

COVID-19 Results Briefing

India

February 20, 2021

This document contains summary information on the latest projections from the IHME model on COVID-19 in India. The model was run on February 20, 2021 with data through February 16, 2021.

There has been a continuous decline in the number of daily COVID-19 cases and deaths in India since September 2020. There was a 4% decrease in the daily COVID-19 cases and a 5% decrease in the daily deaths compared to last week in India. However, the increase in social mobility in recent weeks continues to pose a risk if effective face mask use is not enhanced, and the social distancing and hygiene precautions are not adequately exercised. IHME's reference scenario forecasts 322,000 COVID-19 deaths in India by June 1, 2021.

Current situation

- Daily reported cases in the last week decreased to 11,000 per day on average compared to 11,400 the week before (Figure 1).
- The estimated daily deaths from COVID-19 in the last week decreased to 180 per day on average compared to 190 the week before (Figure 2). This makes COVID-19 the number 25 cause of death in India this week (Table 1).
- Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 3 states (Figure 5).
- We estimated that 12% of people in India have been infected as of February 16 (Figure 4).
- No locations had daily death rates greater than 4 per million (Figure 3).

Trends in drivers of transmission

- Mobility last week was 21% lower than the pre-COVID-19 baseline (Figure 7). Mobility was near baseline (within 10%) in Sikkim. Mobility was lower than 30% of baseline in no locations (Figure 8).
- As of February 16, we estimated that 63% of people always wore a mask when leaving their home (Figure 9) on an online Facebook survey. Mask use was lower than 50% in Assam (Figure 10).
- There were 57 diagnostic tests per 100,000 people on February 16 (Figure 11).
- In India 72% of people say they would accept or would probably accept a vaccine for COVID-19. The fraction of the population who are open to receiving a COVID-19 vaccine ranges from 50% in Nagaland to 82% in Kerala (Figure 14).

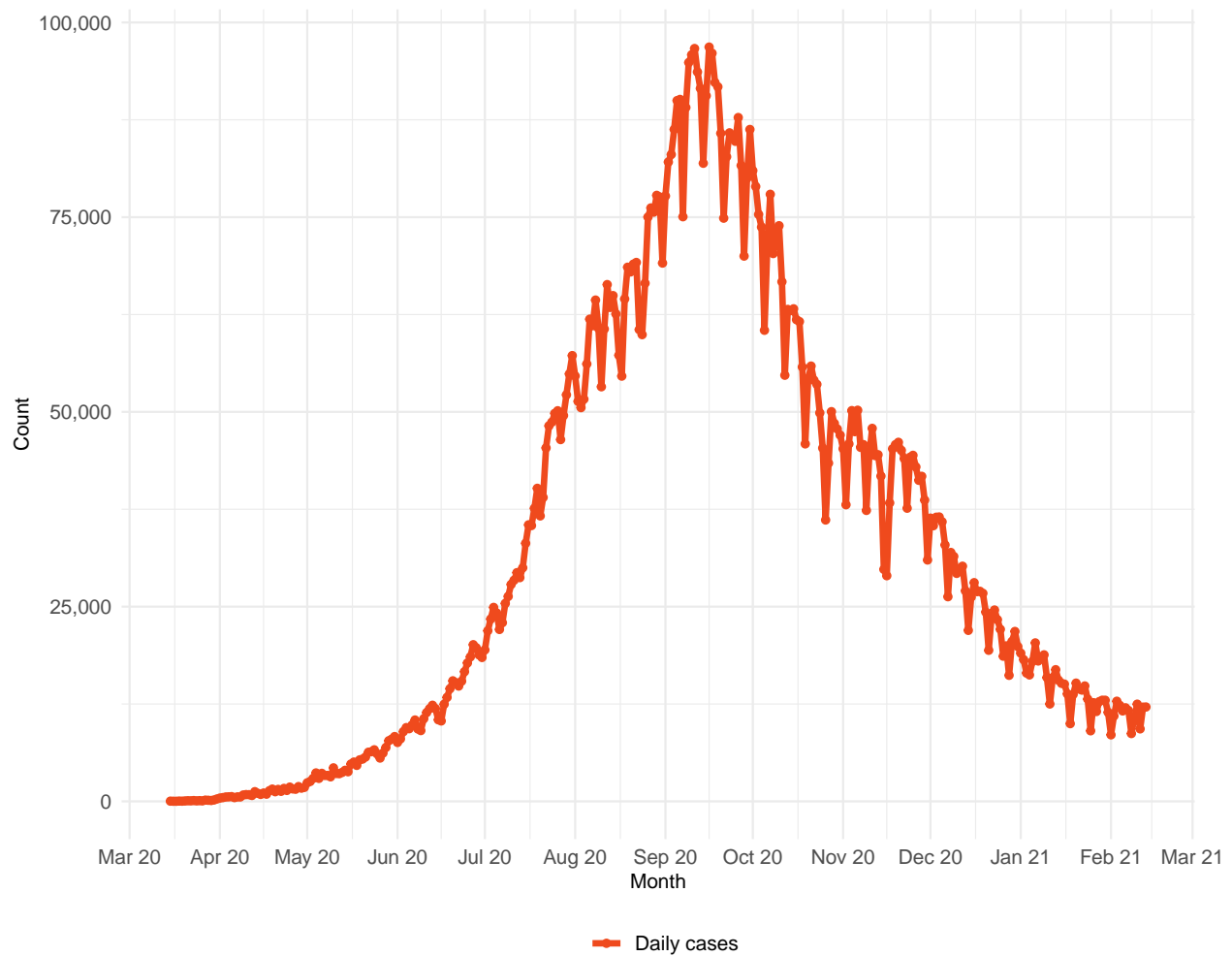
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- In our current reference scenario, we expect that 194 million will be vaccinated by June 1st (Figure 15).

Projections

- In our **reference scenario**, which represents what we think is most likely to happen, our model projects 322,000 cumulative deaths on June 1, 2021. This represents 15,000 additional deaths from February 16 to June 1st (Figure 16). This estimate is based in part on sero-prevalence surveys.
- By June 1, 2021, we project that 900 lives will be saved by the projected vaccine rollout.
- If **universal mask coverage (95%)** were attained in the next week, our model projects 3,000 fewer cumulative deaths compared to the reference scenario on June 1, 2021 (Figure 16).
- Under our **worse scenario**, our model projects 326,000 cumulative deaths on June 1, 2021 (Figure 16).
- Figure 19 compares our reference scenario forecasts to other publicly archived models. Forecasts are widely divergent.

Model updates

We have updated our model that predicts the spread of the new variants, which is used in the reference scenario in two ways. First, the speed of scale-up of the new variants is now based on data from more than 15 locations, whereas previously we only had data from London. Second, we now use observed data on the presence of new variants (B.1.1.7, B.1.351, or P1) in all locations with reported community transmission and more than five cases of those variants sequenced.

Figure 1. Reported daily COVID-19 cases

Table 1. Ranking of 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	1,275	25

Figure 2. Reported daily COVID-19 deaths

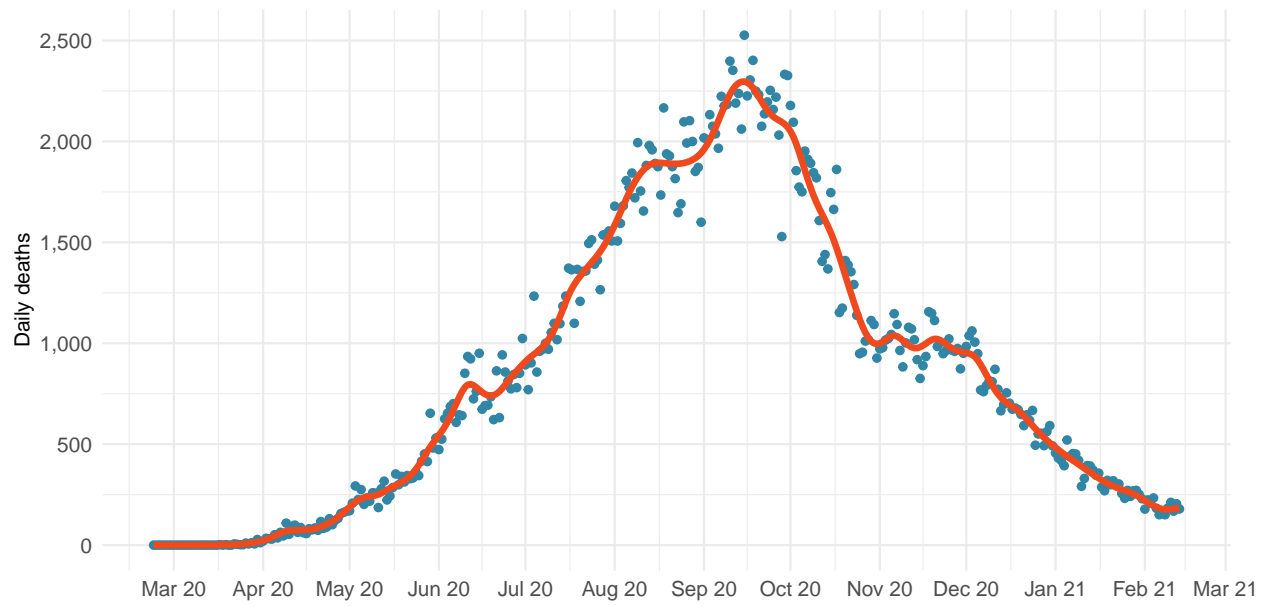


Figure 3. Daily COVID-19 death rate per 1 million on February 16, 2021

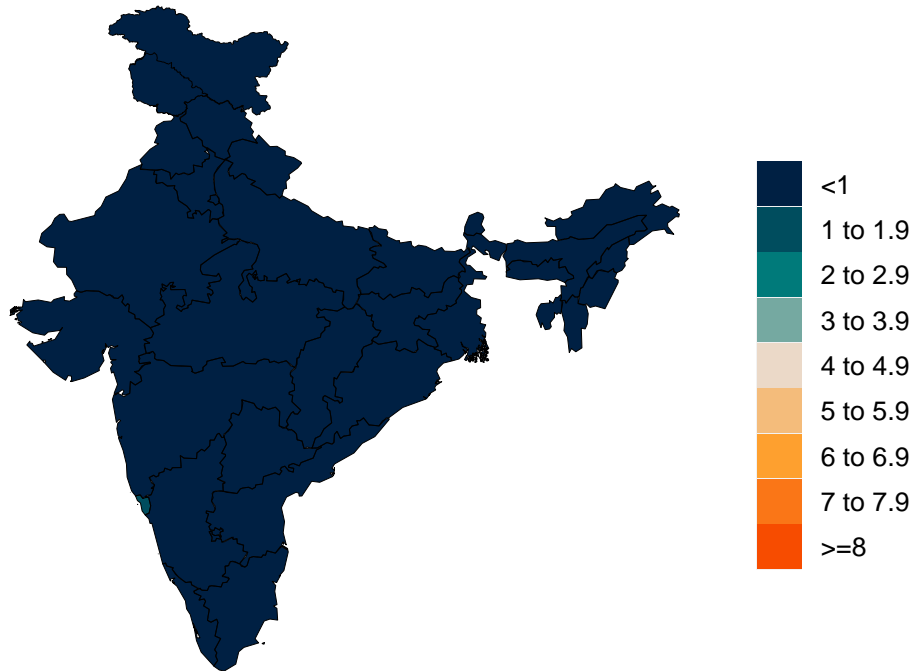


Figure 4. Estimated percent of the population infected with COVID-19 on February 16, 2021

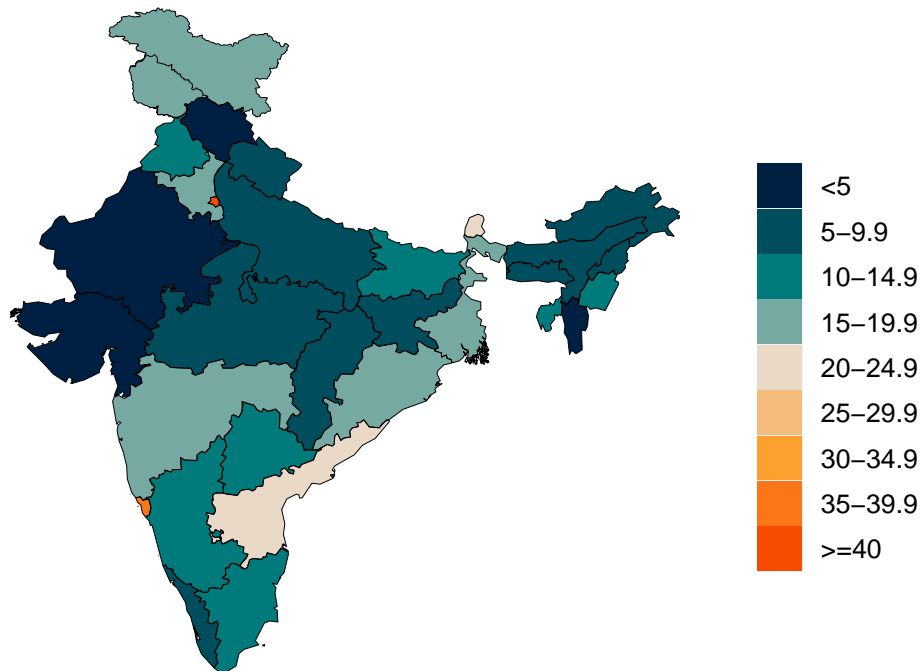


Figure 5. Mean effective R on February 05, 2021. The estimate of effective R is based on the combined analysis of deaths, case reporting, and hospitalizations where available. Current reported cases reflect infections 11-13 days prior, so estimates of effective R can only be made for the recent past. Effective R less than 1 means that transmission should decline, all other things being held the same.

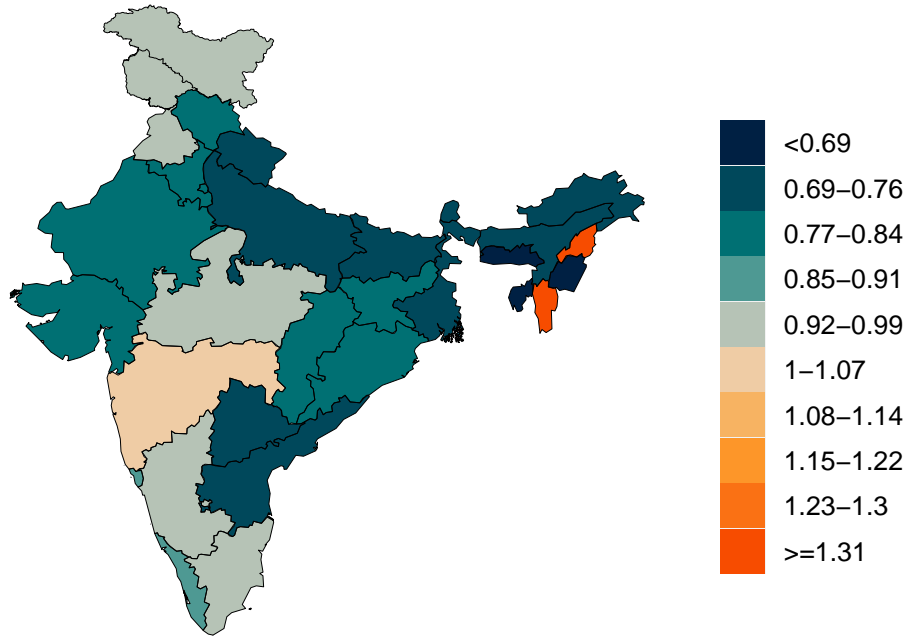
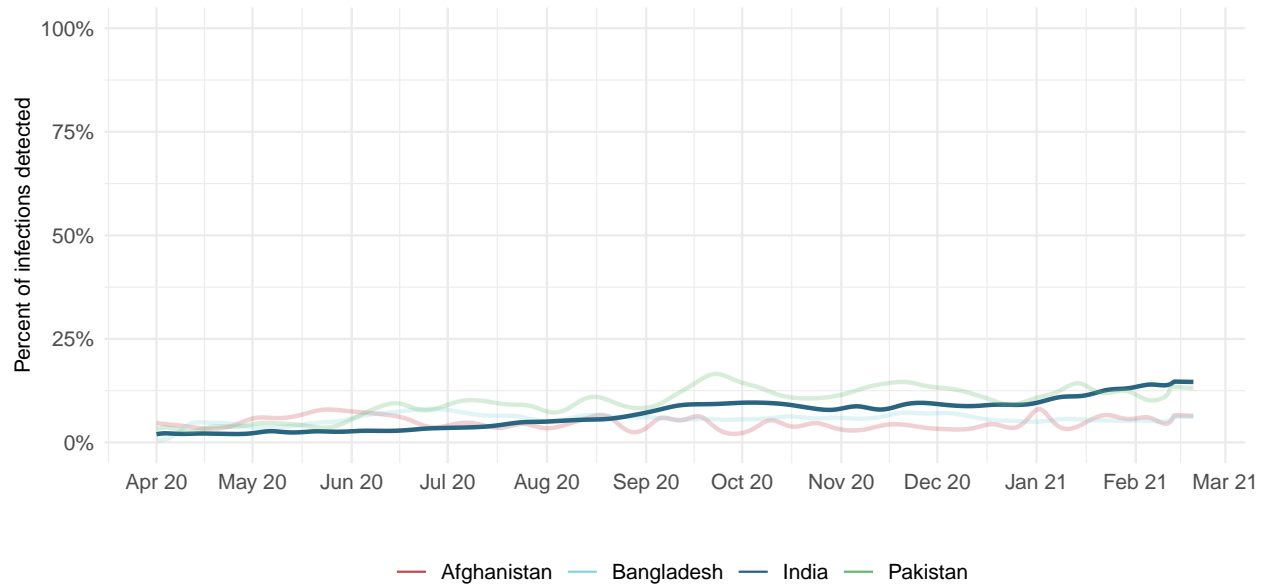


Figure 6. Percent of COVID-19 infections detected. This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model.



*Due to measurement errors in cases and testing rates, the infection to detection rate (IDR) can exceed 100% at particular points in time.

Critical drivers

Table 2. Current mandate implementation

	All nonessential businesses closed	Any businesses restricted	Any gatherings restricted	Mask use	School closure	Stay home order	Travel limits
Andhra Pradesh	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Arunachal Pradesh	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Assam	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Bihar	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Chhattisgarh	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Dadra and Nagar Haveli and Daman and Diu	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Delhi	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Goa	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Gujarat	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Haryana	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Himachal Pradesh	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Jammu & Kashmir and Ladakh	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Jharkhand	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Karnataka	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Kerala	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Madhya Pradesh	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Maharashtra	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Manipur	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Meghalaya	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Mizoram	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Nagaland	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Odisha	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Punjab	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Rajasthan	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Sikkim	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Tamil Nadu	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Telangana	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Tripura	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Uttar Pradesh	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
Uttarakhand	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate
West Bengal	No mandate	Mandate in place	Mandate in place	Mandate in place	Mandate in place	No mandate	No mandate

Mandate in place
 No mandate
 Mandate in place (imposed this week)
 No mandate (lifted this week)

*Not all locations are measured at the subnational level.

Figure 7. Trend in mobility as measured through smartphone app use compared to January 2020 baseline

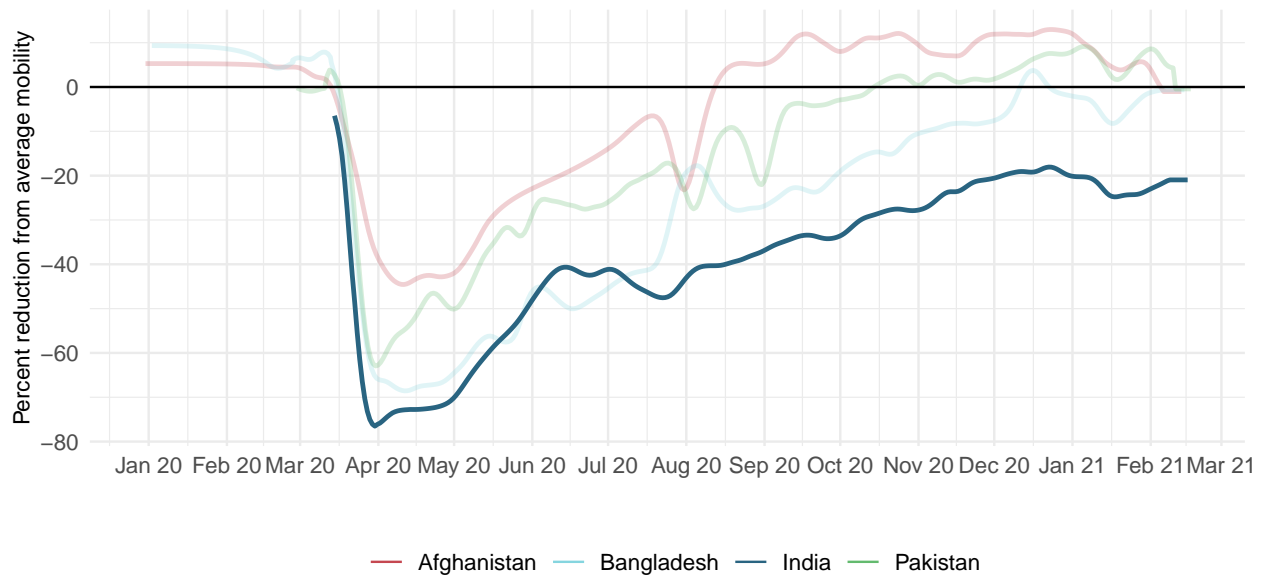


Figure 8. Mobility level as measured through smartphone app use compared to January 2020 baseline (percent) on February 16, 2021

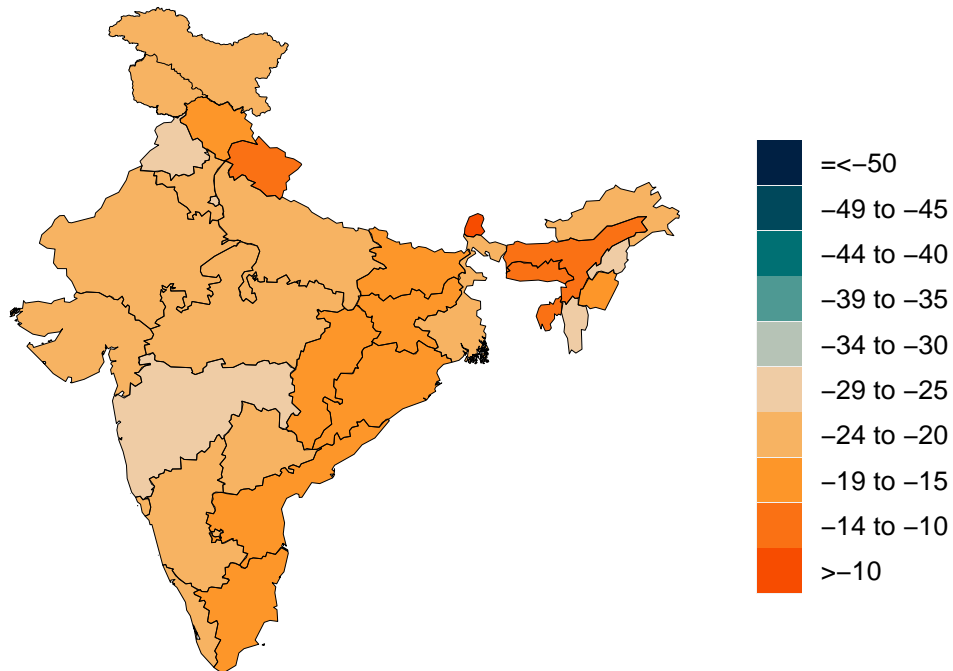


Figure 9. Trend in the proportion of the population reporting always wearing a mask when leaving home

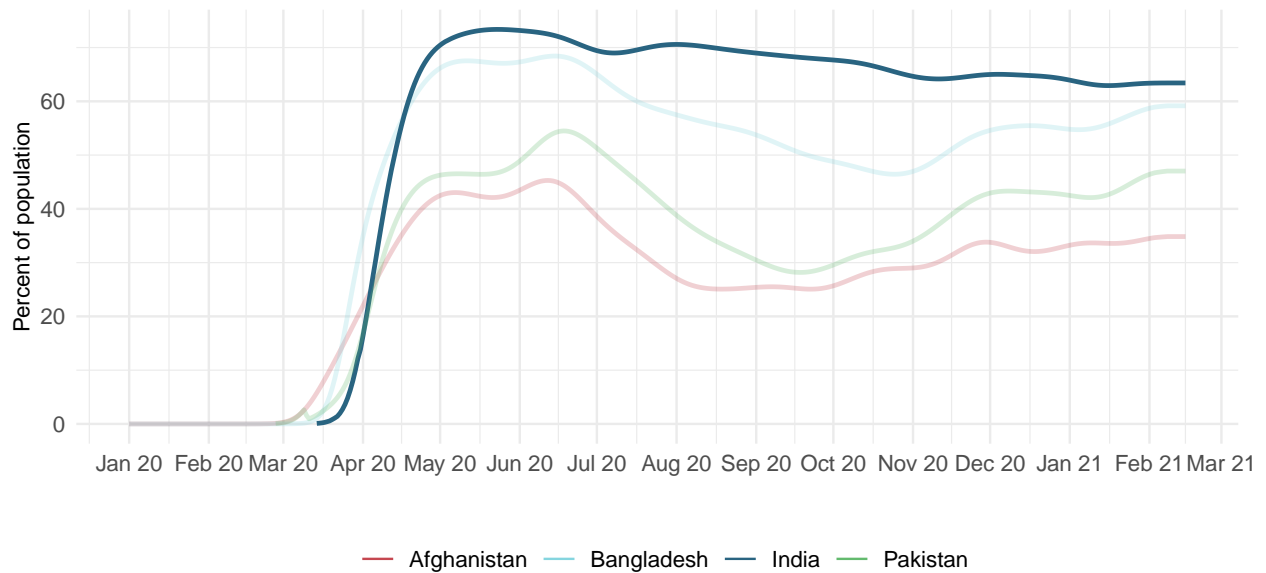


Figure 10. Proportion of the population reporting always wearing a mask when leaving home on February 16, 2021

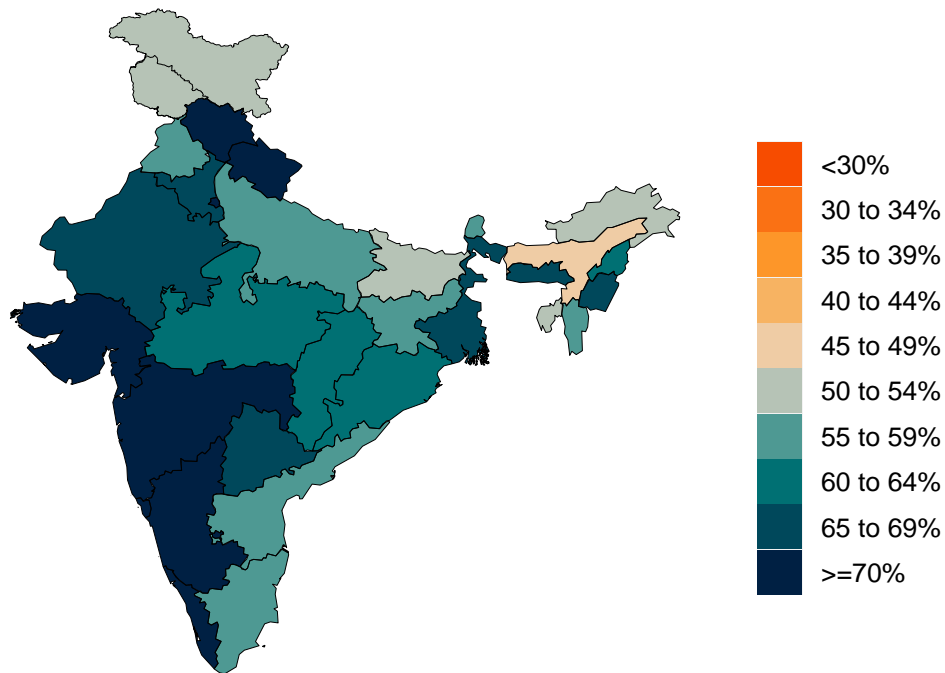


Figure 11. Trend in COVID-19 diagnostic tests per 100,000 people

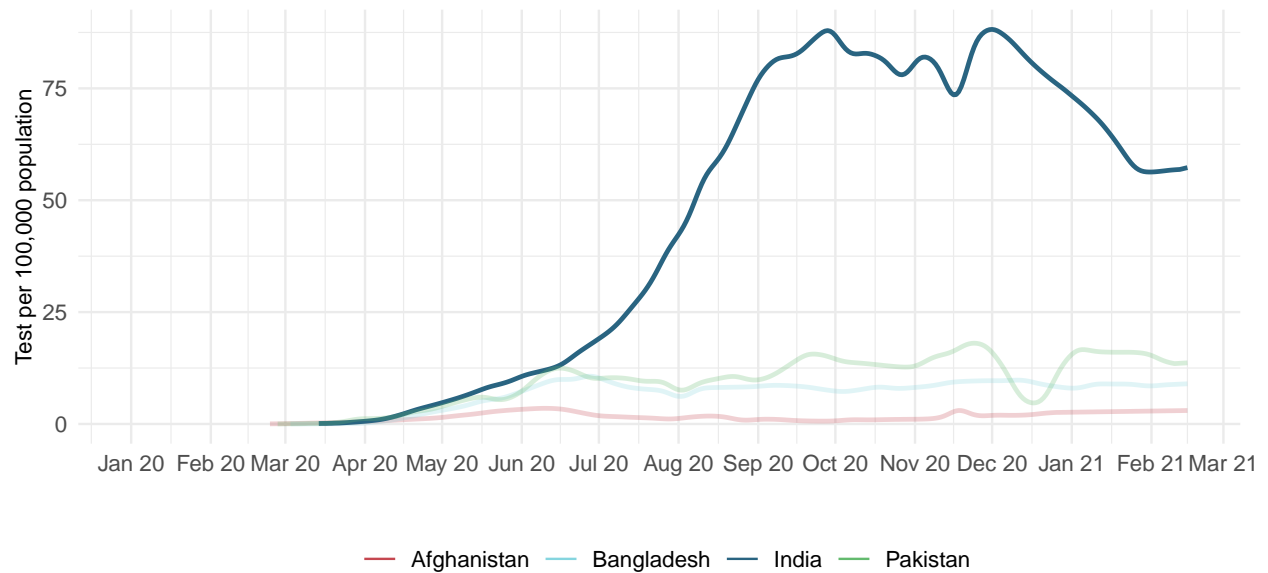


Figure 12. COVID-19 diagnostic tests per 100,000 people on February 12, 2021

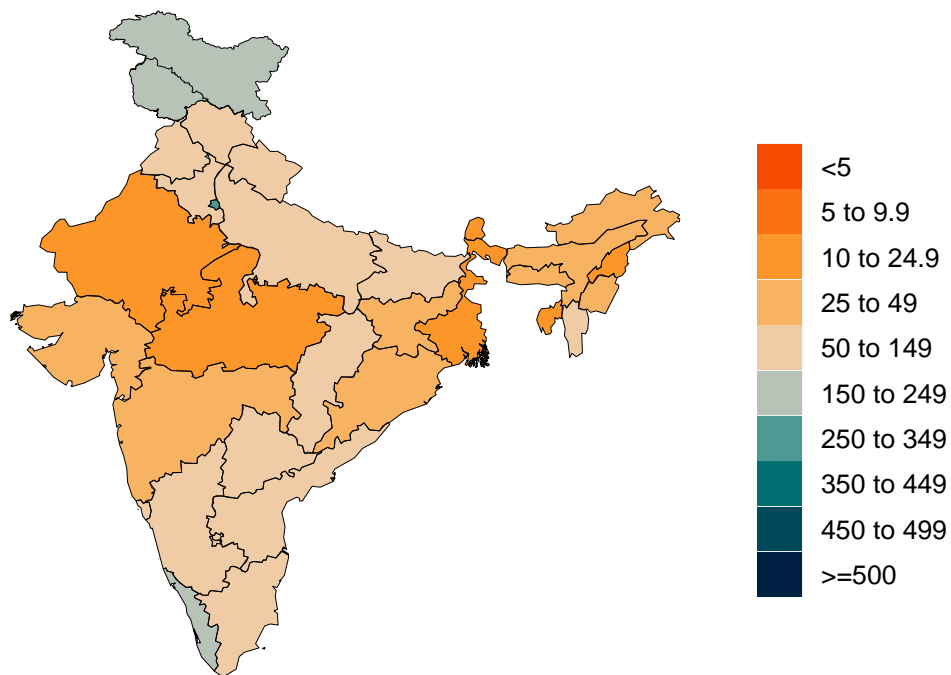


Figure 13 Increase in the risk of death due to pneumonia on February 1 2020 compared to August 1 2020

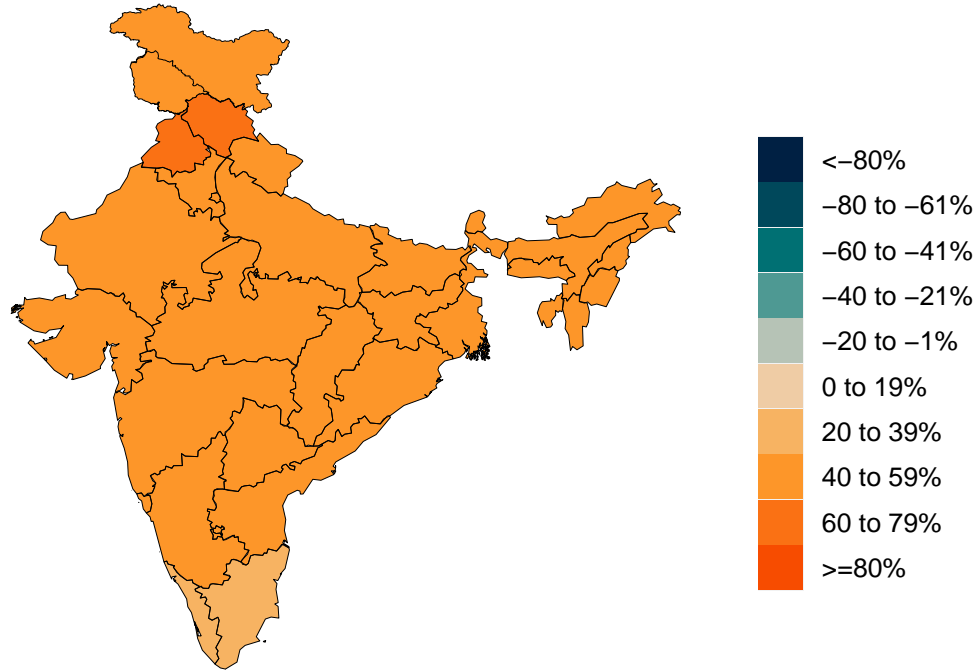


Figure 14. This figure shows the estimated proportion of the adult (18+) population that is open to receiving a COVID-19 vaccine based on Facebook survey responses (yes and yes, probably).

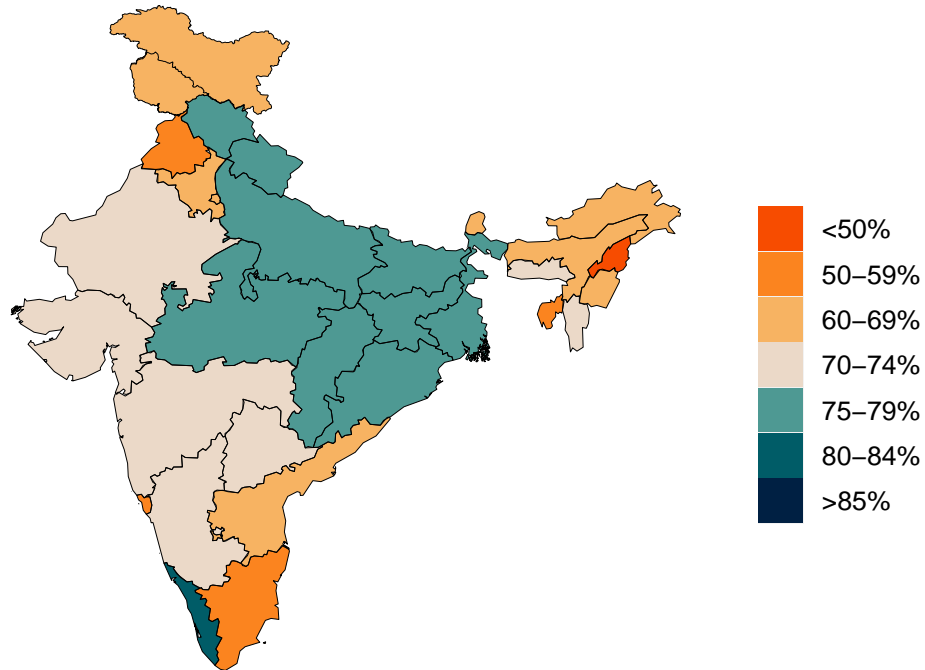
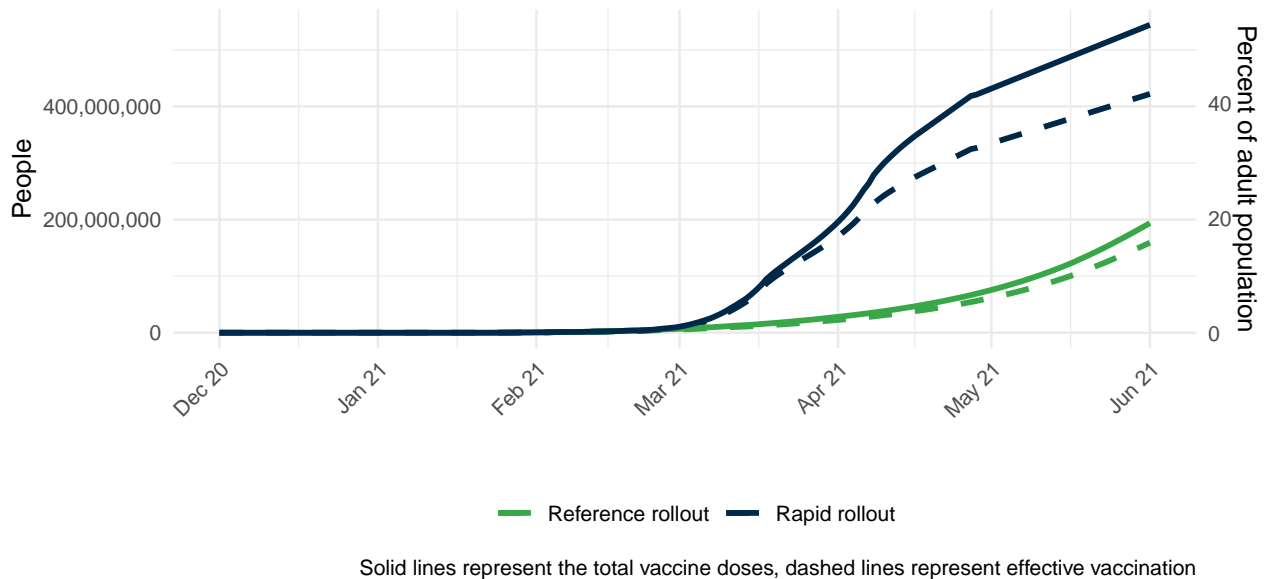


Figure 15. The number of people who receive any vaccine and those who are effectively vaccinated and protected against disease, accounting for efficacy, loss to follow up for two-dose vaccines, partial immunity after one dose, and immunity after two doses.



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.
- 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 scenario assumes that mandates are re-imposed when daily deaths reach 15 per million.
- Variants B.1.1.7 (first identified in the UK), B.1.351 (first identified in South Africa), and P1 (first identified in Brazil) continue to spread from locations with (a) more than 5 sequenced variants, and (b) reports of community transmission, to adjacent locations following the speed of variant scale-up observed in the regions of the UK.
- In one-quarter of those vaccinated, mobility increases toward pre-COVID-19 levels.

The **worse scenario** modifies the reference scenario assumptions in two ways:

- First, it assumes that variants B.1.351 or P1 begin to spread within 2 weeks in all locations that do not already have B.1.351 or P1 community transmission.
- Second, it also assumes that all those vaccinated increase their mobility toward pre-COVID-19 levels.

The **universal masks scenario** makes all the same assumptions as the reference scenario but also assumes 95% of the population wear masks in public in every location.

Figure 16. Cumulative COVID-19 deaths until June 01, 2021 for three scenarios

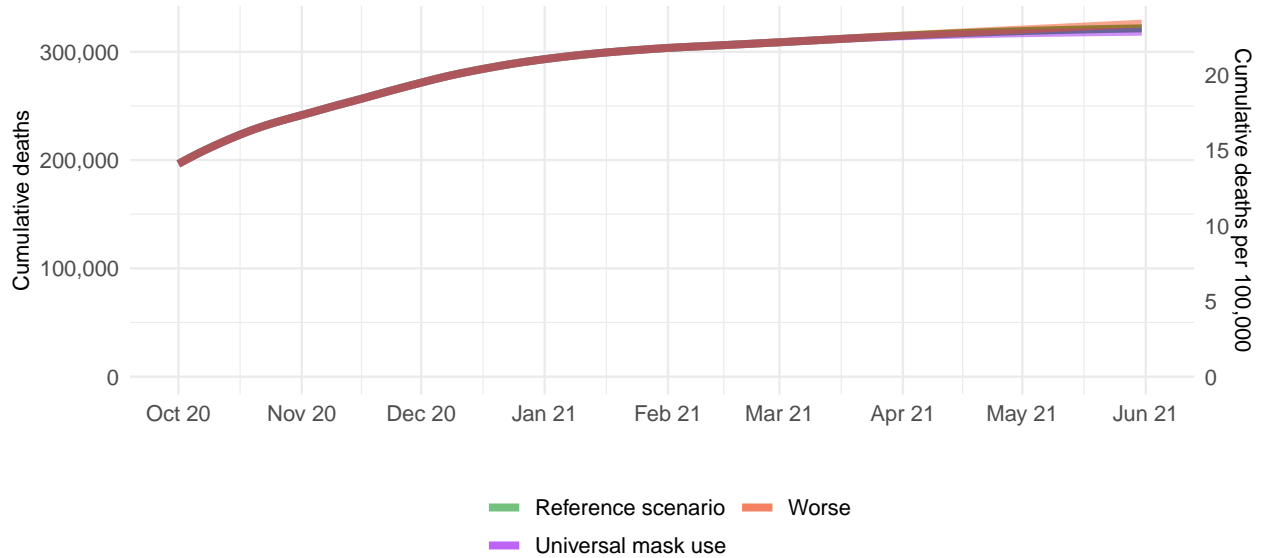


Figure 17. Daily COVID-19 deaths until June 01, 2021 for three scenarios

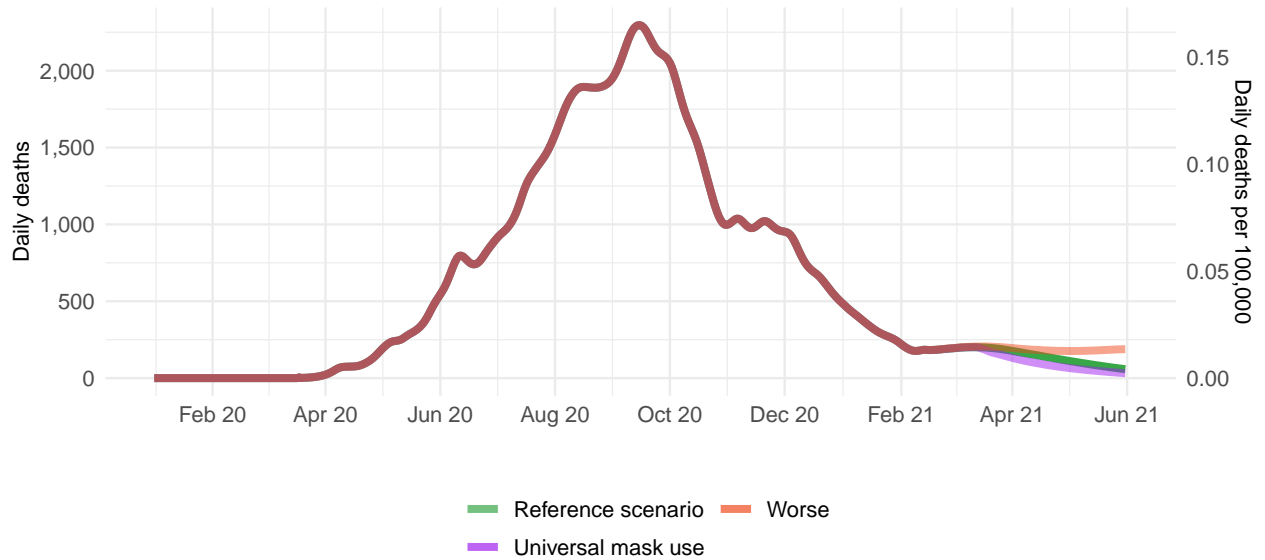


Figure 18. Daily COVID-19 infections until June 01, 2021 for three scenarios

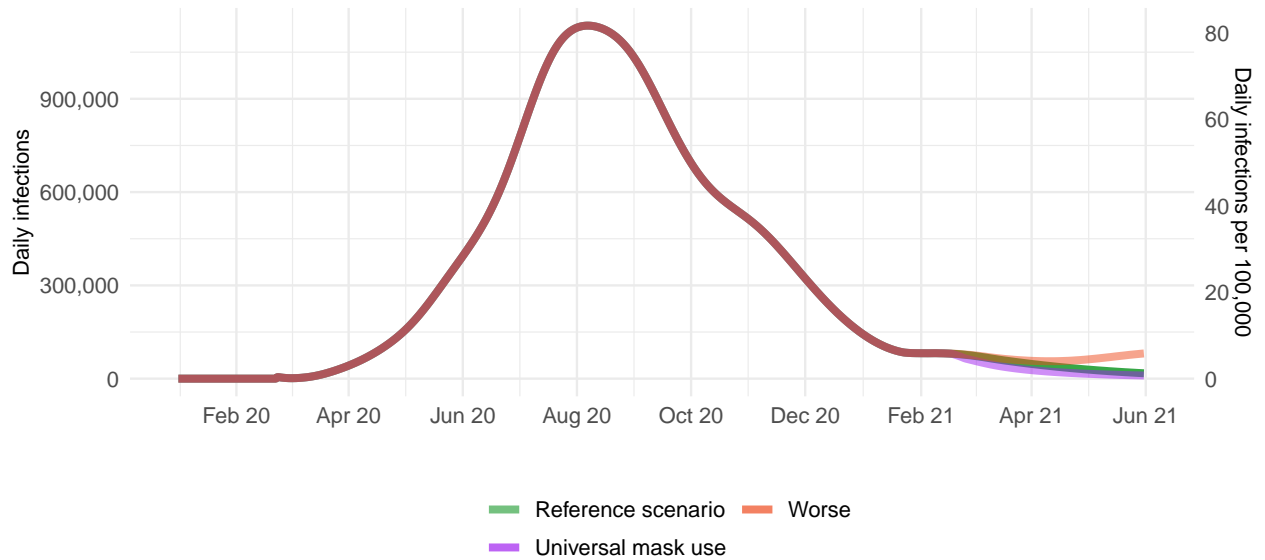


Figure 23. Forecasted percent infected with COVID-19 on June 01, 2021

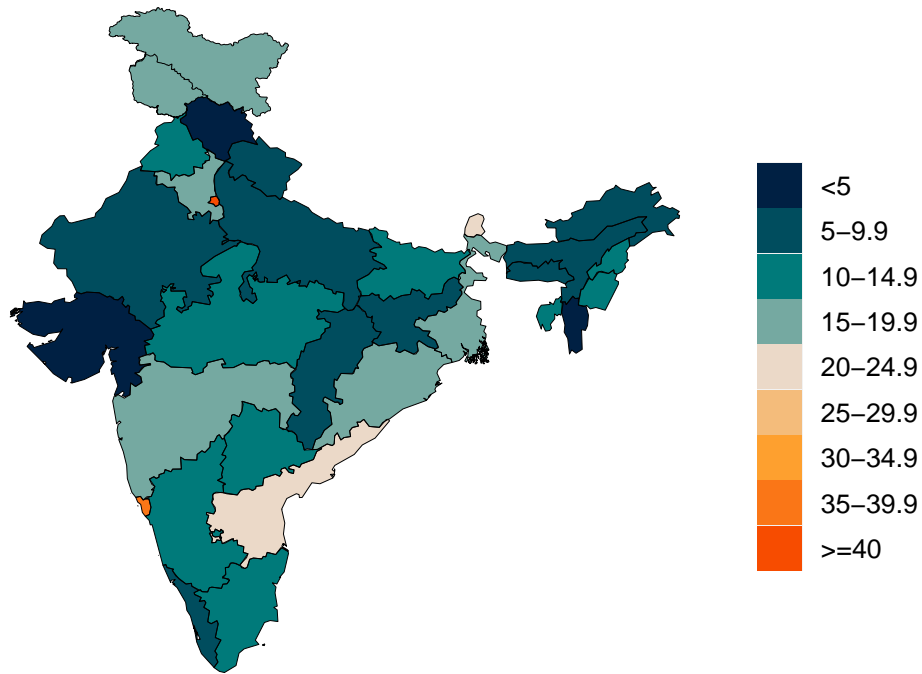
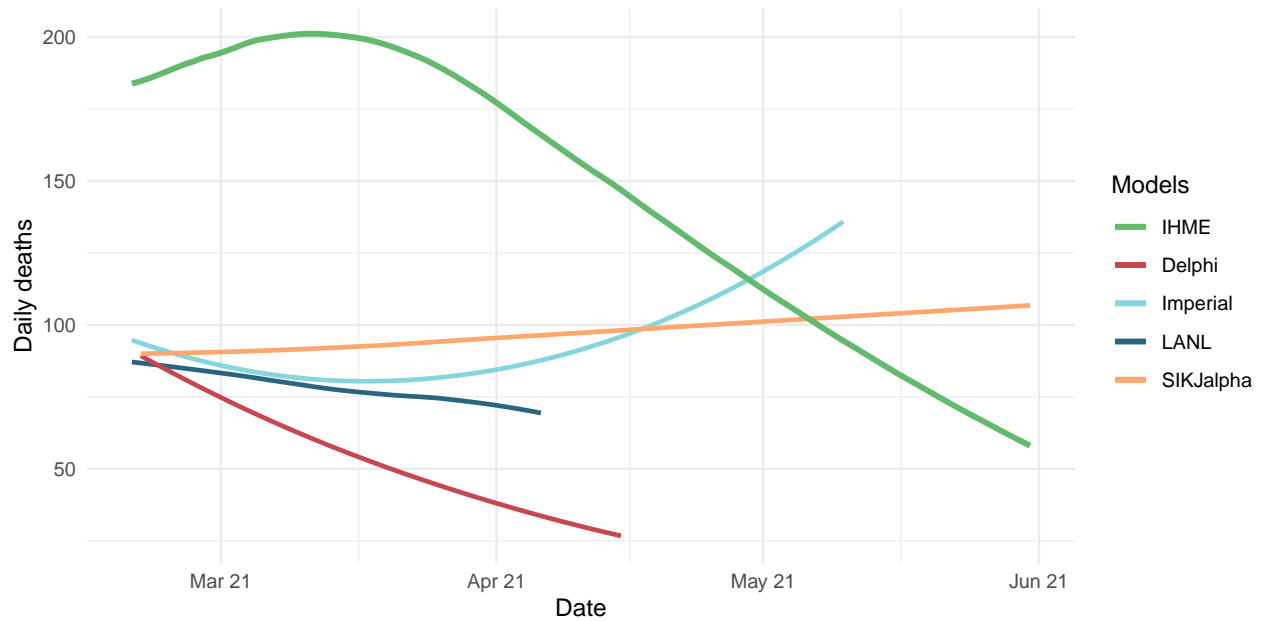


Figure 19. Comparison of reference model projections with other COVID modeling groups. For this comparison, we are including projections of daily COVID-19 deaths from other modeling groups when available: Delphi from the Massachusetts Institute of Technology (Delphi; <https://www.covidanalytics.io/home>), Imperial College London (Imperial; <https://www.covidsim.org>), The Los Alamos National Laboratory (LANL; <https://covid-19.bsvgateway.org/>), and the SI-KJalpha model from the University of Southern California (SIKJalpha; <https://github.com/scc-usc/ReCOVER-COVID-19>). 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 data sources include PREMISE; Facebook Global symptom survey (This research is based on survey results from University of Maryland Social Data Science Center) and the Facebook United States symptom survey (in collaboration with Carnegie Mellon University); Kaiser Family Foundation; YouGov COVID-19 Behaviour Tracker survey.

Vaccine hesitancy data are from the COVID-19 Beliefs, Behaviors, and Norms Study, a survey conducted on Facebook by the Massachusetts Institute of Technology (<https://covidsurvey.mit.edu/>).

Data on vaccine candidates, stages of development, manufacturing capacity, and pre-purchasing agreements are primarily from Linksbridge and supplemented by Duke University.

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>.

Questions? Requests? Feedback? Please contact us at <https://www.healthdata.org/covid/contact-us>.