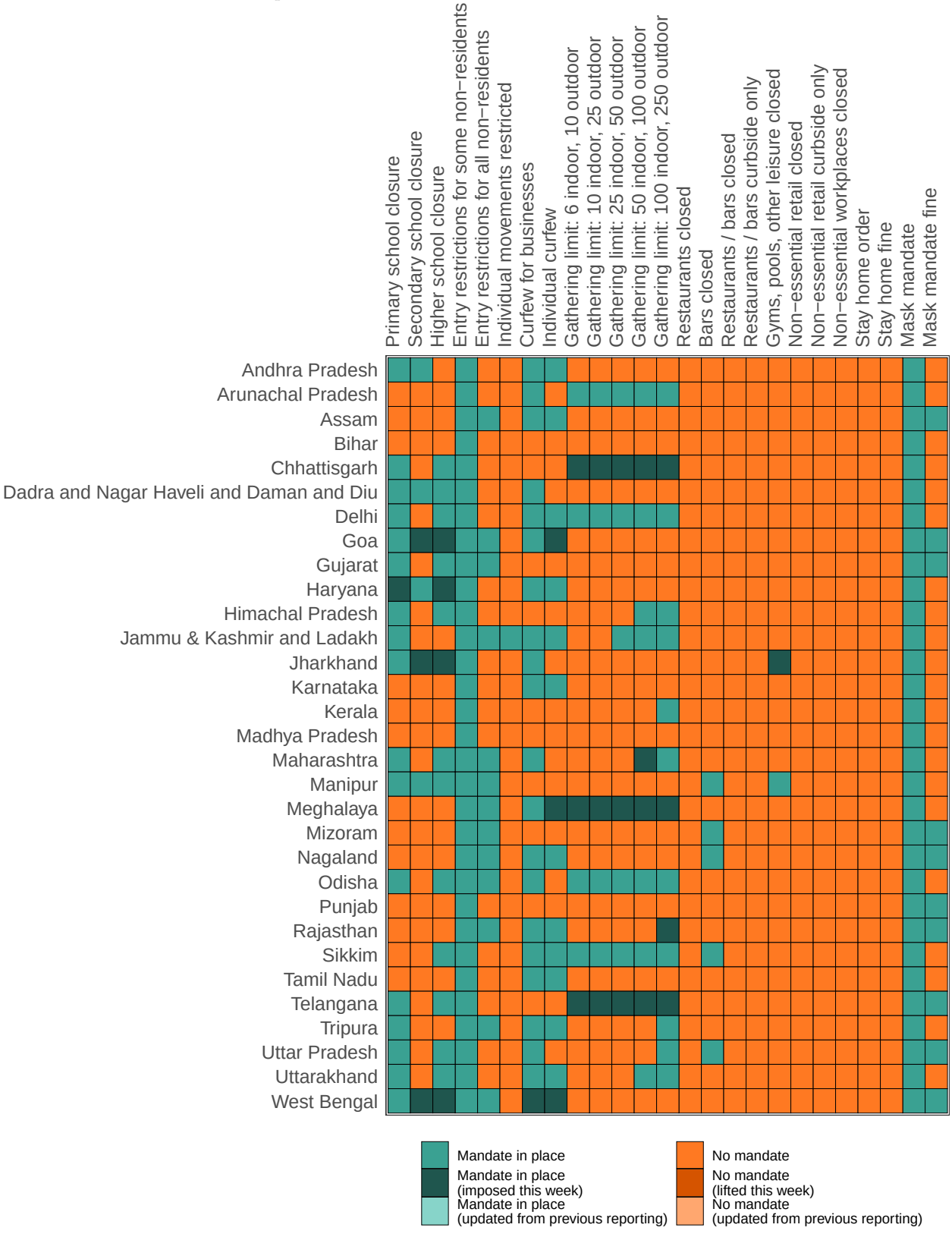


Figure 11.1. Trend in mobility as measured through smartphone app use, compared to January 2020 baseline

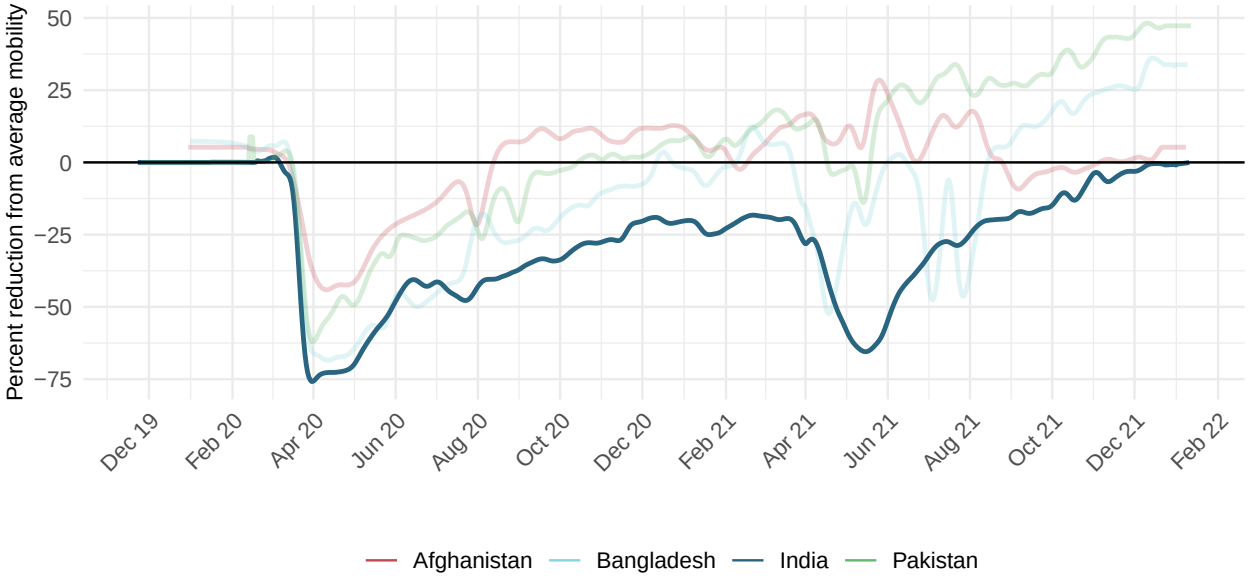


Figure 12.1. Mobility level as measured through smartphone app use, compared to January 2020 baseline (percent) on January 10, 2022

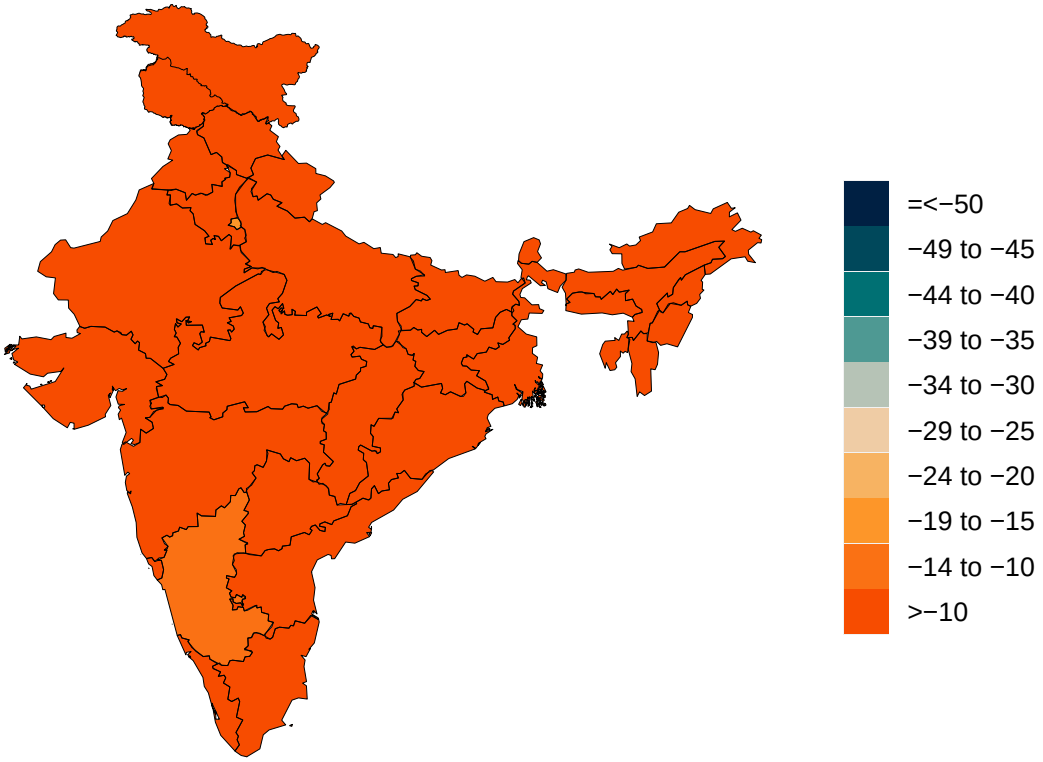


Figure 13.1. Trend in the proportion of the population reporting always wearing a mask when leaving home

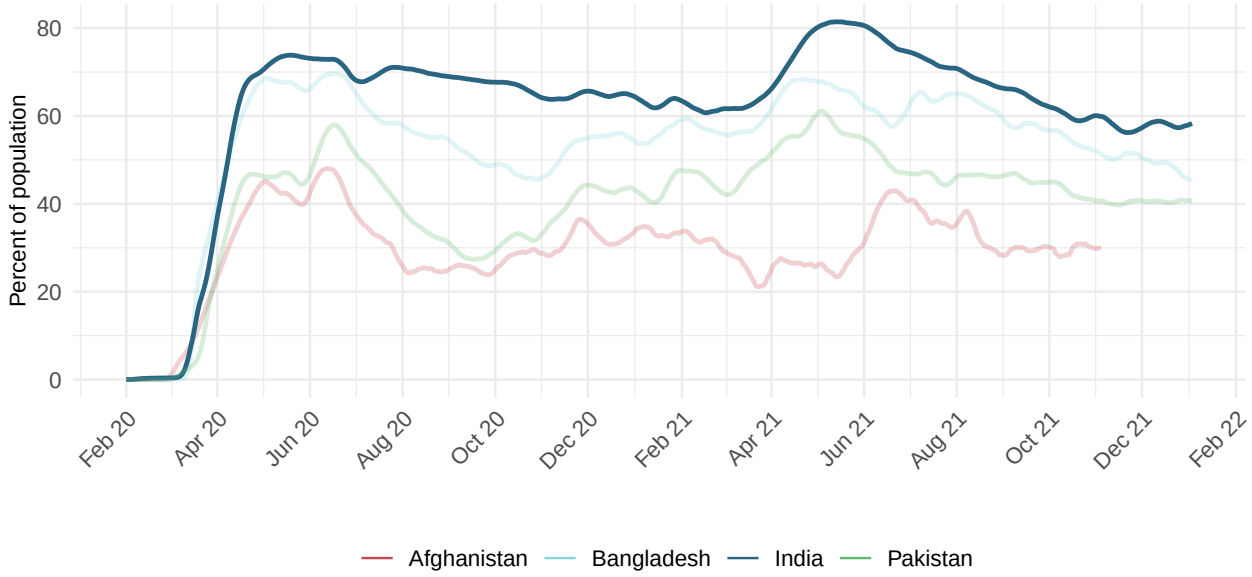


Figure 14.1. Proportion of the population reporting always wearing a mask when leaving home on January 10, 2022

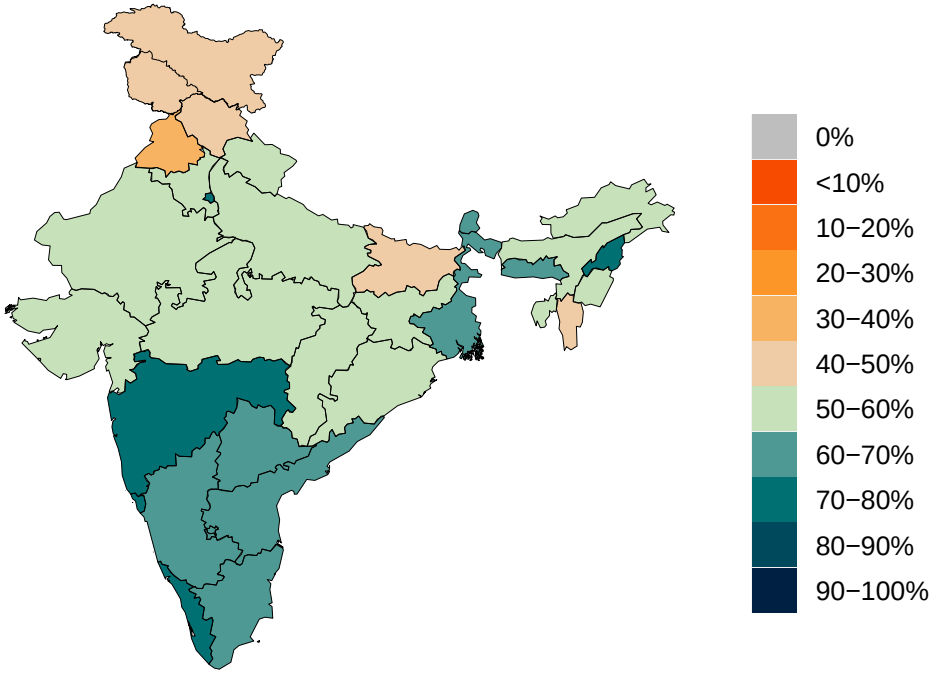


Figure 15.1. Trend in COVID-19 diagnostic tests per 100,000 people

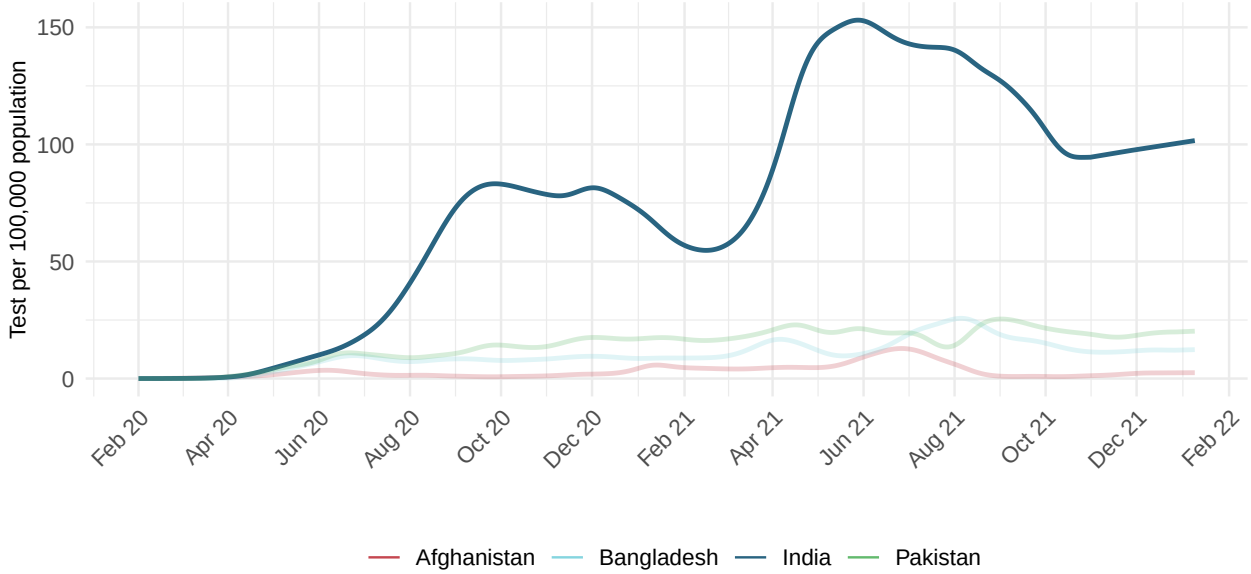


Figure 16.1. COVID-19 diagnostic tests per 100,000 people on January 10, 2022

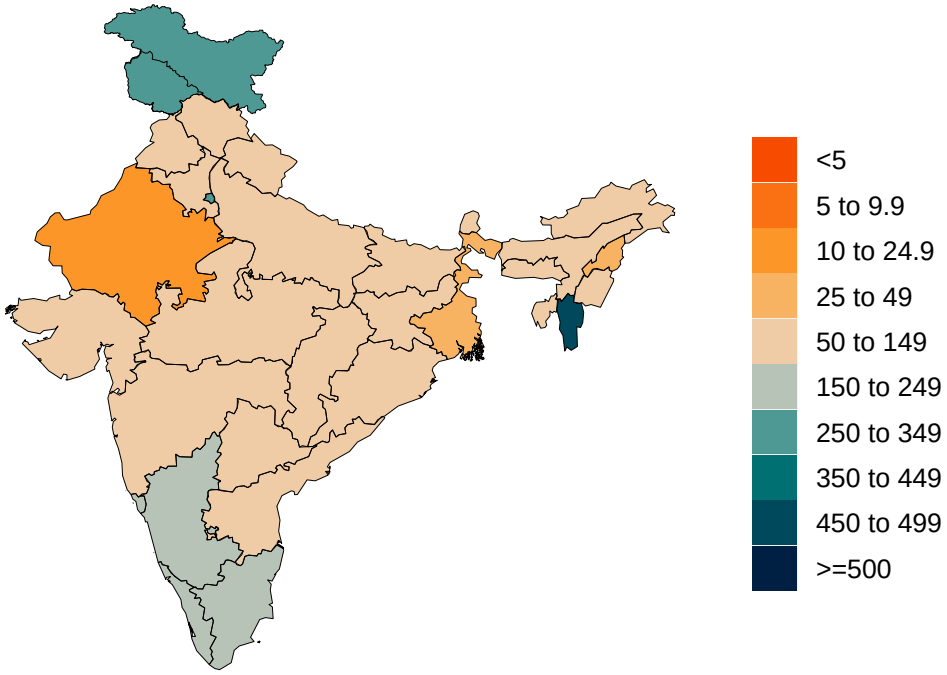


Table 3. Estimates of vaccine effectiveness for specific vaccines used in the model at preventing severe disease and infection. We use data from clinical trials directly, where available, and make estimates otherwise. More information can be found on our website.

	Effectiveness at preventing											
	Ancestral		Alpha		Beta		Gamma		Delta		Omicron	
Vaccine	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection
AstraZeneca	94%	63%	94%	63%	94%	69%	94%	69%	94%	69%	71%	36%
CanSino	66%	62%	66%	62%	64%	61%	64%	61%	64%	61%	48%	32%
CoronaVac	50%	47%	50%	47%	49%	46%	49%	46%	49%	46%	37%	24%
Covaxin	78%	73%	78%	73%	76%	72%	76%	72%	76%	72%	57%	38%
Johnson & Johnson	86%	72%	86%	72%	76%	64%	76%	64%	76%	64%	57%	33%
Moderna	97%	92%	97%	92%	97%	91%	97%	91%	97%	91%	73%	48%
Novavax	89%	83%	89%	83%	86%	82%	86%	82%	86%	82%	65%	43%
Pfizer/BioNTech	95%	86%	95%	86%	95%	84%	95%	84%	95%	84%	72%	44%
Sinopharm	73%	68%	73%	68%	71%	67%	71%	67%	71%	67%	53%	35%
Sputnik-V	92%	86%	92%	86%	89%	85%	89%	85%	89%	85%	67%	44%
Other vaccines	75%	70%	75%	70%	73%	69%	73%	69%	73%	69%	55%	36%
Other vaccines (mRNA)	91%	86%	91%	86%	88%	85%	88%	85%	88%	85%	67%	45%

Percent of the population having received at least one dose (17.1) and fully vaccinated against SARS-CoV-2 (17.2) by January 10, 2022

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

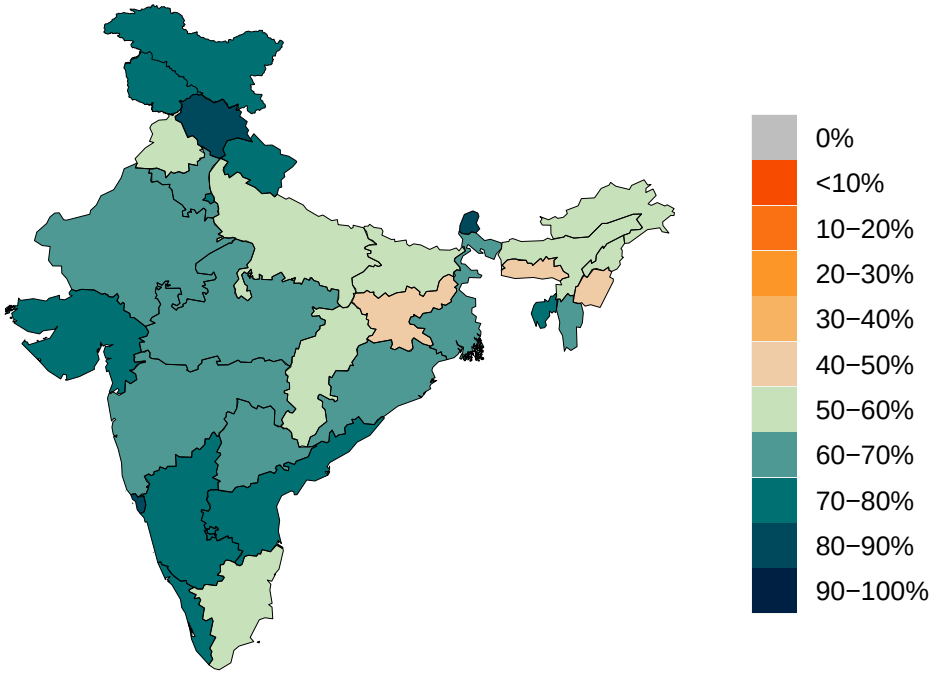


Figure 17.2 Percent of the population fully vaccinated against SARS-CoV-2

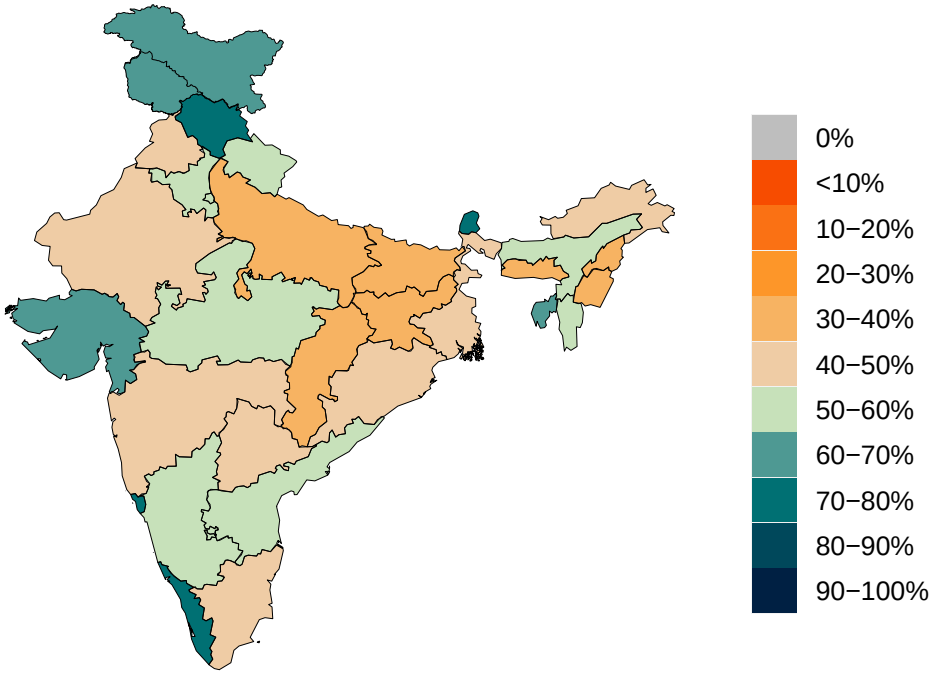


Figure 18.1. Trend in the estimated proportion of the population that is 12 years and older that has been vaccinated or would probably or definitely receive the COVID-19 vaccine if available. Note that vaccine acceptance is calculated using survey data from the 18+ population.

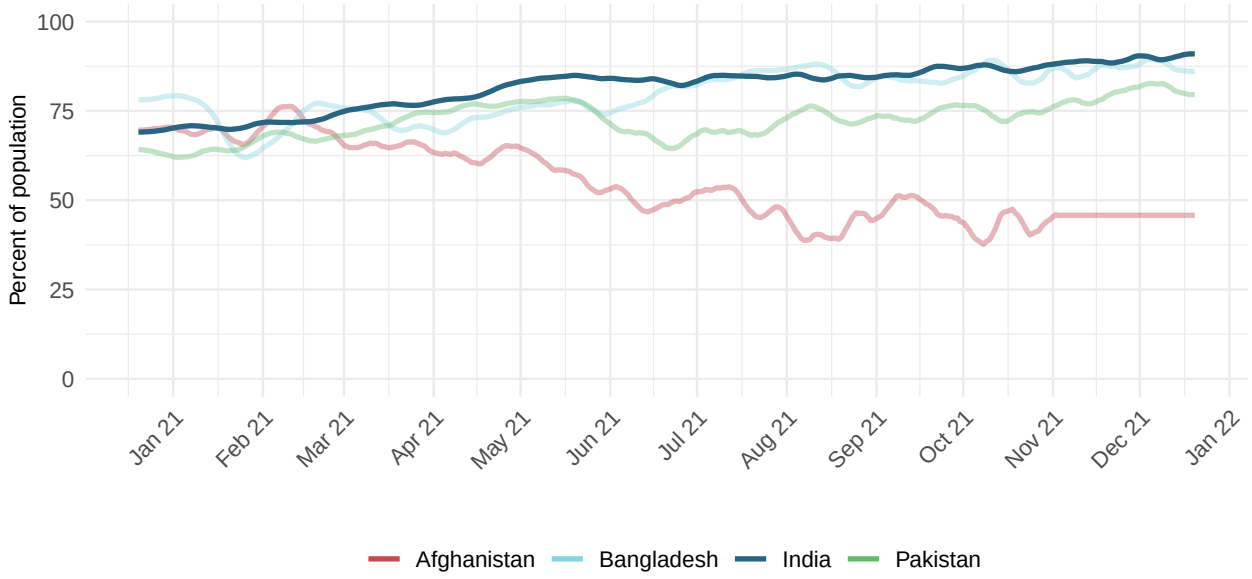


Figure 19.1. Estimated proportion of the population that is 12 years and older that has been vaccinated or would probably or definitely receive the COVID-19 vaccine if available. Note that vaccine acceptance is calculated using survey data from the 18+ population.

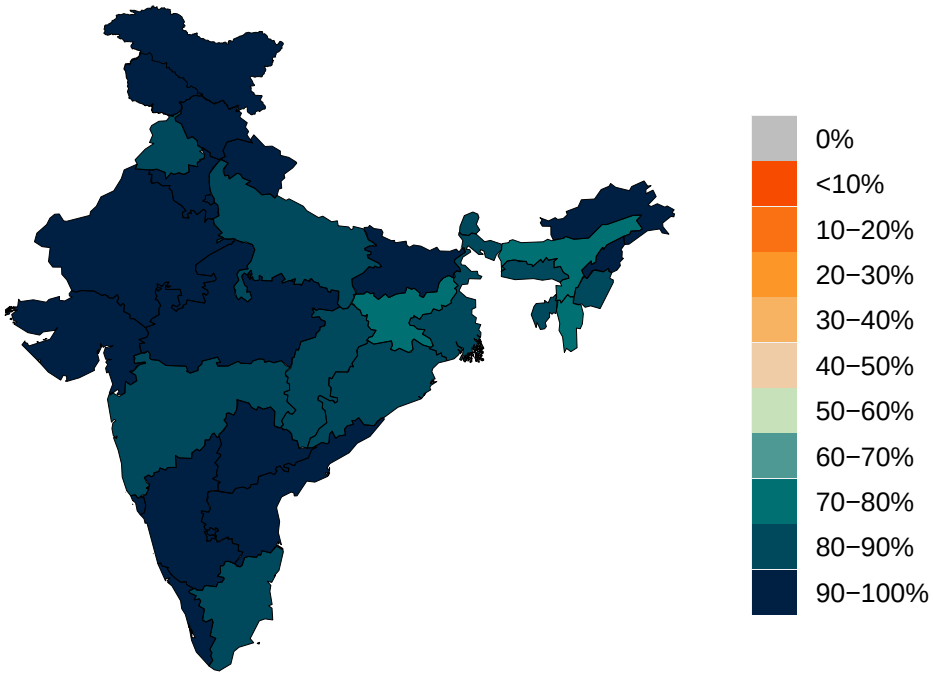
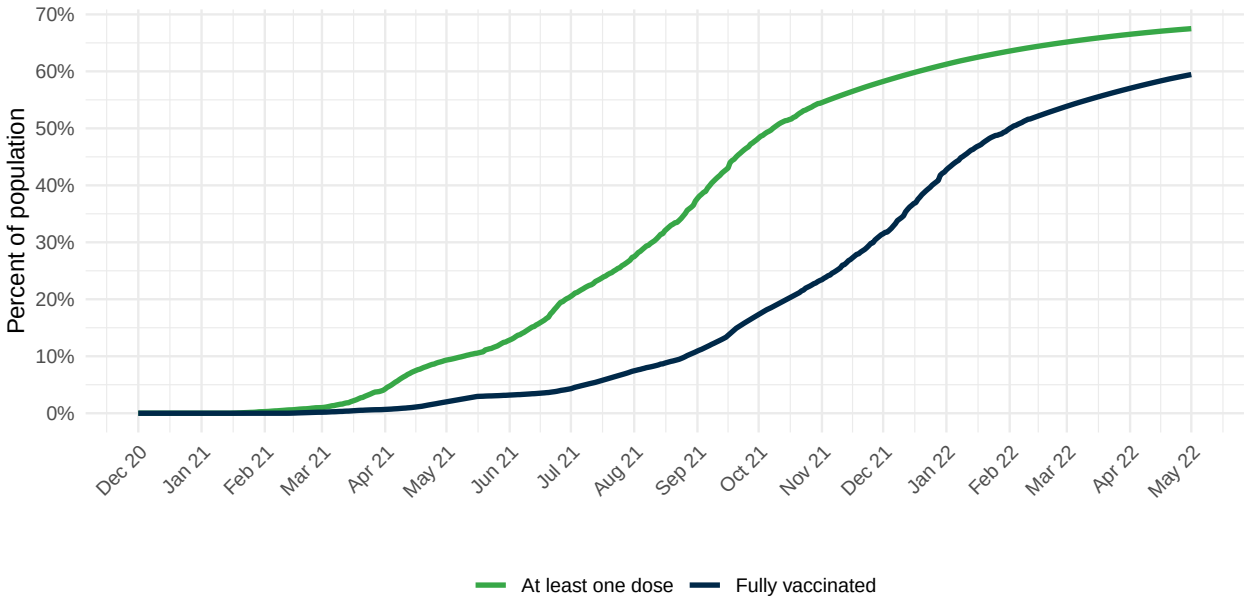


Figure 20.1. Percent of people who receive at least one dose of a COVID-19 vaccine and those who are fully vaccinated



Projections and scenarios

We produce 4 scenarios when projecting COVID-19. The **reference scenario** is our forecast of what we think is most likely to happen:

- Vaccines are distributed at the expected pace. Brand- and variant-specific vaccine efficacy is updated using the latest available information from peer-reviewed publications and other reports.
- Future mask use is the mean of mask use over the last 7 days.
- Mobility increases as vaccine coverage increases.
- Omicron variant spreads according to our flight and local spread model.

- 80% of those who have had two doses of vaccine (or one dose for Johnson & Johnson) receive a third dose at 6 months after their second dose.

The **80% mask use scenario** makes all the same assumptions as the reference scenario but assumes all locations reach 80% mask use within 7 days. If a location currently has higher than 80% use, mask use remains at the current level.

The **third dose scenario** is the same as the reference scenario but assumes that 100% of those who have received two doses of vaccine will get a third dose at 6 months.

The **reduced vaccine hesitancy scenario** assumes that those in each location who respond on surveys that they probably will not receive a vaccine are persuaded or mandated to receive a vaccine.

Figure 21.1. Daily COVID-19 infections until May 01, 2022 for 4 scenarios

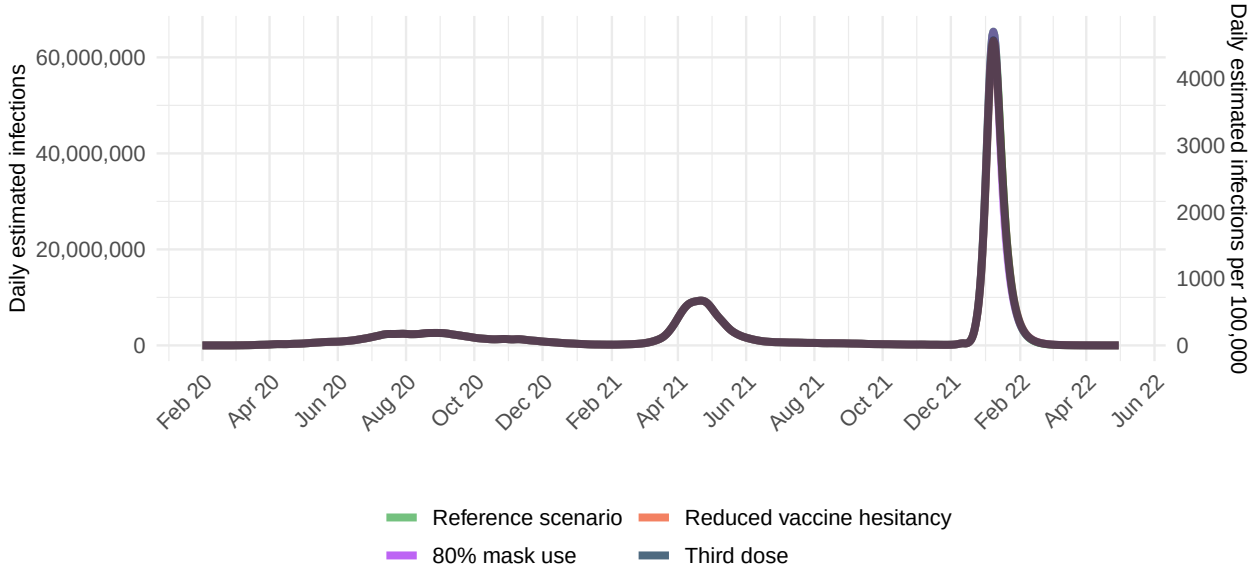


Figure 21.2. Daily COVID-19 reported cases until May 01, 2022 for 4 scenarios

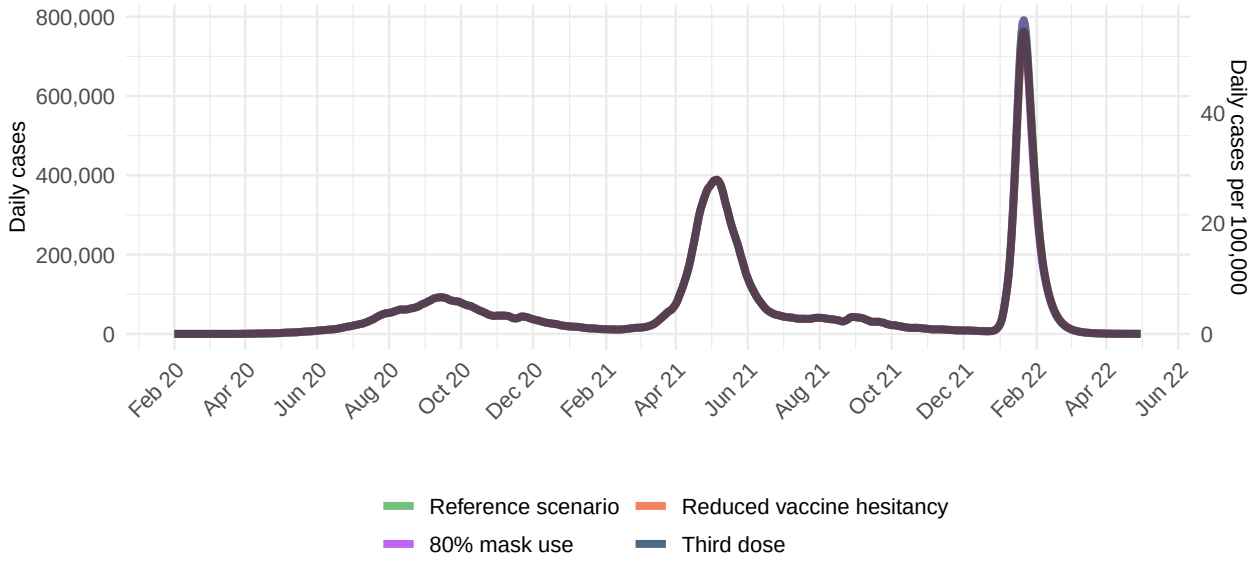


Figure 21.3. Daily COVID-19 hospital census until May 01, 2022 for 4 scenarios

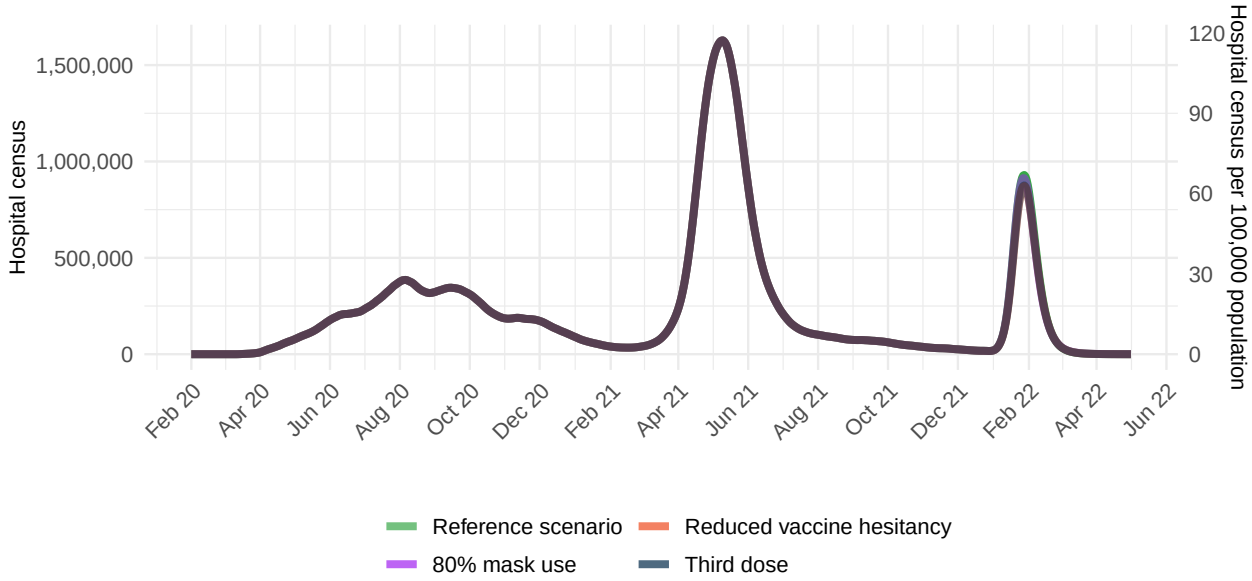


Figure 21.4 Reported daily COVID-19 deaths per 100,000

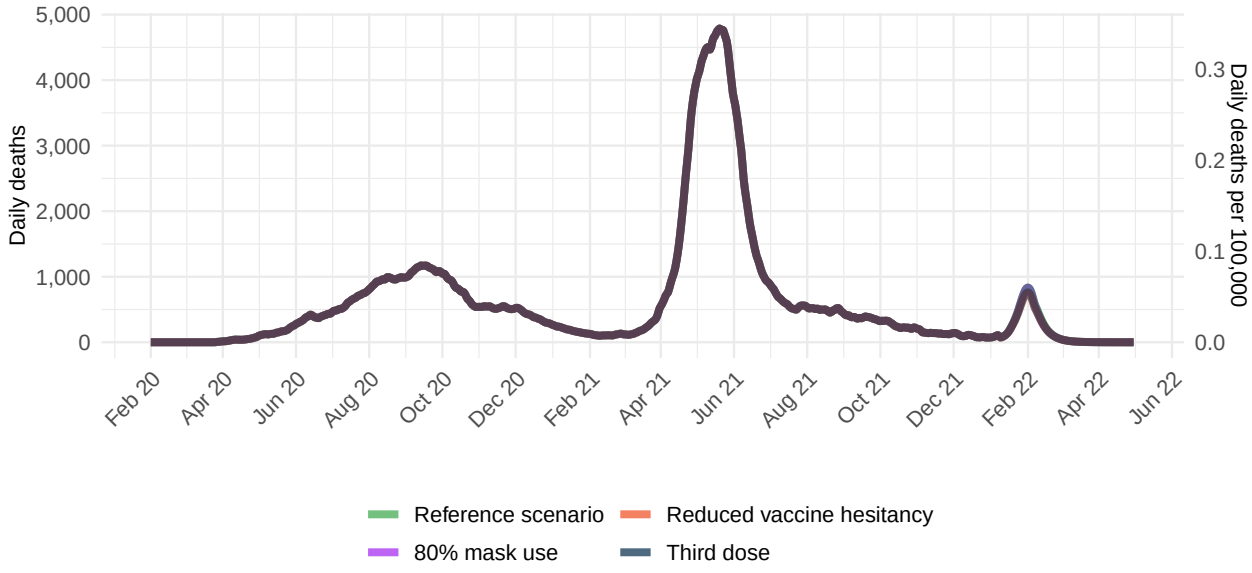


Figure 21.5 Total daily COVID-19 deaths per 100,000

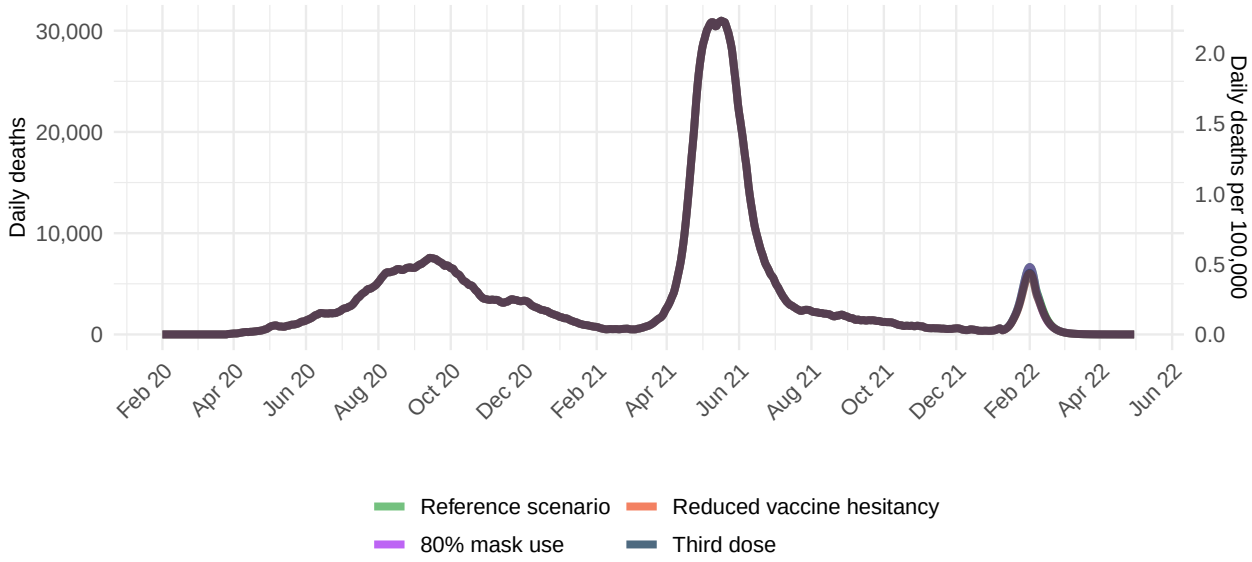
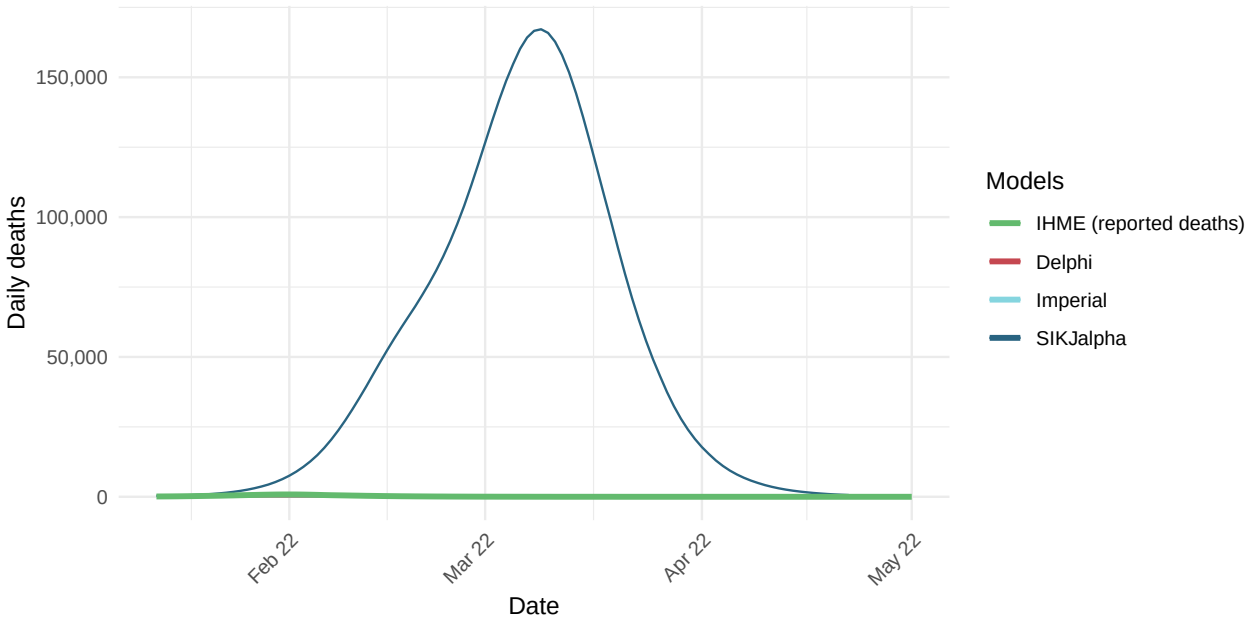


Figure 22.1. Comparison of reference model projections with other COVID modeling groups. For this comparison, we are including projections of daily COVID-19 deaths from other modeling groups when available, last model update in brackets: Delphi from the Massachusetts Institute of Technology (Delphi)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



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.