

## COVID-19 Results Briefing

### India

May 5, 2022

This document contains summary information on the latest projections from the IHME model on COVID-19 in India. The model was run on May 5, 2022, with data through May 3, 2022.

The Omicron variant surge that hit India in January–February 2022 has subsided with a generally decreasing trend in the number of reported cases, but with a slight upward swing in the past few weeks. Persistent measures are needed to bolster the health system to deal with potential surges of COVID-19 in the future and continue the pace of vaccination, including boosters, as well as to sustain appropriate restrictions where relevant – particularly for the vulnerable. IHME’s reference scenario forecasts 3.7 million total deaths due to COVID-19 in India by September 1, 2022. An important component for successful management 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 1,096,000 per day on average compared to 768,000 the week before (Figure 1.1). Daily hospital census in the last week (through May 3) increased to 6,600 per day on average compared to 5,000 the week before.
- Daily reported cases in the last week increased to 3,400 per day on average compared to 2,500 the week before (Figure 2.1).
- Reported deaths due to COVID-19 in the last week increased to seven per day on average compared to five the week before (Figure 3.1).
- The estimated total deaths due to COVID-19 in the last week increased to 38 per day on average compared to 33 the week before (Figure 3.1). This makes COVID-19 the number 68 cause of death in India this week (Table 1). Estimated total daily deaths due to COVID-19 in the past week were 5.8 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 and union territories (Figure 4.1).
- The daily rate of total deaths due to COVID-19 is greater than 4 per million in no states and union territories (Figure 4.2).
- We estimate that 87% of people in India have been infected at least once as of May 2 (Figure 6.1).

- Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 22 states and union territories (Figure 7.1).
- The infection-detection rate in India was close to 1% on May 2 (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 Omicron variant is circulating in 35 states and union territories, that the Delta variant is circulating in 35 states and union territories, that the Alpha variant is circulating in 26 states and union territories, that the Beta variant is circulating in seven states and union territories, and that the Gamma variant is circulating in five states and union territories.

## Trends in drivers of transmission

- Mobility last week was 16% higher than the pre-COVID-19 baseline (Figure 11.1). Mobility was lower than 15% of baseline in one state or union territory (Figure 12.1).
- There were 30 diagnostic tests per 100,000 people on May 2 (Figure 15.1).
- As of May 2, 16 states and union territories have reached 70% or more of the population who have received at least one vaccine dose, and nine states and union territories have reached 70% or more of the population who are fully vaccinated (Figures 17.1 and 17.2). 68% of people in India have received at least one vaccine dose, and 60% are fully vaccinated.
- In India, 92% of the population that is 12 years and older say they would accept a vaccine for COVID-19 (Figure 18.1). 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 68% in Manipur to 100% in Tripura (Figure 19.1).
- As of April 25, 2022, 3.7% of the population in India say they would accept a vaccine for COVID-19 but have not yet been vaccinated.
- In our current reference scenario, we expect that 953 million people will be vaccinated with at least one dose by September 1 (Figure 21.1). We expect that 64% of the population will be fully vaccinated by September 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.

- The 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 1,407,160 by May 11, 2022 (Figure 23.1).
- Daily estimated infections in the **80% mask use scenario** will rise to 1,249,040 by May 3, 2022 (Figure 23.1).
- Daily estimated infections in the **third dose scenario** will rise to 1,404,400 by May 11, 2022 (Figure 23.1).

### Cases

- Daily estimated cases in the **reference scenario** will rise to 8,470 by May 28, 2022 (Figure 23.2).
- Daily estimated cases in the **80% mask use scenario** will rise to 6,650 by May 16, 2022 (Figure 23.2).
- Daily estimated cases in the **third dose scenario** will rise to 8,430 by May 28, 2022 (Figure 23.2).

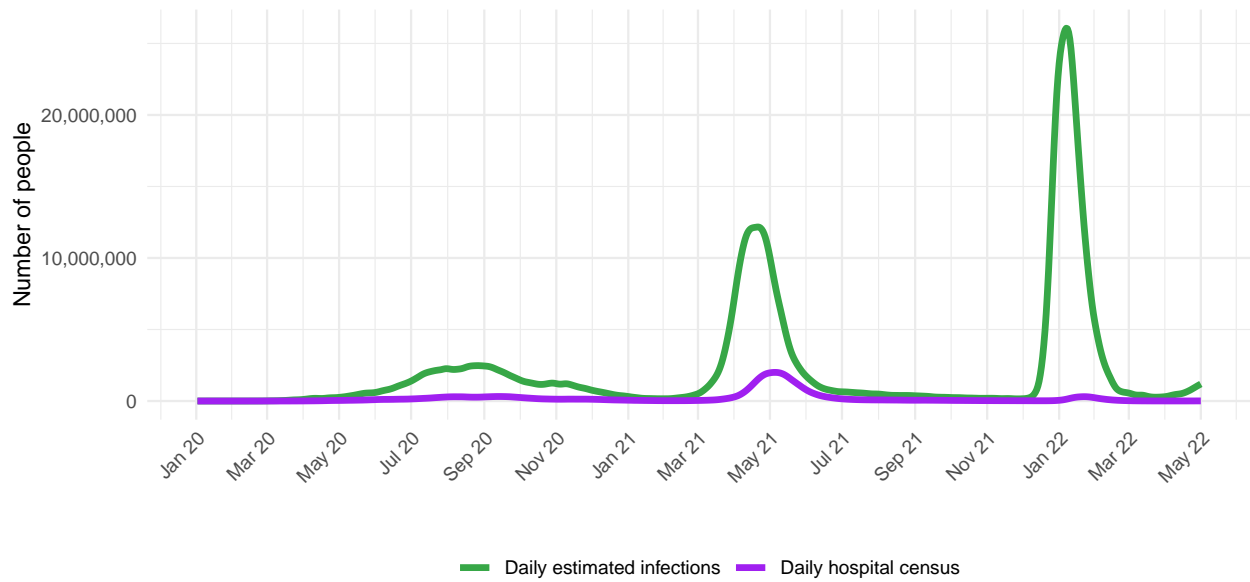
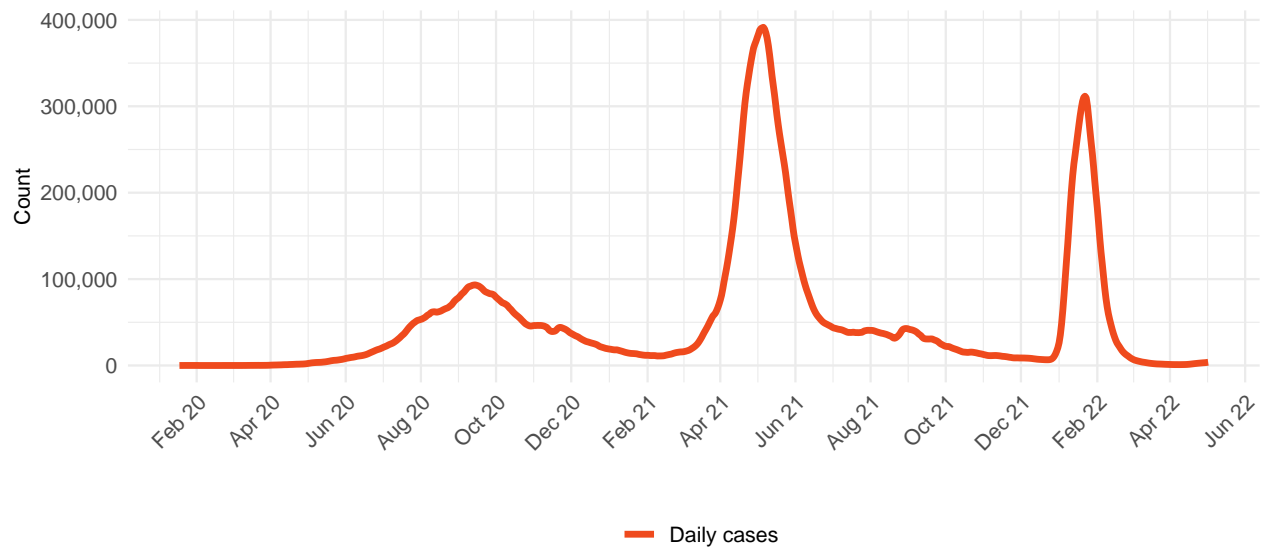
### Deaths

- In our **reference scenario**, our model projects 526,000 cumulative reported deaths due to COVID-19 on September 1. This represents 3,600 additional deaths from May 2 to September 1. Daily reported COVID-19 deaths in the **reference scenario** will rise to 50 by June 4, 2022 (Figure 23.4).
- Under our **reference scenario**, our model projects 3,681,000 cumulative total deaths due to COVID-19 on September 1. This represents 23,000 additional deaths from May 2 to September 1 (Figure 23.5).
- In our **80% mask use scenario**, our model projects 525,000 cumulative reported deaths due to COVID-19 on September 1. This represents 2,100 additional deaths from May 2 to September 1. Daily reported COVID-19 deaths in the **80% mask use scenario** will rise to 40 by May 28, 2022 (Figure 23.4).

- In our **third dose scenario**, our model projects 526,000 cumulative reported deaths due to COVID-19 on September 1. This represents 3,600 additional deaths from May 2 to September 1. Daily reported COVID-19 deaths in the **third dose scenario** will rise to 50 by June 4, 2022 (Figure 23.4).
- Figure 24.1 compares our reference scenario forecasts to other publicly archived models. Forecasts are widely divergent.

**Model updates**

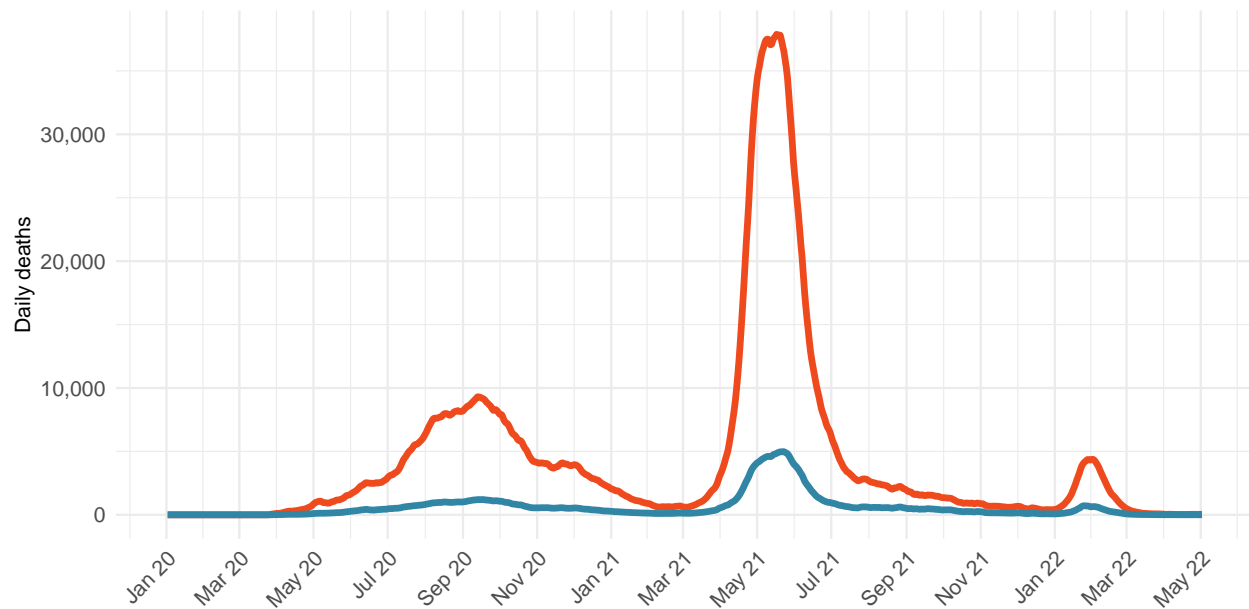
No model updates.

**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	269	68

**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 May 2, 2022

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

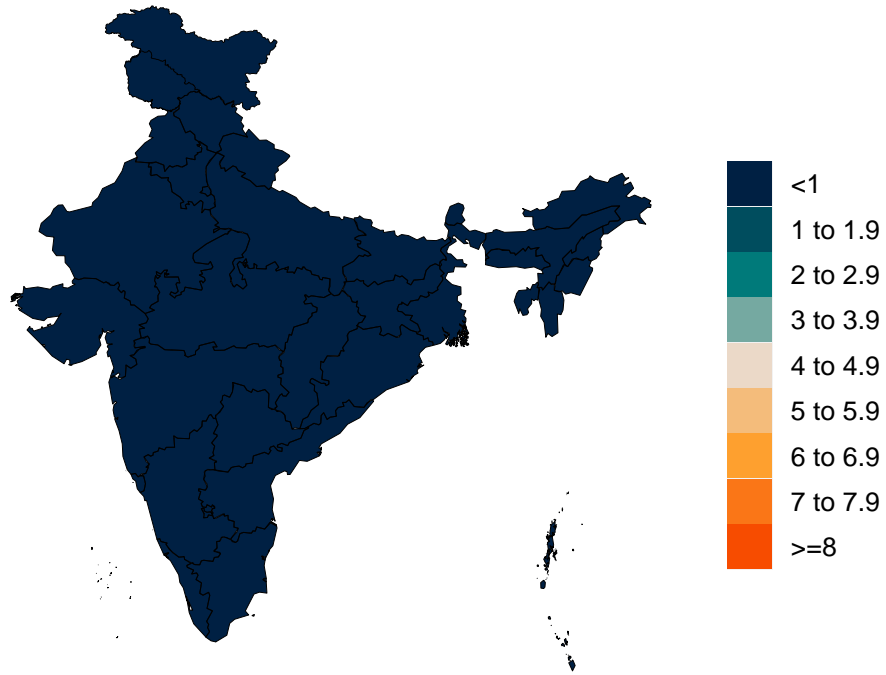
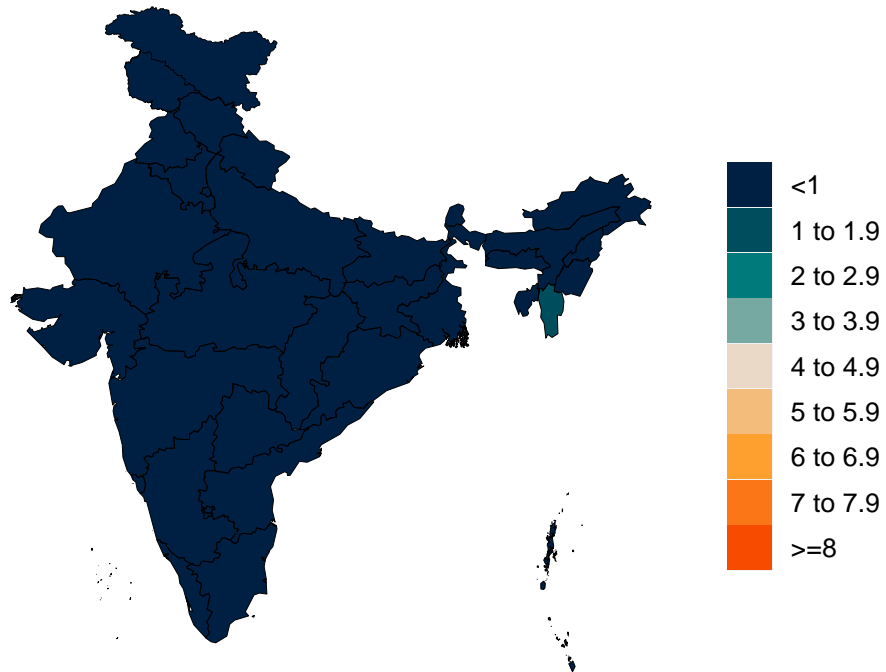


Figure 4.2: Daily total COVID-19 death rate per 1 million





Cumulative COVID-19 deaths per 100,000 on May 2, 2022

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

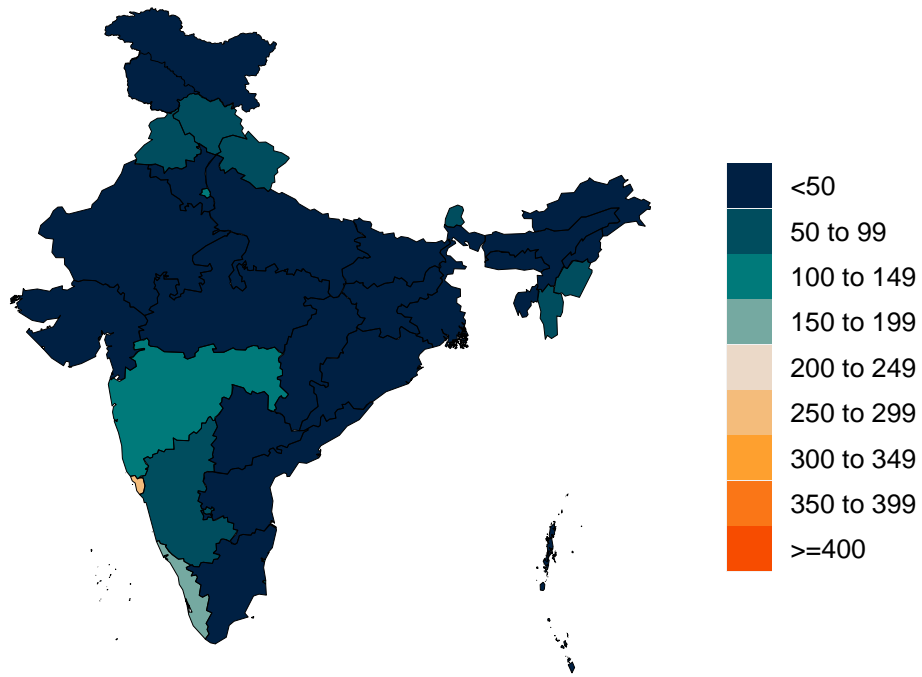
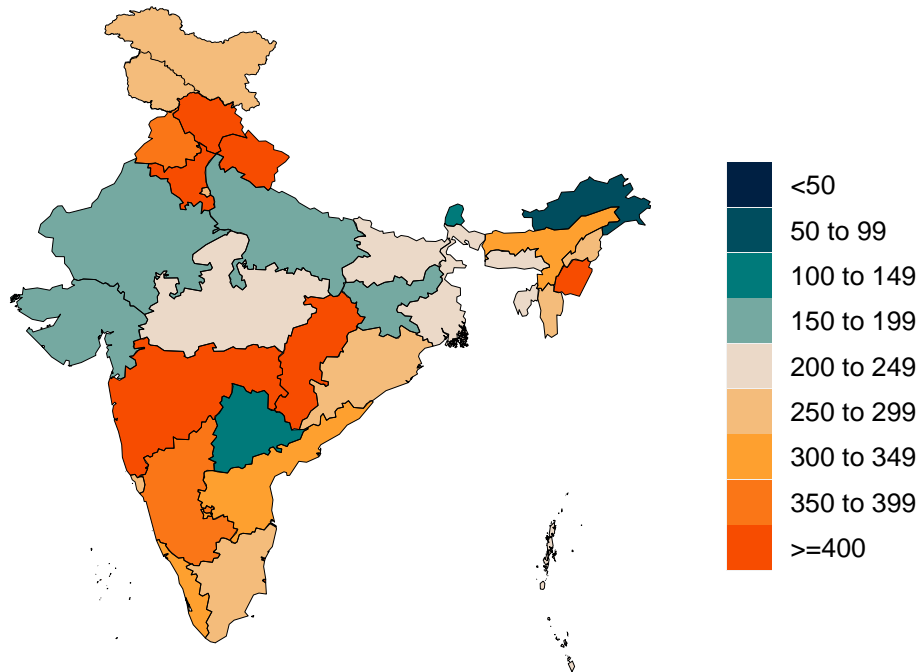
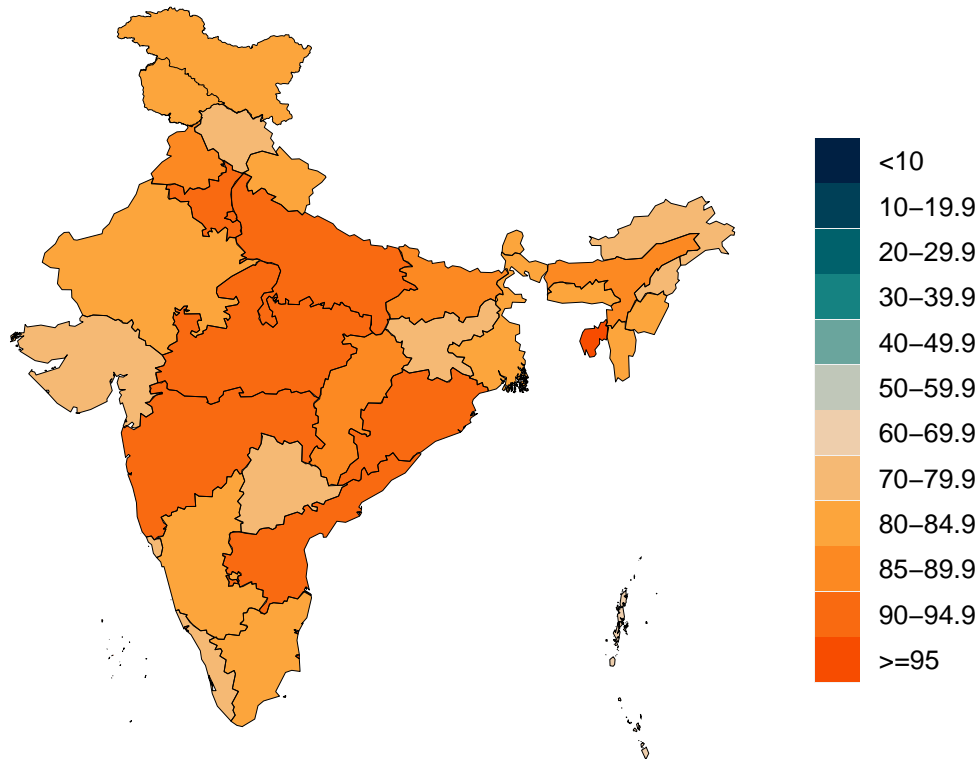


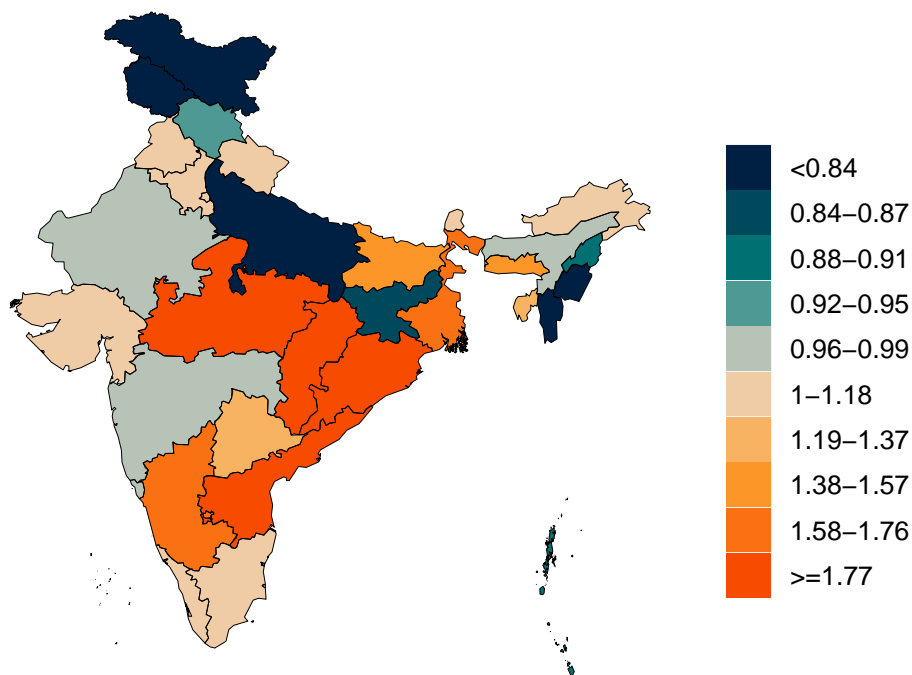
Figure 5.2: Total cumulative COVID-19 deaths per 100,000



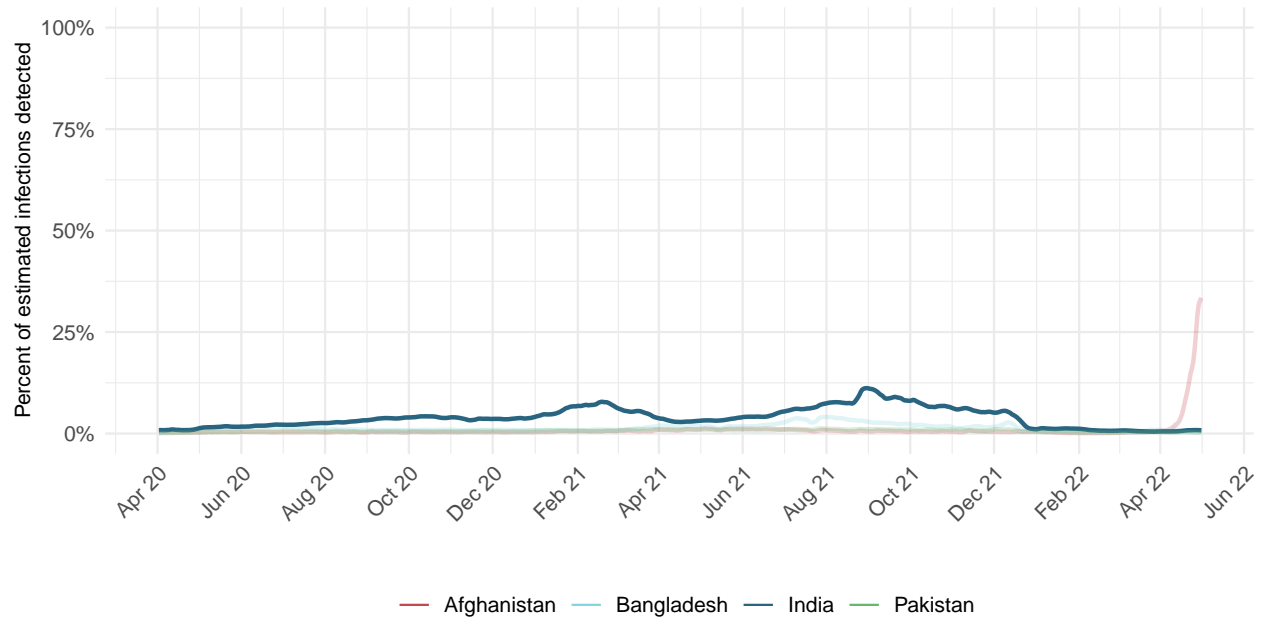
**Figure 6.1: Estimated percent of the population infected with COVID-19 on May 2, 2022**



**Figure 7.1: Mean effective R on April 21, 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.

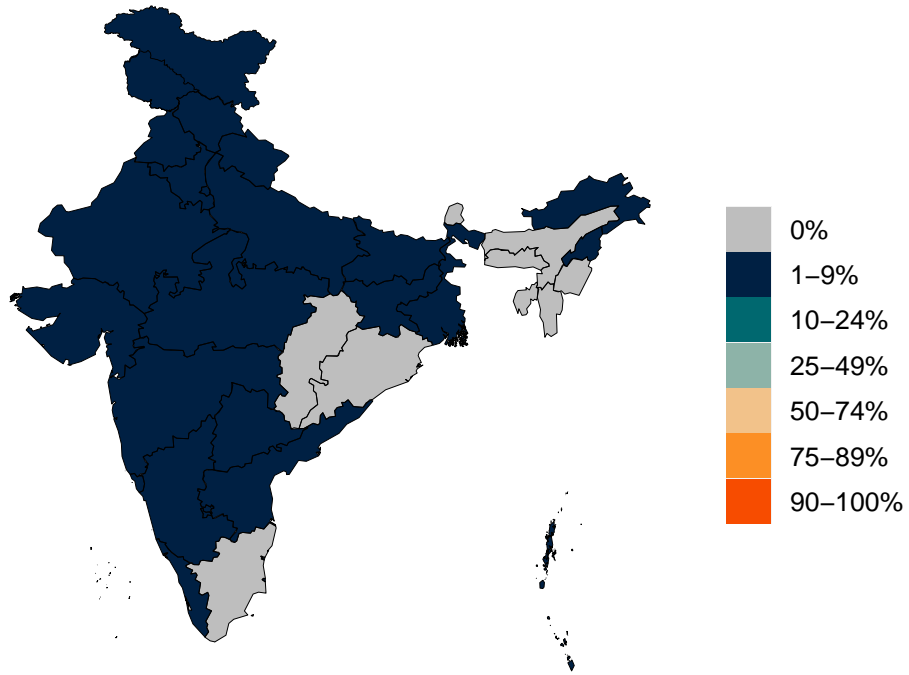


**Figure 8.1: Percent of estimated COVID-19 infections detected.** This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model. Due to measurement errors in cases and testing rates, the infection-detection rate can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



Estimated percent of circulating SARS-CoV-2 for primary variant families on May 2, 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**

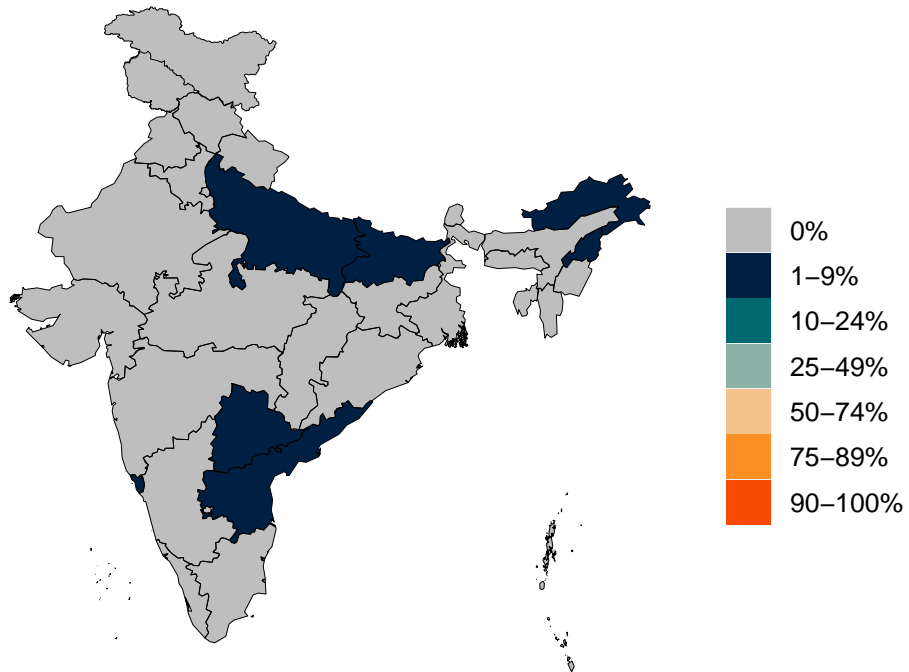


Figure 9.3: Estimated percent of new infections that are Delta variant

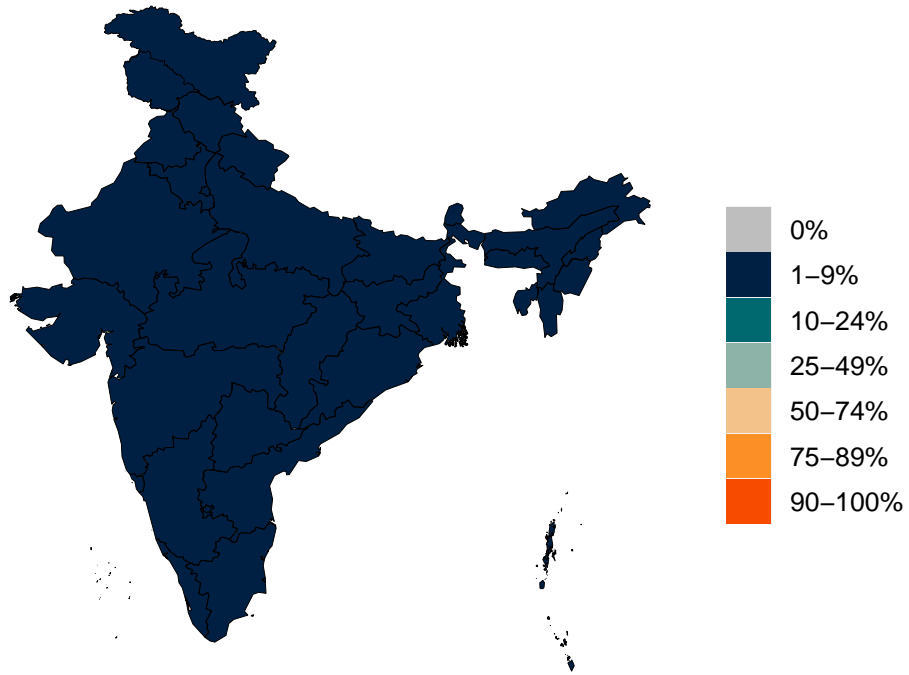


Figure 9.4: Estimated percent of new infections that are Gamma variant

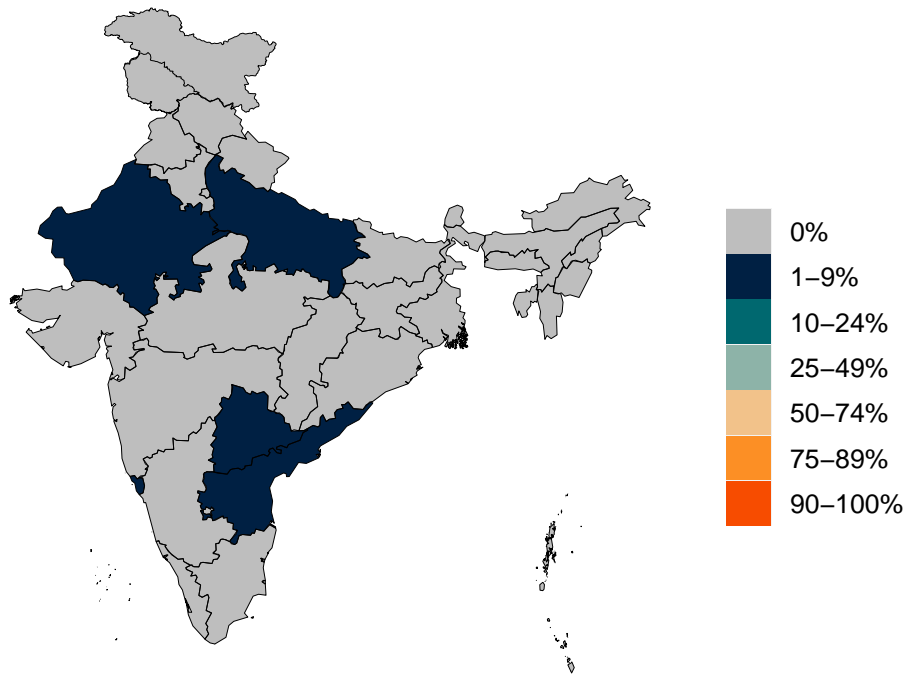
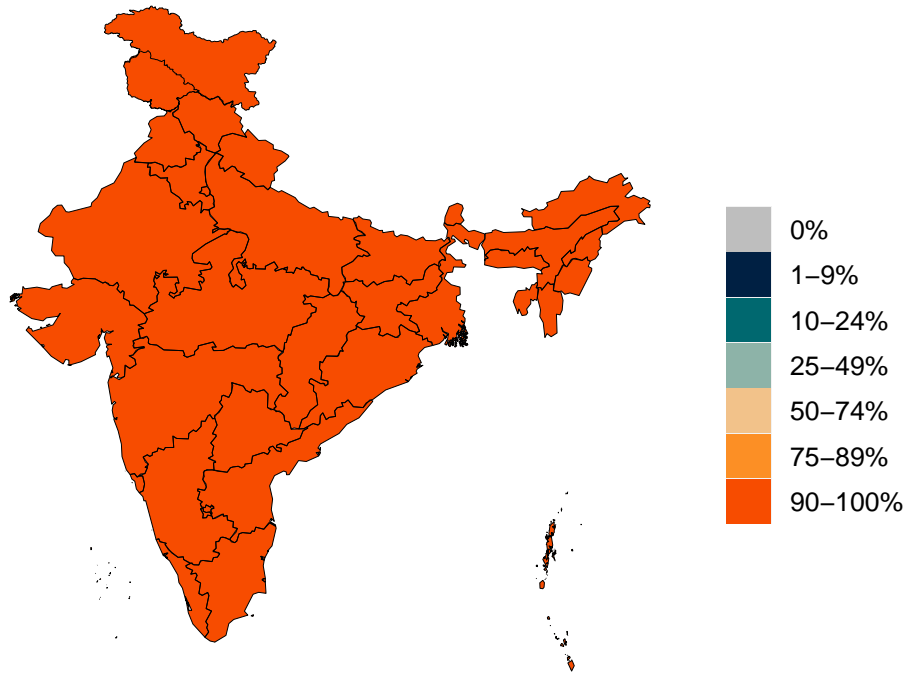
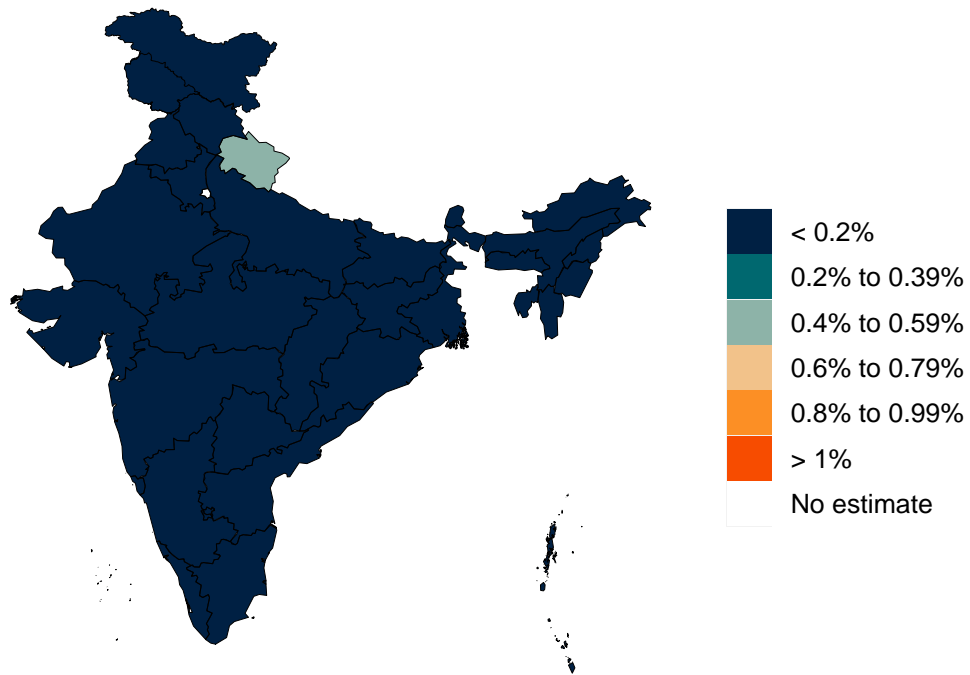


Figure 9.5: Estimated percent of new infections that are Omicron variant



**Figure 10.1: Infection-fatality rate on May 2, 2022.** This is estimated as the ratio of COVID-19 deaths to estimated daily COVID-19 infections.



Critical drivers

Table 2: Current mandate implementation

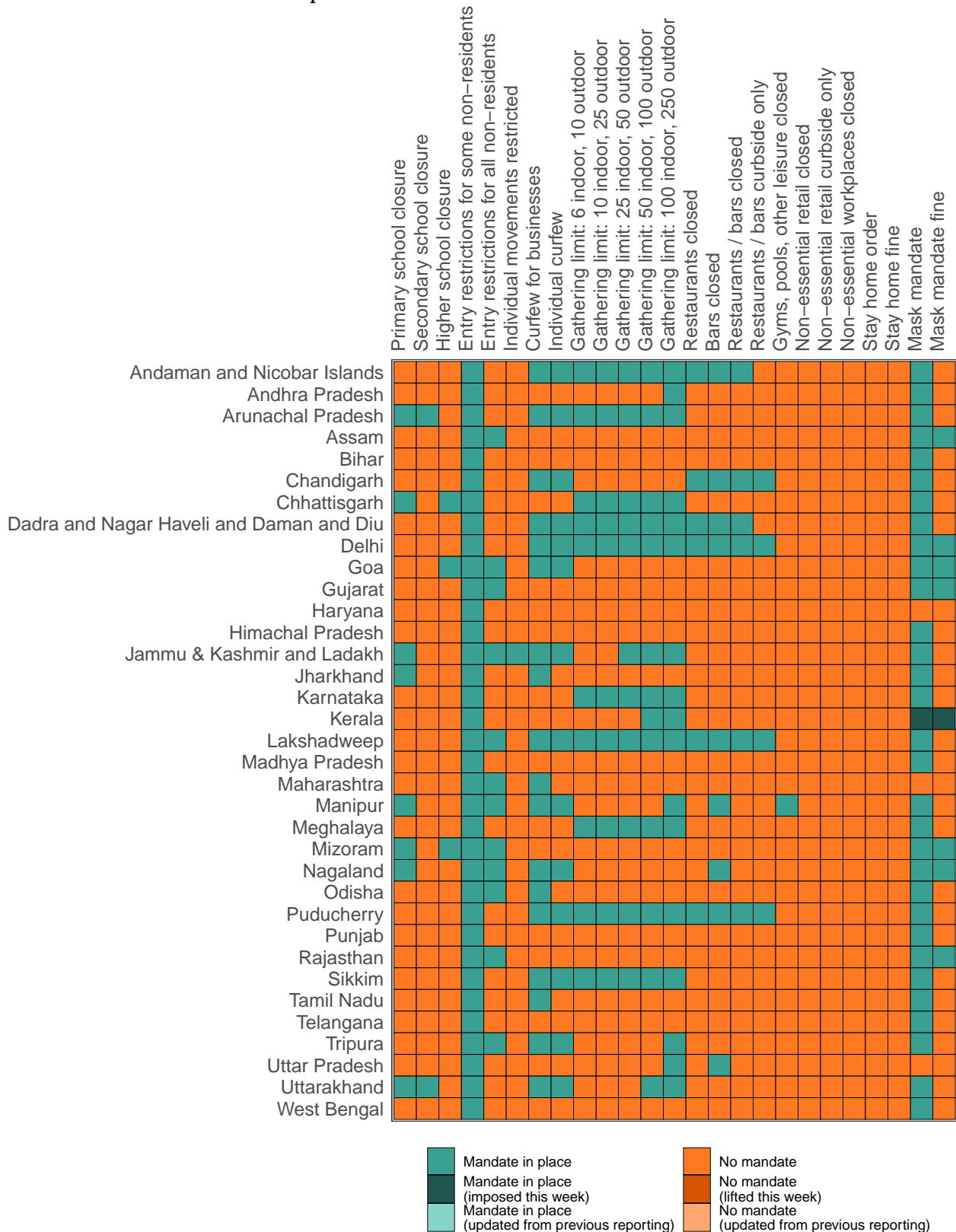




Figure 11.1: Trend in mobility as measured through smartphone app use, compared to January 2020 baseline

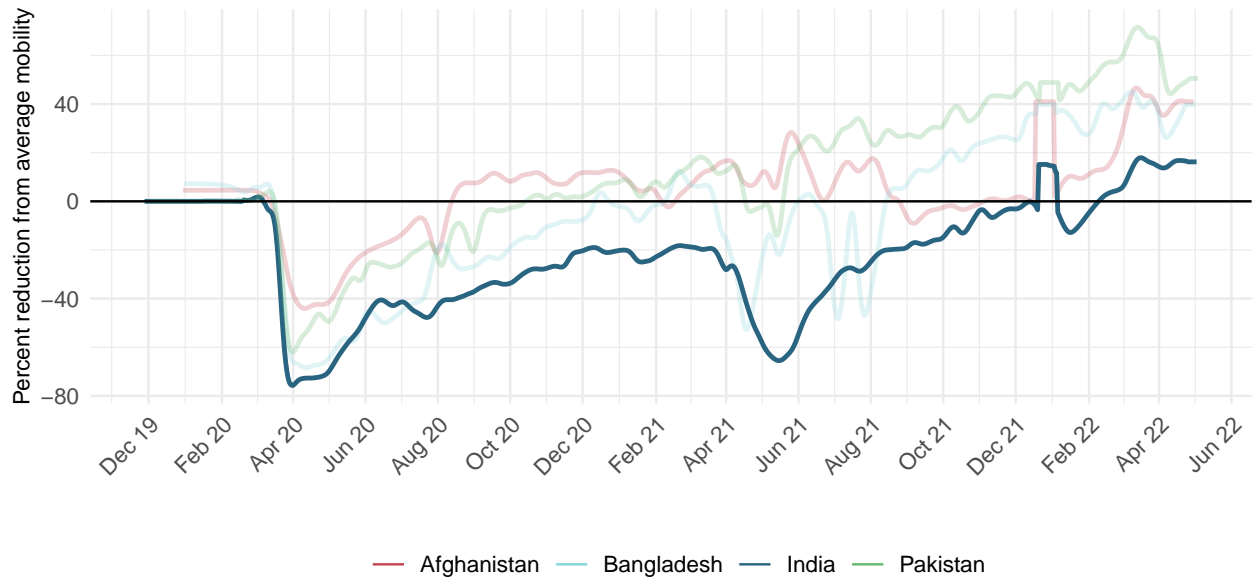


Figure 12.1: Mobility level as measured through smartphone app use, compared to January 2020 baseline (percent) on May 2, 2022

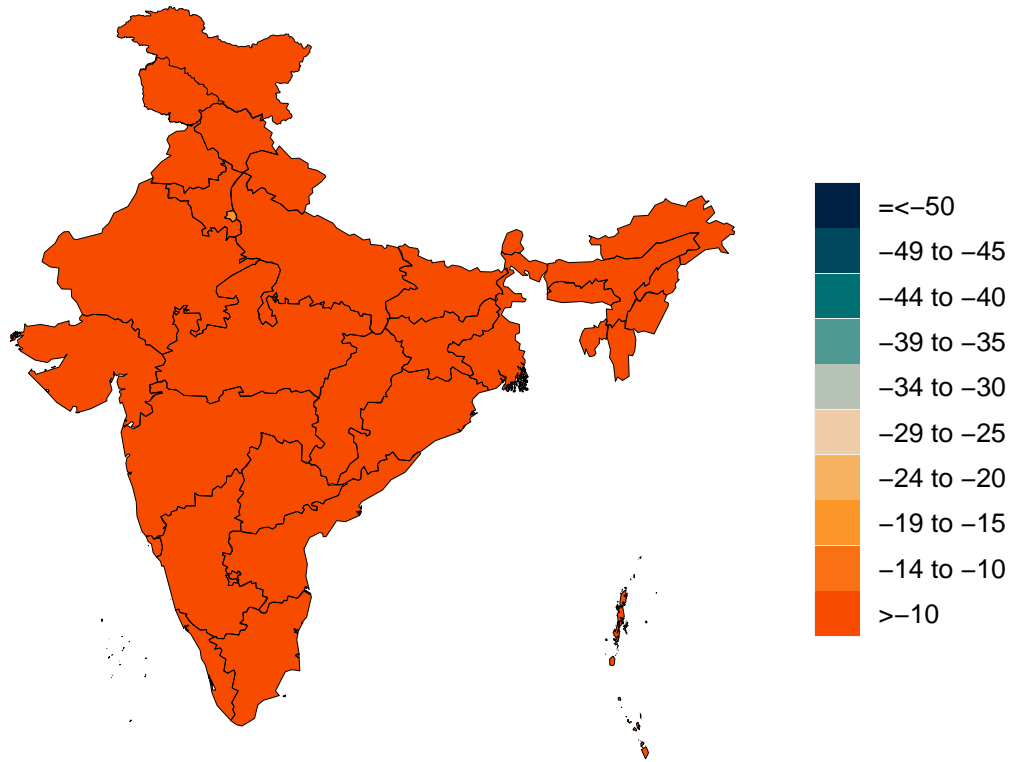


Figure 13.1: Trend in the proportion of the population reporting always wearing a mask when leaving home

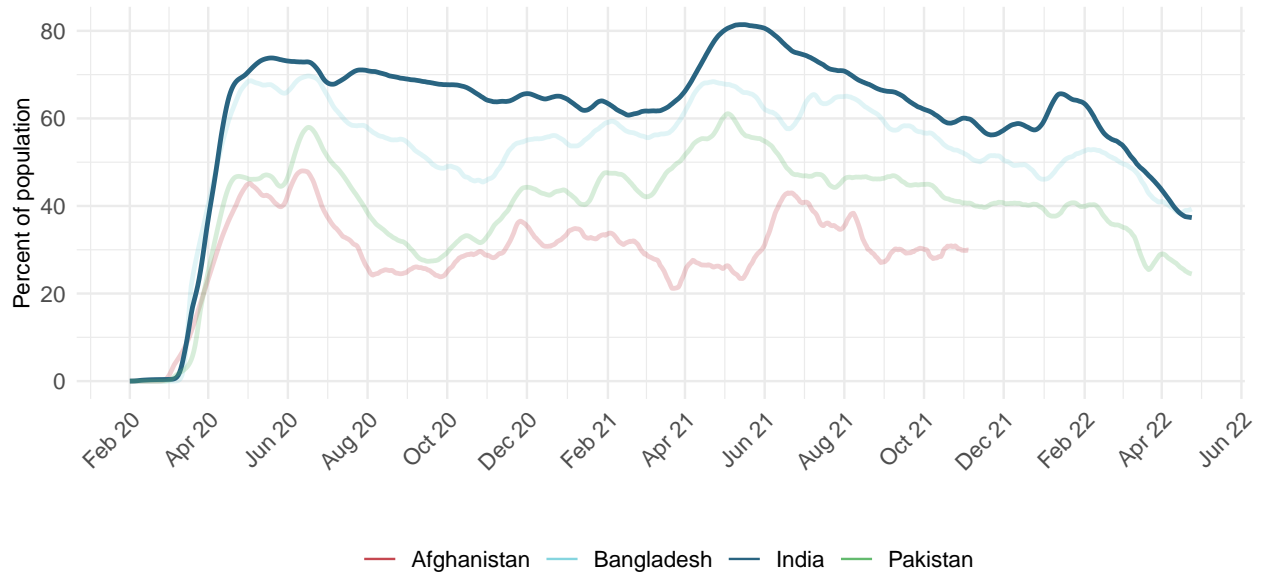


Figure 14.1: Proportion of the population reporting always wearing a mask when leaving home on May 2, 2022

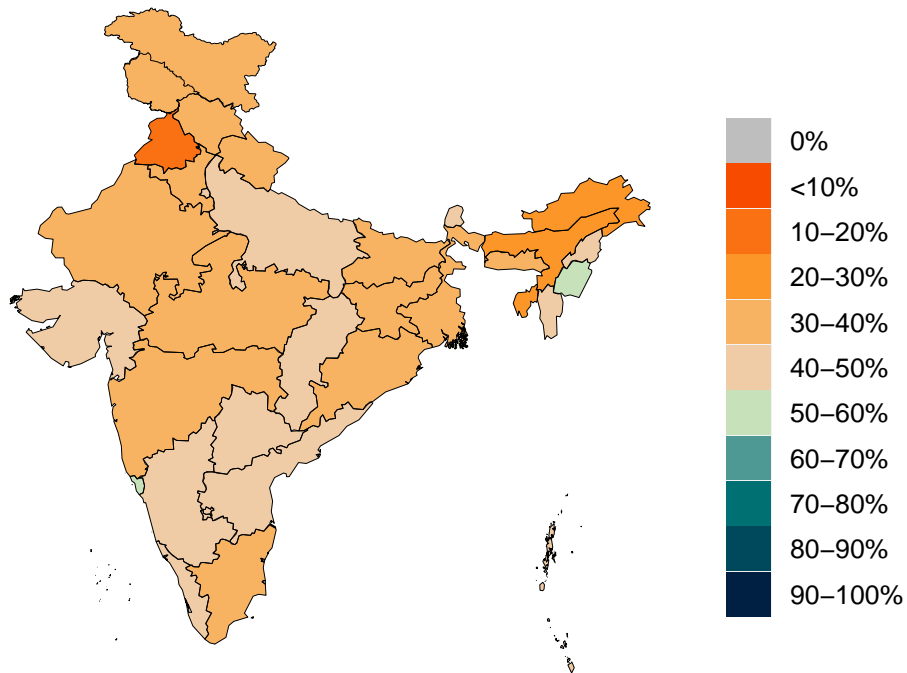


Figure 15.1: Trend in COVID-19 diagnostic tests per 100,000 people

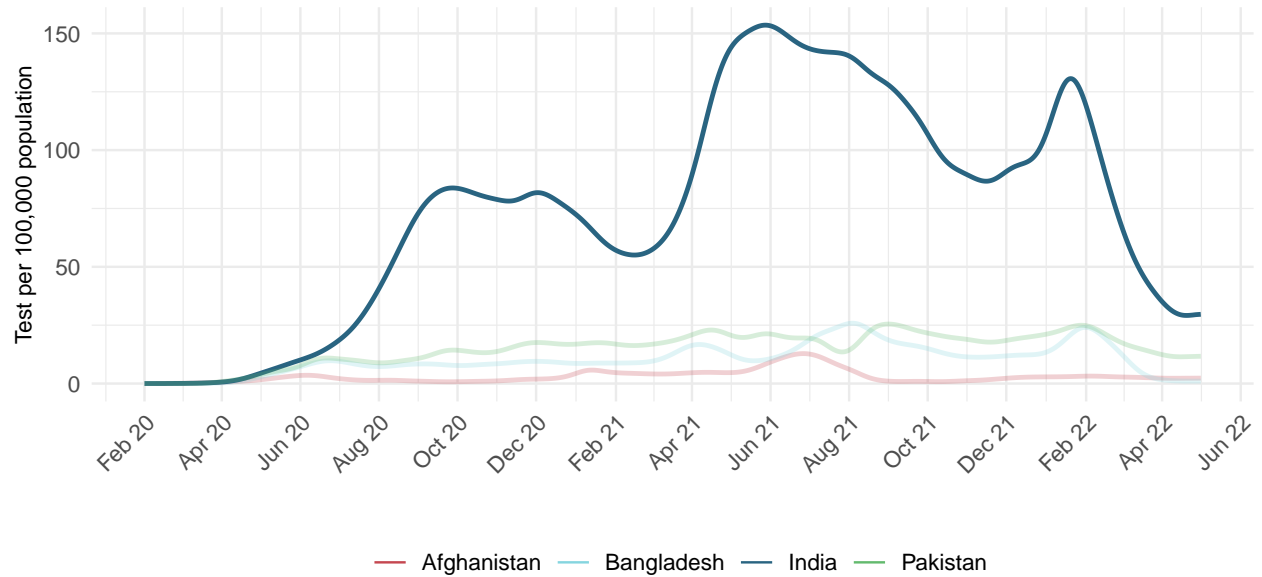
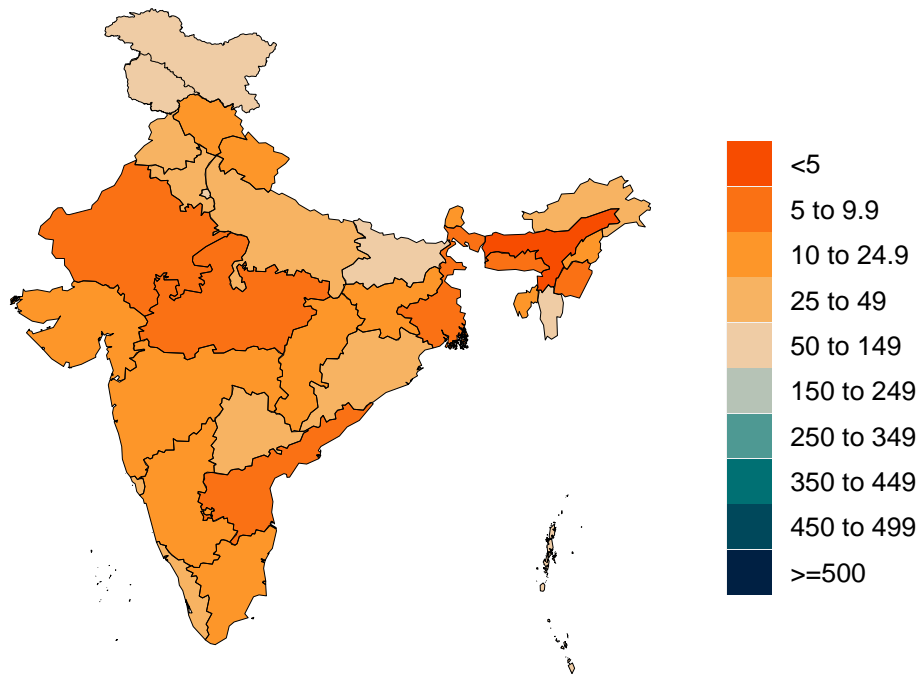


Figure 16.1: COVID-19 diagnostic tests per 100,000 people on May 2, 2022

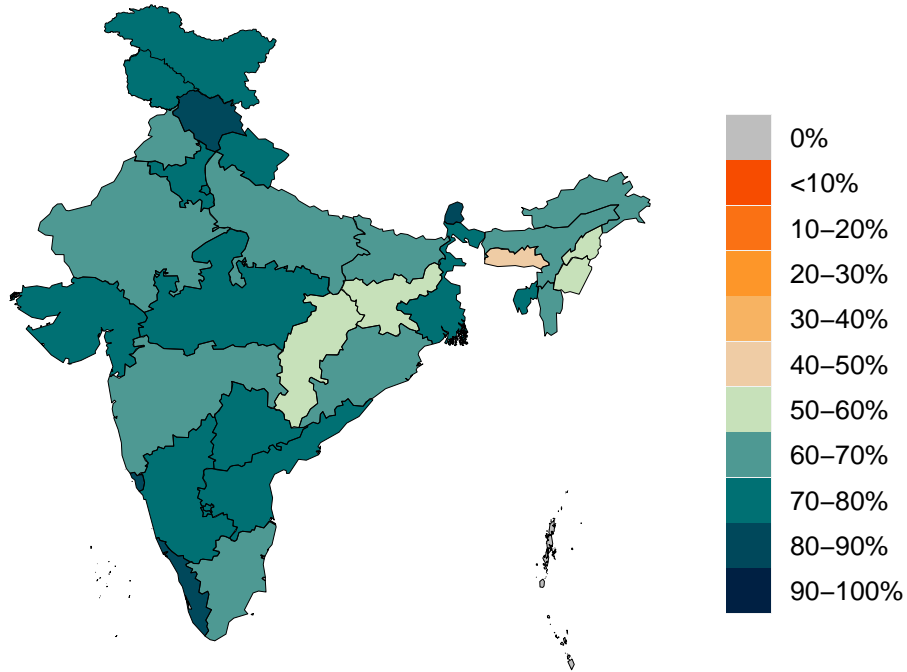


**Table 3: Estimates of vaccine effectiveness for specific vaccines used in the model at preventing severe disease and infection.** We use data from clinical trials directly, where available, and make estimates otherwise. More information can be found on our [website](#).

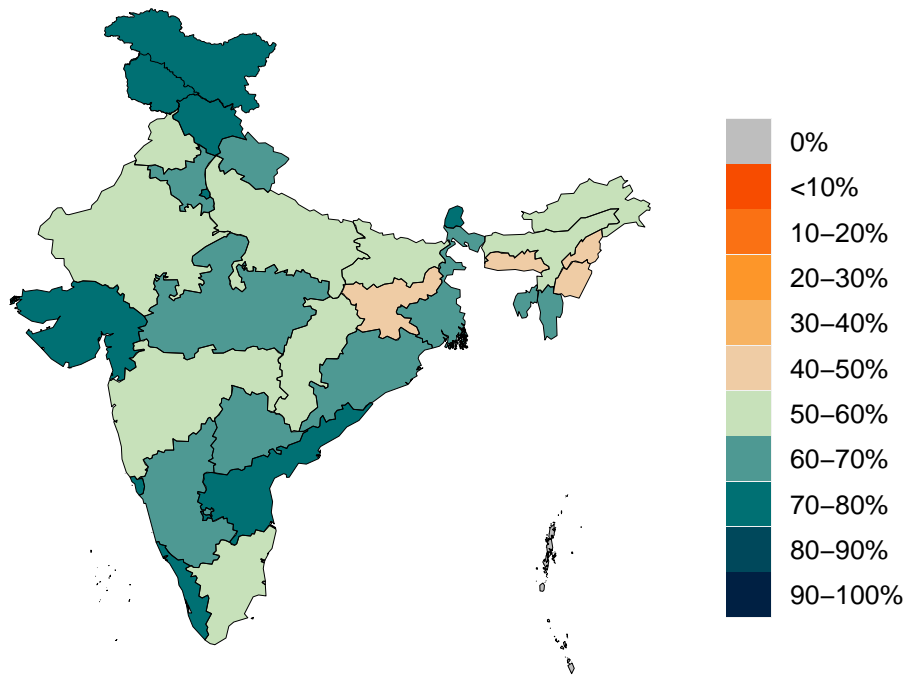
Vaccine	Effectiveness at preventing											
	Ancestral		Alpha		Beta		Gamma		Delta		Omicron	
	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection
AstraZeneca	94%	63%	94%	63%	94%	69%	94%	69%	94%	69%	71%	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 May 2, 2022

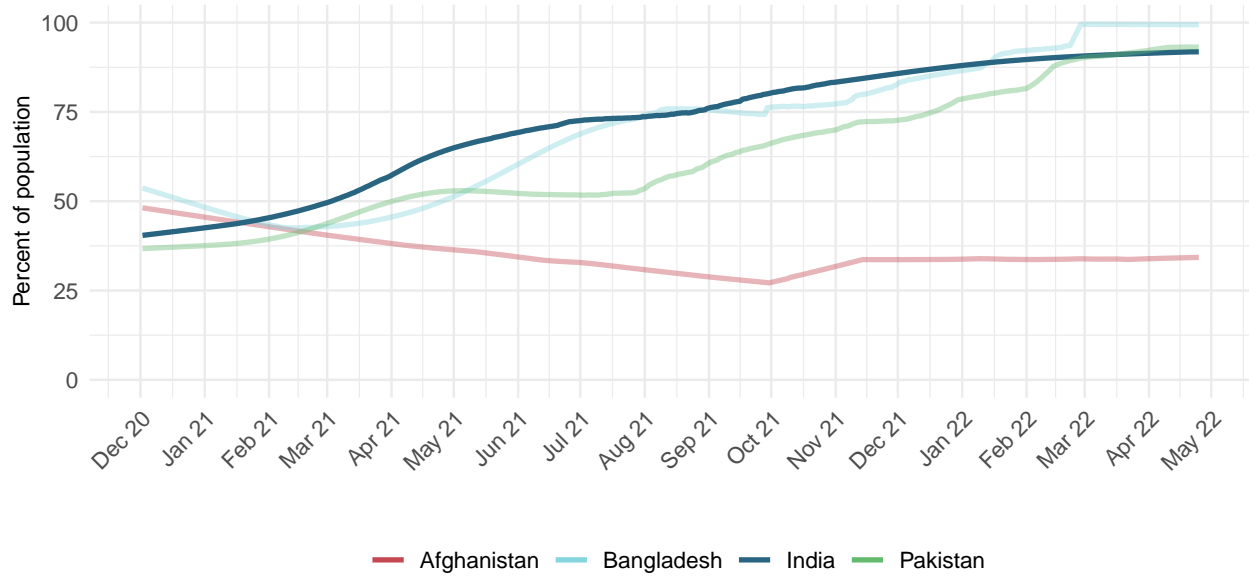
**Figure 17.1: Percent of the population having received one dose of a COVID-19 vaccine**



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



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



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

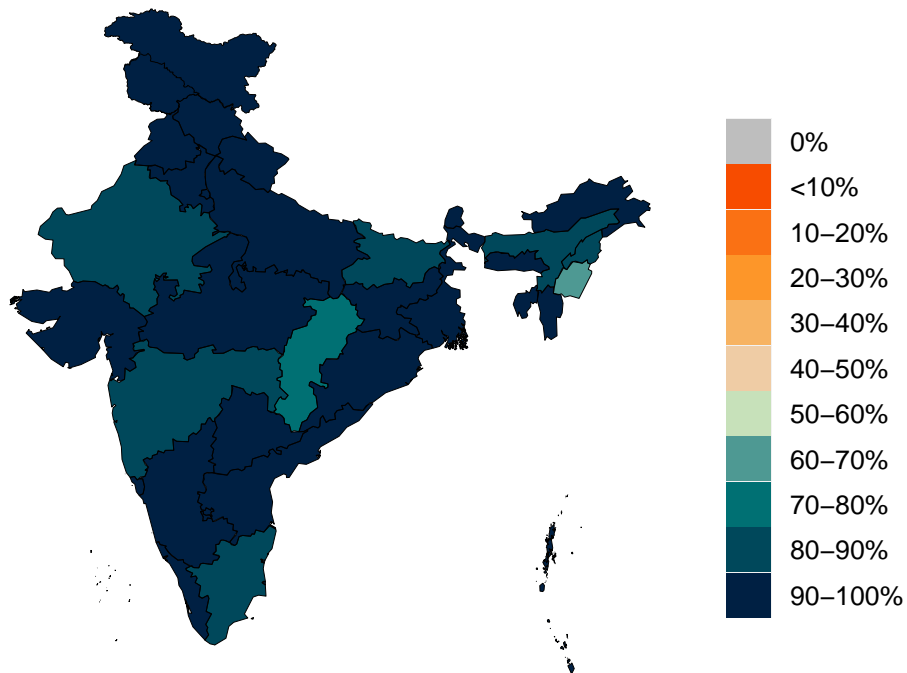
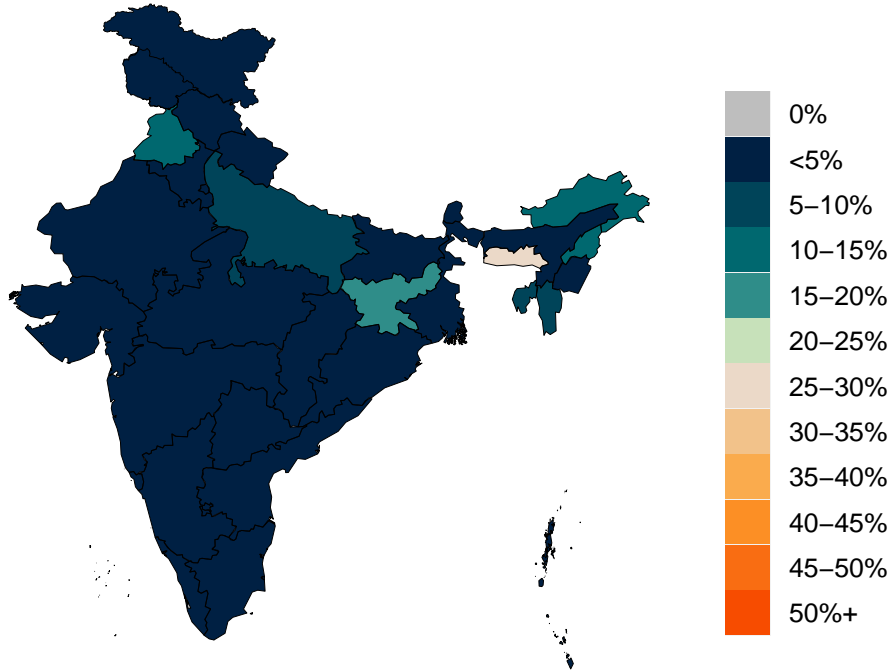
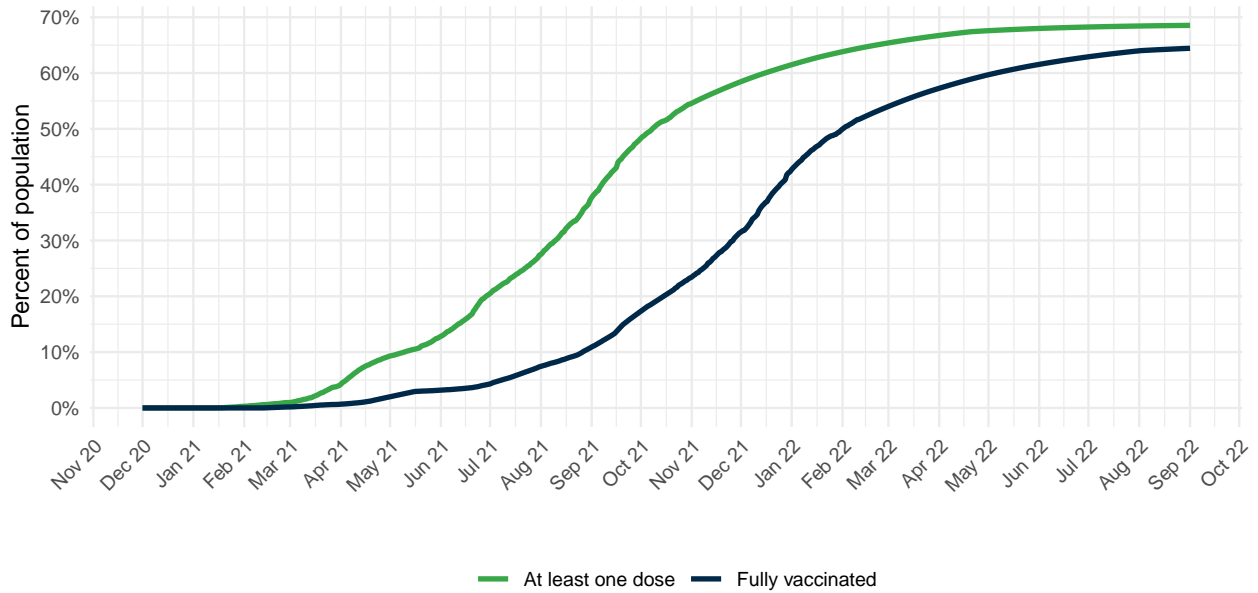


Figure 20.1: Estimated proportion of the total population that is not vaccinated but willing to be vaccinated as of April 25, 2022

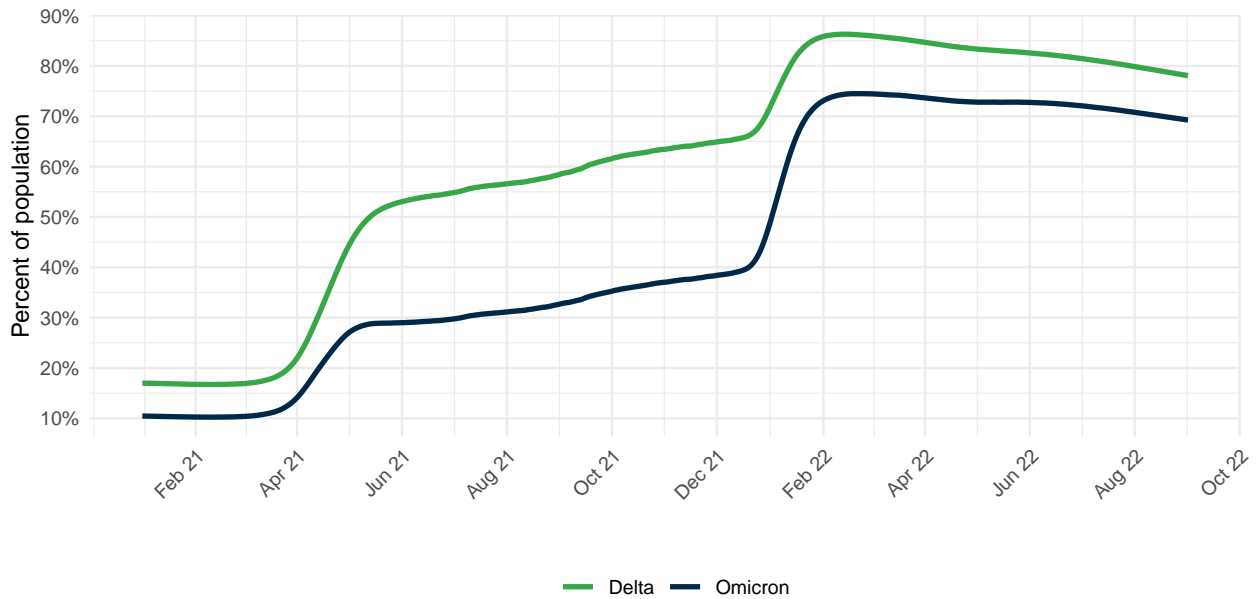




**Figure 21.1: Percent of people who receive at least one dose of a COVID-19 vaccine and those who are fully vaccinated**

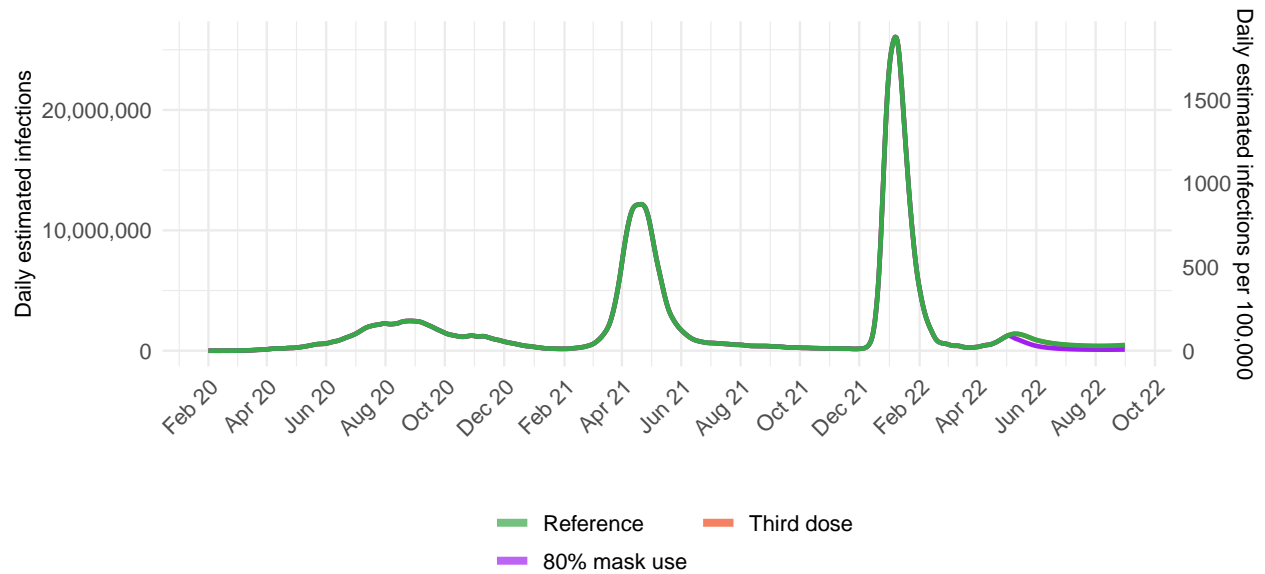


**Figure 22.1: Percent of people who are immune to Delta or Omicron.** Immunity is based on protection due to prior vaccination and infection(s). Moreover, variant-specific immunity is also based on variant-variant specific protection.



## Projections and scenarios

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



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

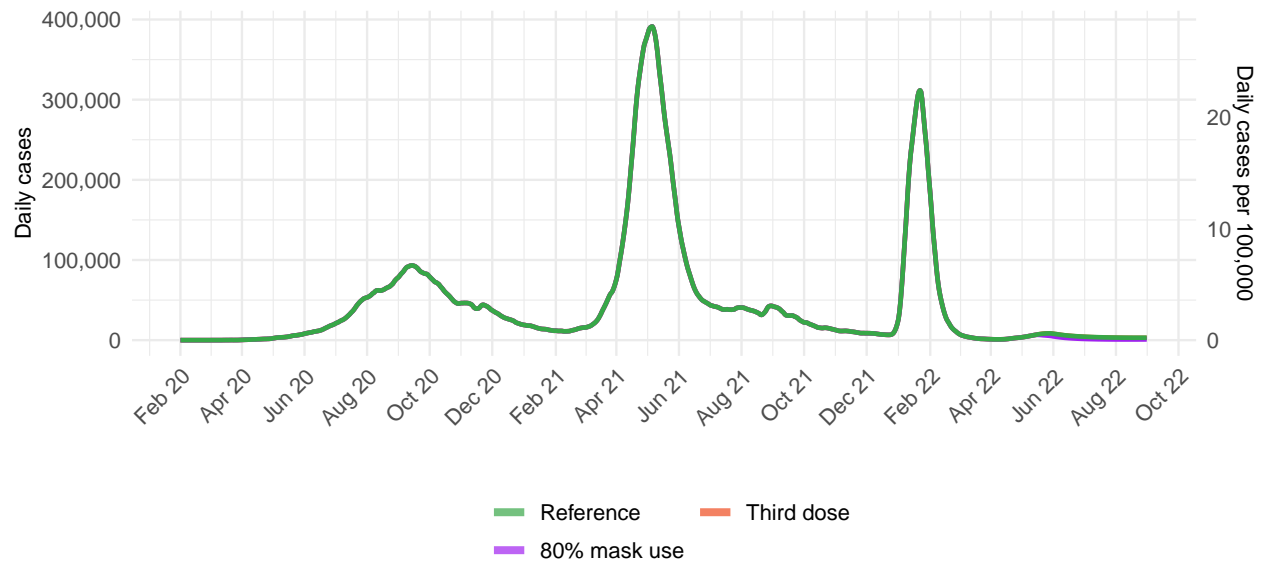


Figure 23.3: Daily COVID-19 hospital census until September 01, 2022 for three scenarios

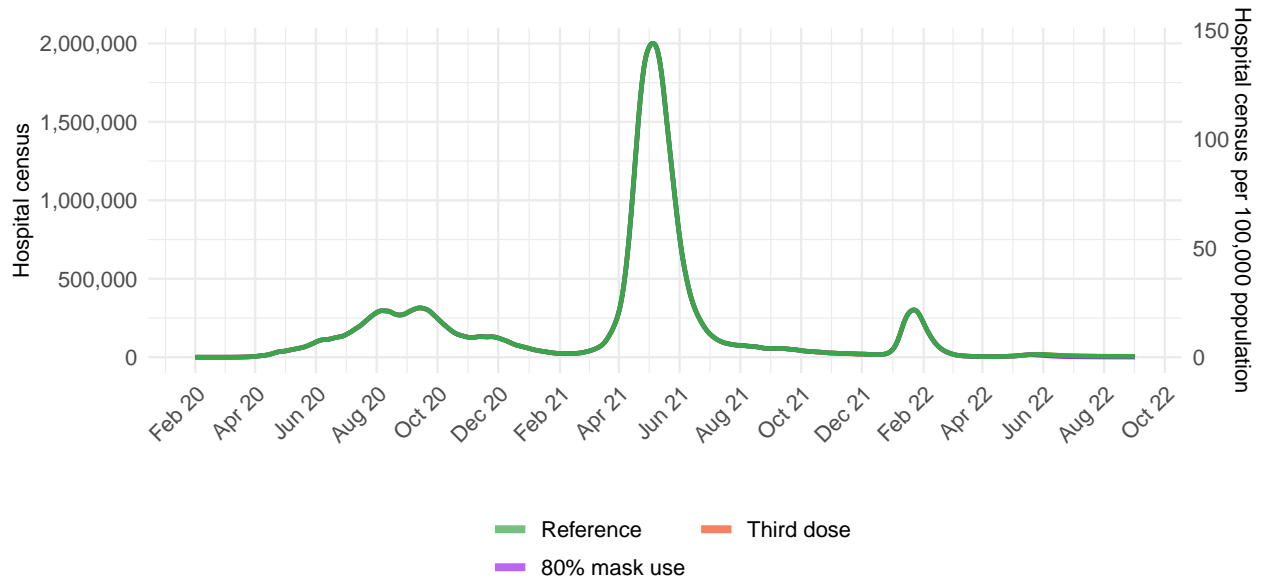


Figure 23.4: Reported daily COVID-19 deaths per 100,000

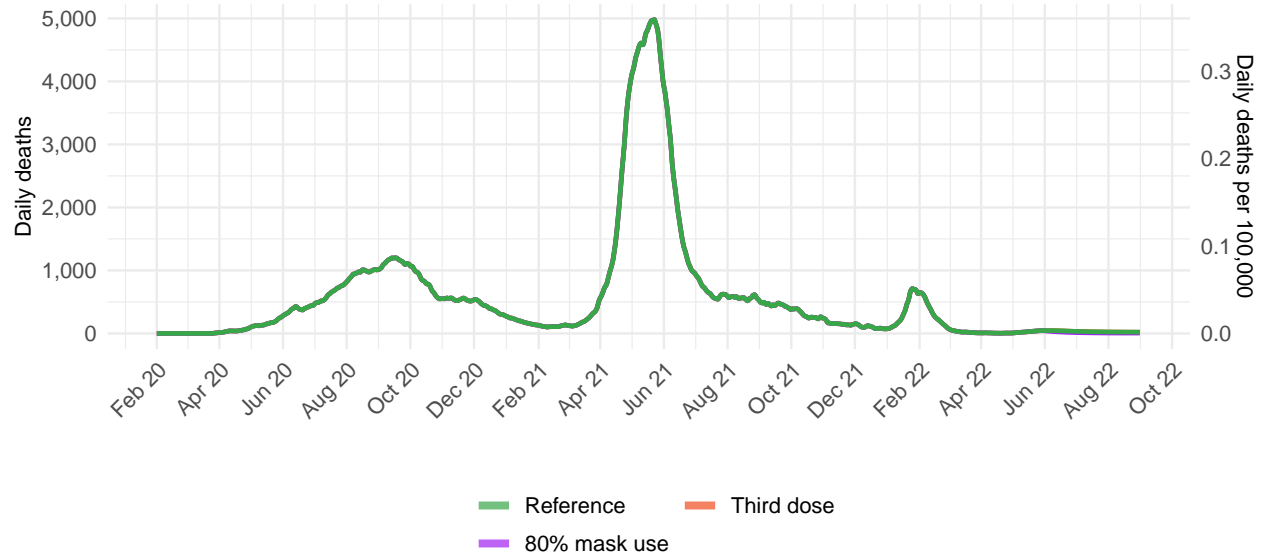
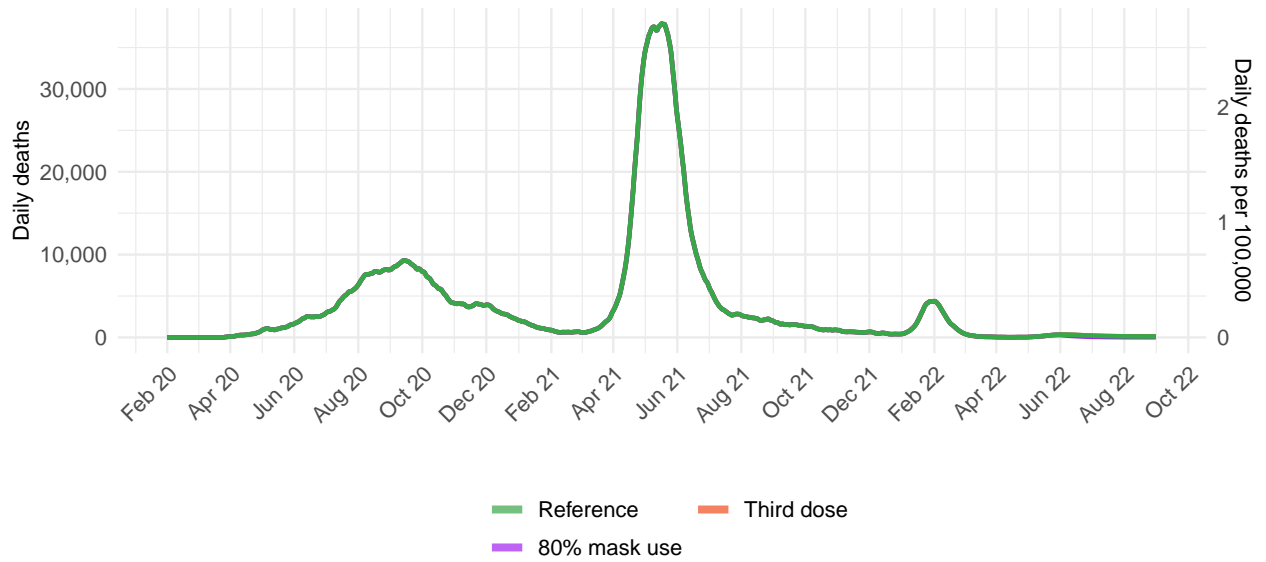
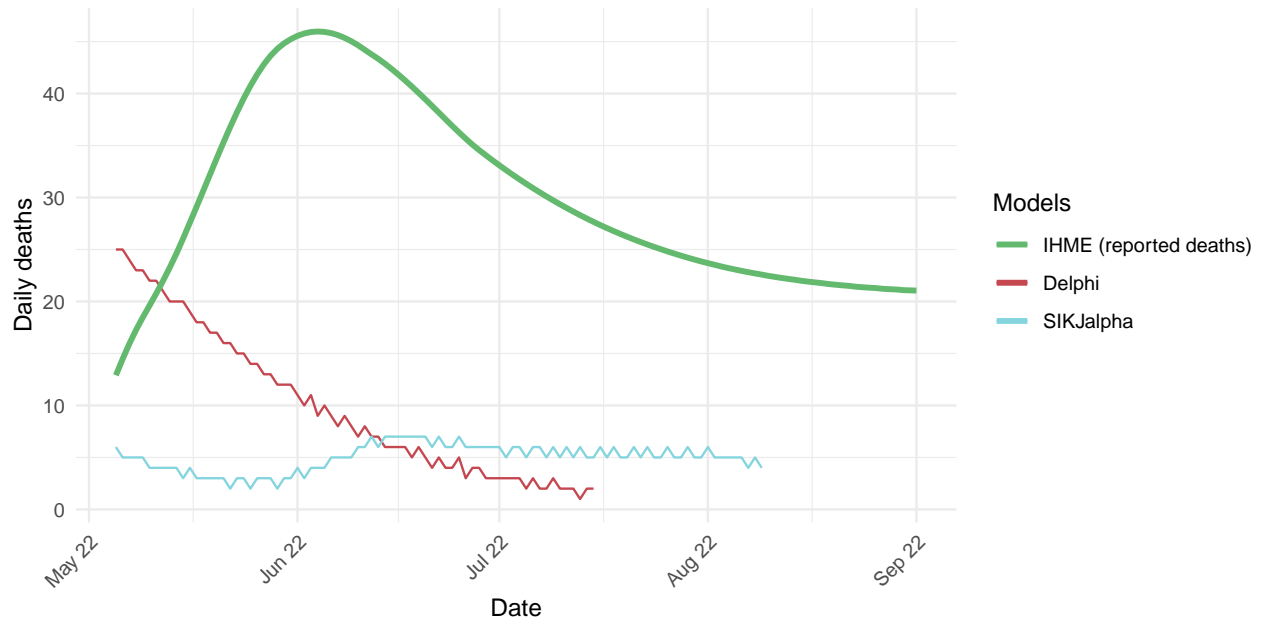


Figure 23.5: Total daily COVID-19 deaths per 100,000



**Figure 24.1: Comparison of reference model projections with other COVID modeling groups.** For this comparison, we are including projections of daily COVID-19 deaths from other modeling groups when available, last model update in brackets: Delphi from the Massachusetts Institute of Technology ([Delphi](#)) [May 2, 2022], and the SI-KJalpha model from the University of Southern California ([SIKJalpha](#)) [May 2, 2022]. 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>.