COVID-19 Results Briefing

Global

March 17, 2021

This document contains summary information on the latest projections from the IHME model on COVID-19 globally. The model was run on March 17, 2021, with data through March 15, 2021.

Global case counts are rising, driven by the surge in Brazil, Peru, and many countries in Europe. The surge in Brazil and Peru is most likely due to the spread of the P1 variant, for which prior infection with ancestral variants is providing only partial immunity. Given that P1 has many mutations in common with B.1.351, we expect that vaccines will be less effective against this variant and the AstraZeneca vaccine in particular may have not effectiveness at all. The spread of P1, combined with increasing seasonality in the Southern Hemisphere, makes this surge potentially the most important trend influencing the global picture. In Europe, case and death counts are increasing in the majority of countries. This spring surge is likely driven by the spread of B.1.1.7 and some reductions in mask use and increases in mobility. While it is difficult to predict a peak for Europe, rising vaccination and declining seasonality should eventually bring daily case and death rates down in the next six weeks. In the US, the state of Michigan has increasing case counts and high levels of B.1.1.7 circulation. The trend in Michigan may be indicative of what will happen in other states. However, in our reference scenario, we still expect cases and deaths to continue to decline. More rapid declines in mask use and increases in mobility in the US (and in Europe) can easily intensify transmission and lead to larger spring surges. The most important strategies at this point for most locations are accelerating vaccination wherever possible, encouraging continued mask use and cautious behavior, and minimizing the risk of the spread of the escape variants (P1 and B.1.351).

Current situation

- Daily reported cases in the last week increased to 400,000 per day on average compared to 386,700 the week before (Figure 1).
- Daily deaths in the last week stayed essentially constant at 9,900 per day (Figure 2). This makes COVID-19 the number 3 cause of death globally this week (Table 1).
- The daily death rate is greater than 4 per million in 30 countries, all of which are in South America or the Northern Hemisphere (Figure 3).
- We estimated that 11% of people globally have been infected as of March 15 (Figure 4).
- Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 112 countries (Figure 5).
- The infection-detection rate remains below 20% (Figure 6).

- Variant B.1.1.7 is circulating widely in Europe and parts of the Middle East and some states in the United States. B.1.351 is circulating widely in southern Africa and P1 widely in South America (Figure 7).
- The infection-fatality ratio varies widely across countries, with the highest rates in Russia and the lowest rates in sub-Saharan Africa and South Asia.

Trends in drivers of transmission

- Mobility last week remained essentially constant at 18% lower than the pre-COVID-19 baseline (Figure 9). Mobility was near baseline (within 10%) in many countries in sub-Saharan Africa, Eastern Europe and Central Asia, and some parts of the Middle East.
- As of March 15, we estimated that 62% of people always wore a mask when leaving their home (Figure 11). Mask use was lower than 50% in 45 countries.
- There were 111 diagnostic tests per 100,000 people on March 15 (Figure 13).
- Globally, 72.9% 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 is lowest in Eastern Europe, Central Asia, and Central sub-Saharan Africa (Figure 16).
- In our current reference scenario, we expect that 2.9 billion will be vaccinated by July 1 (Figure 17).

Projections

- In our **reference scenario**, which represents what we think is most likely to happen, our model projects 3,918,000 cumulative deaths on July 1, 2021. This represents 808,000 additional deaths from March 15 to July 1 (Figure 18). Daily deaths will peak in mid-April and then decline to below 5,000 in late May (Figure 19).
- If **universal mask coverage (95%)** were attained in the next week, our model projects 175,000 fewer cumulative deaths compared to the reference scenario on July 1, 2021 (Figure 18).
- Under our **worse scenario**, our model projects 4,198,000 cumulative deaths on July 1, 2021 (Figure 18). This represents 280,000 more deaths compared to the reference scenario. Daily deaths remain constant in the worse scenario at over 7,500 from May onward.
- By July 1, we project that 269,400 lives will be saved by the projected vaccine rollout. This does not include lives saved through vaccination to date.
- Daily infections are expected to decline to 1.5 million in the reference scenario by May 1 and then stay constant (Figure 20). In the worse scenario, daily infections are expected to rise steadily from mid-April onward, reaching 4 million by July 1.

Model updates

There are no major updates in the model this week.

Current situation

Figure 1. Reported daily COVID-19 cases

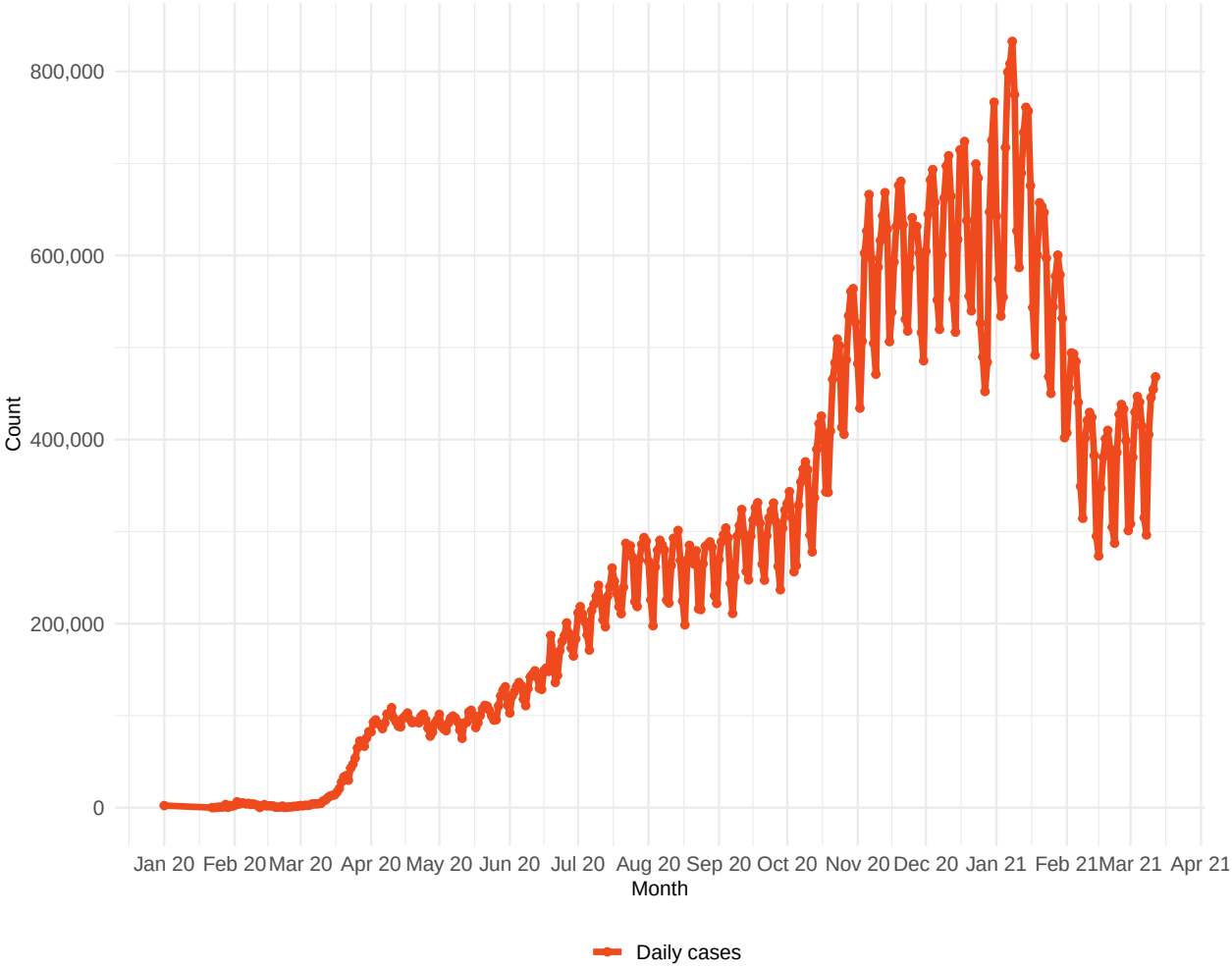


Table 1. Ranking of COVID-19 among the leading causes of mortality this week, assuming uniform deaths of non-COVID causes throughout the year

Cause name	Weekly deaths	Ranking
Ischemic heart disease	175,727	1
Stroke	126,014	2
COVID-19	69,419	3
Chronic obstructive pulmonary disease	63,089	4
Lower respiratory infections	47,946	5
Tracheal, bronchus, and lung cancer	39,282	6
Neonatal disorders	36,201	7
Alzheimer's disease and other dementias	31,217	8
Diabetes mellitus	29,830	9
Diarrheal diseases	29,509	10

Figure 2. Reported daily COVID-19 deaths and smoothed trend estimate.

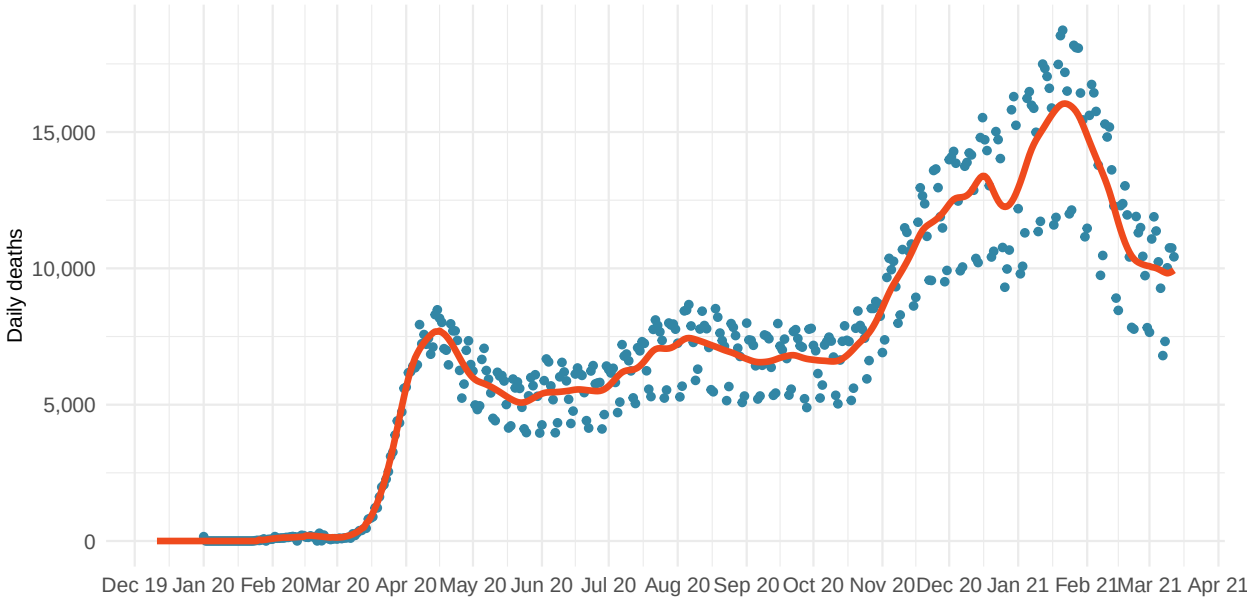


Figure 3. Daily COVID-19 death rate per 1 million on March 15, 2021

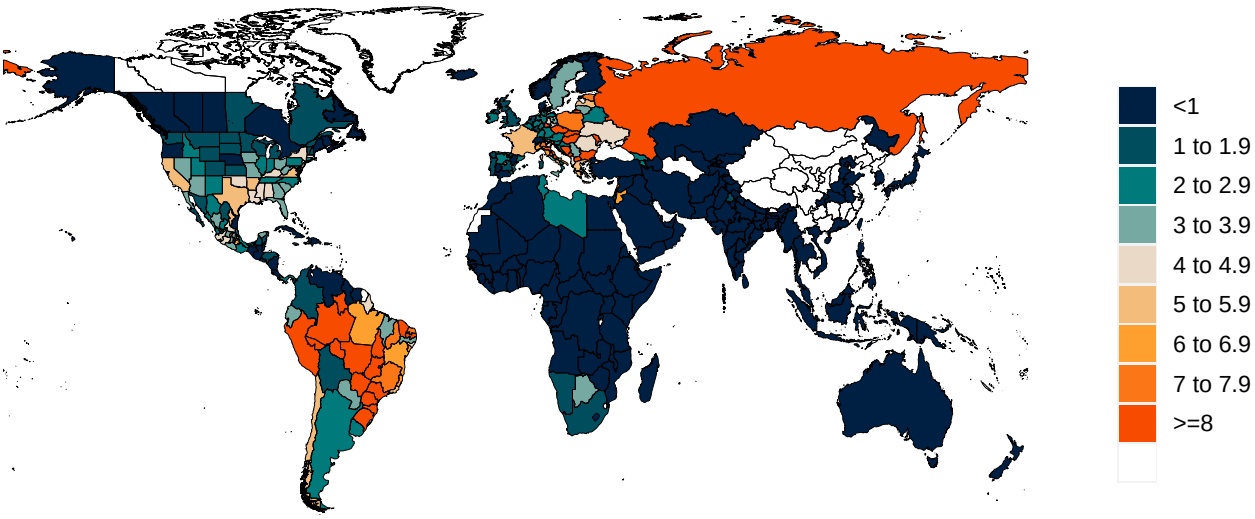


Figure 4. Estimated percent infected with COVID-19 on March 15, 2021

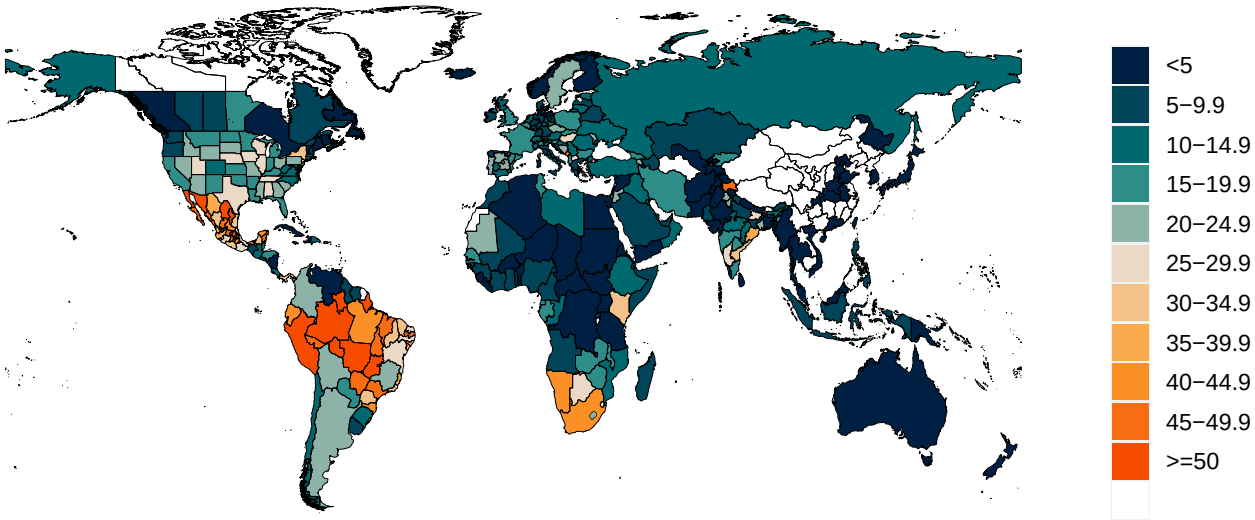


Figure 5. Mean effective R on March 04, 2021. The estimate of effective R is based on the combined analysis of deaths, case reporting and hospitalizations where available. Current reported cases reflect infections 11-13 days prior so estimates of effective R can only be made for the recent past. Effective R less than 1 means that transmission should decline all other things being held the same.

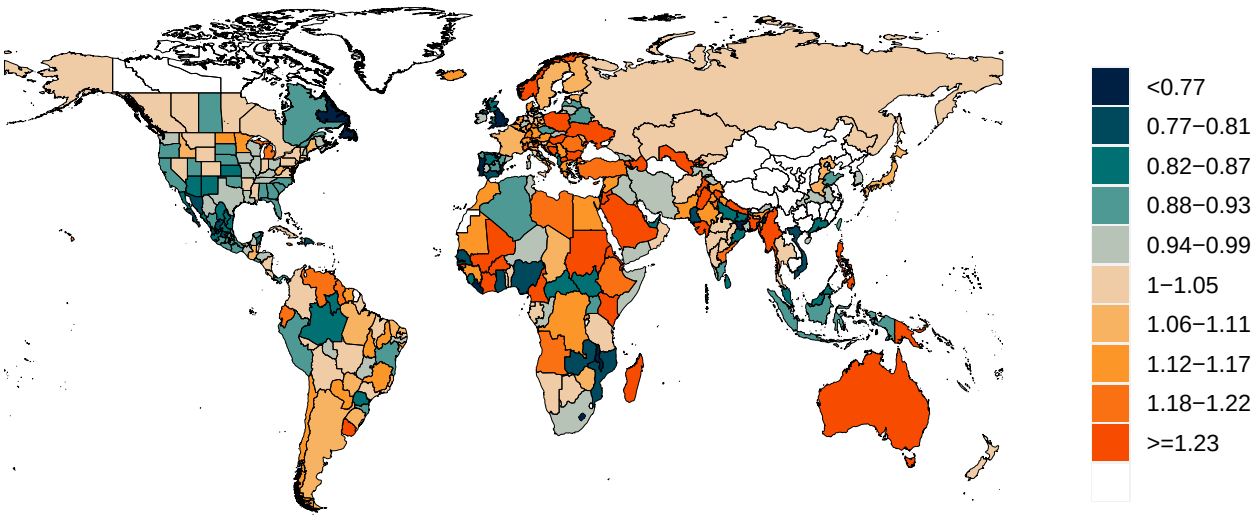
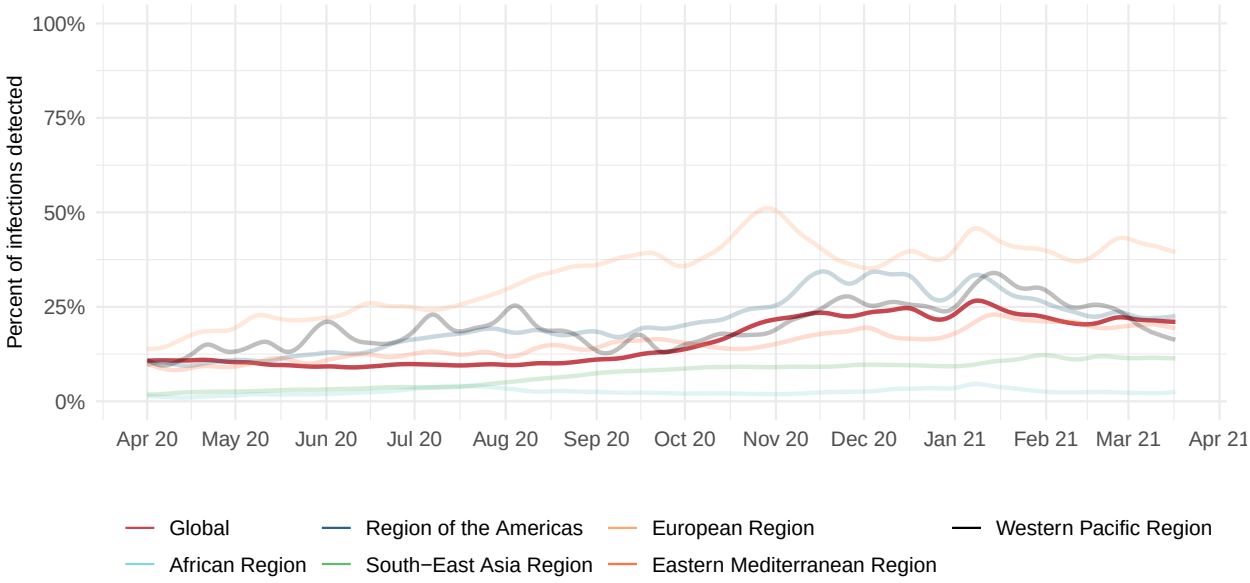


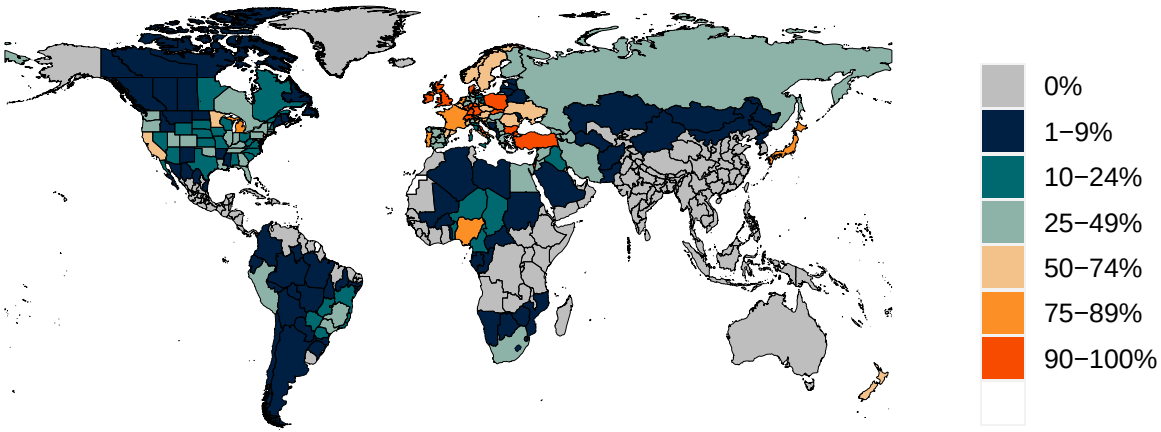
Figure 6. Percent of COVID-19 infections detected. This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model.



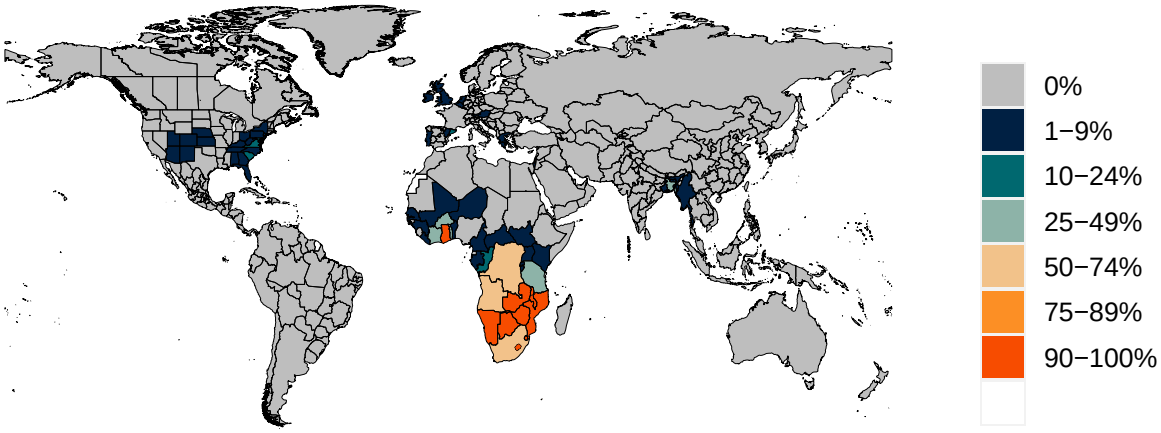
*Due to measurement errors in cases and testing rates, the infection to detection rate (IDR) can exceed 100% at particular points in time.

Figure 7. Percent of circulating SARS-CoV-2 for 3 primary variants on March 15, 2021.

A. Percent B.1.1.7 variant



B. Percent B.1.351 variant



C. Percent P1 variant

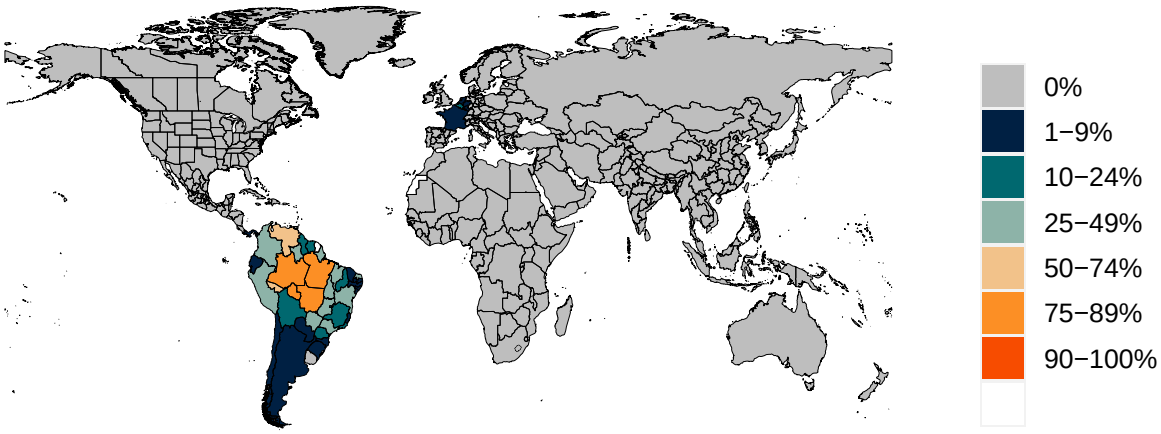
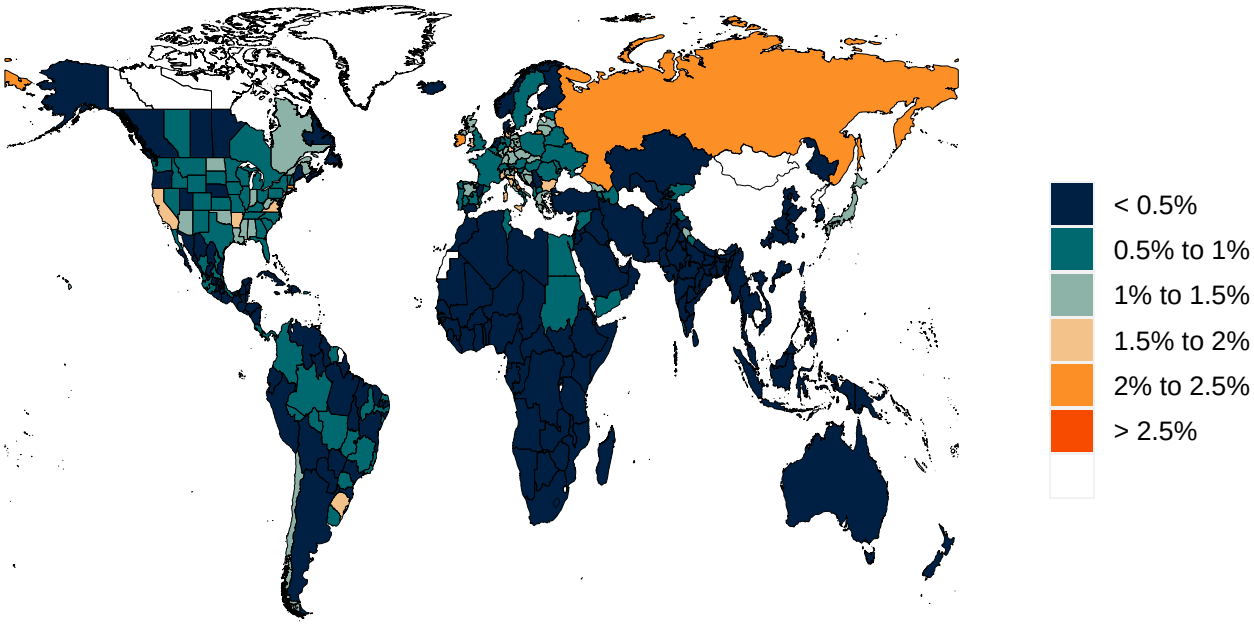


Figure 8. Infection fatality ratio on March 15, 2021. This is estimated as the ratio of COVID-19 deaths to infections based on the SEIR disease transmission model.



Critical drivers

Figure 9. Trend in mobility as measured through smartphone app use compared to January 2020 baseline

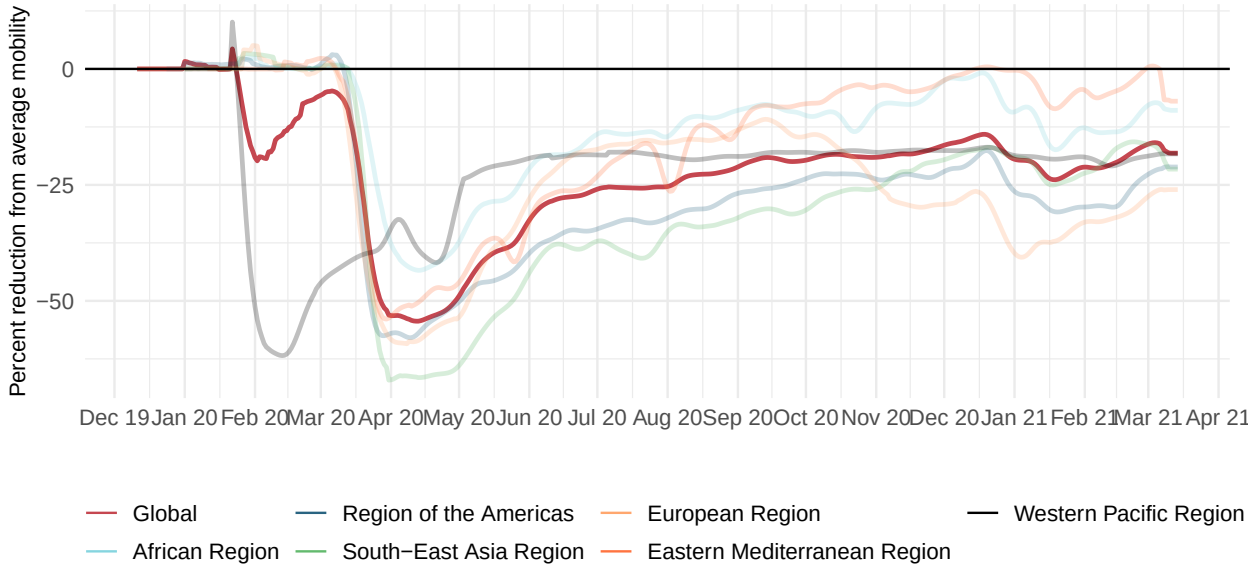


Figure 10. Mobility level as measured through smartphone app use compared to January 2020 baseline (percent)

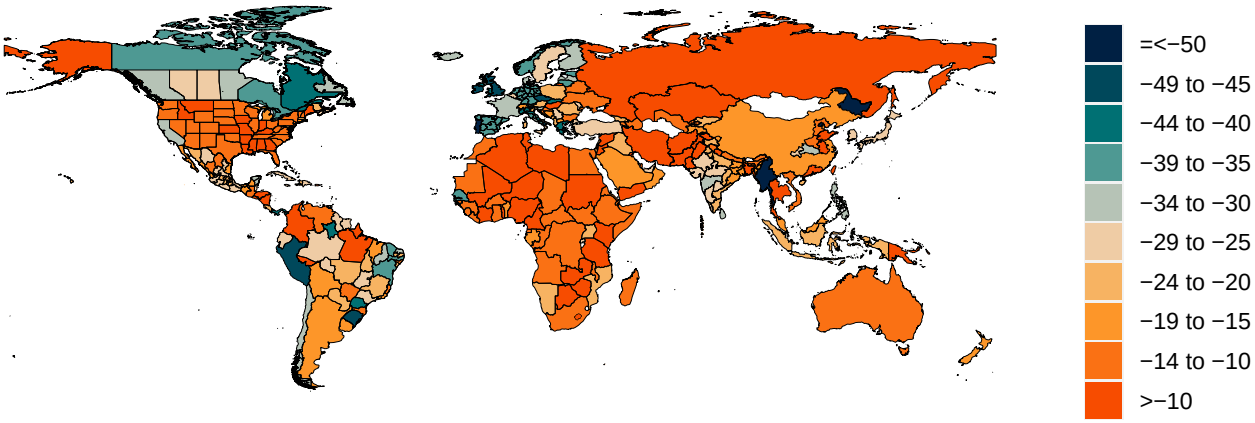


Figure 11. Trend in the proportion of the population reporting always wearing a mask when leaving home

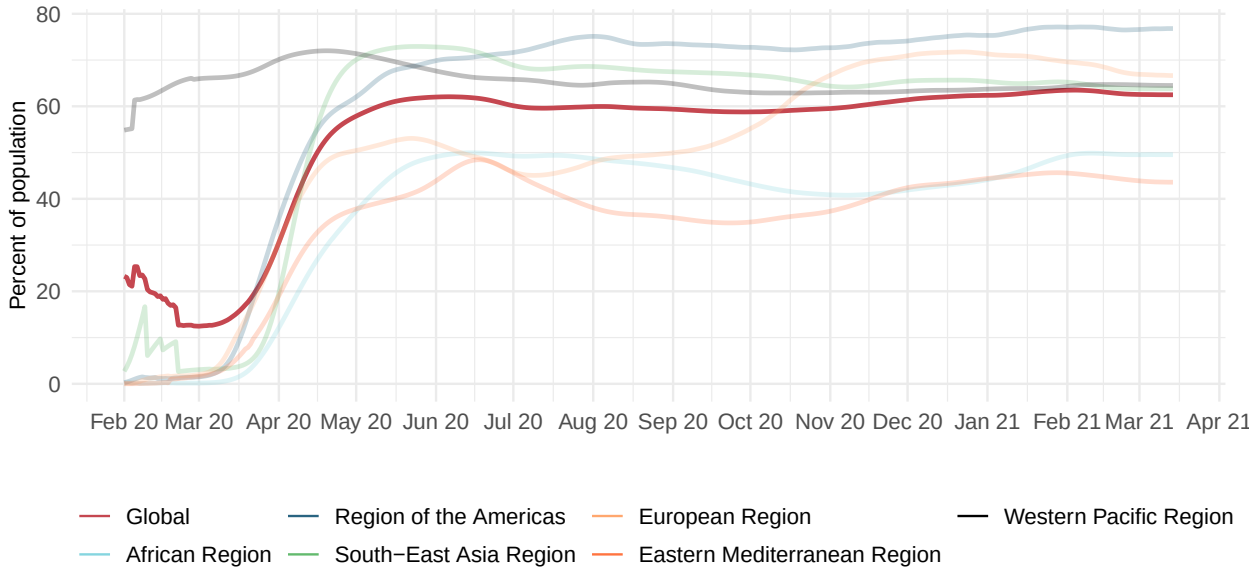


Figure 12. Proportion of the population reporting always wearing a mask when leaving home on March 15, 2021

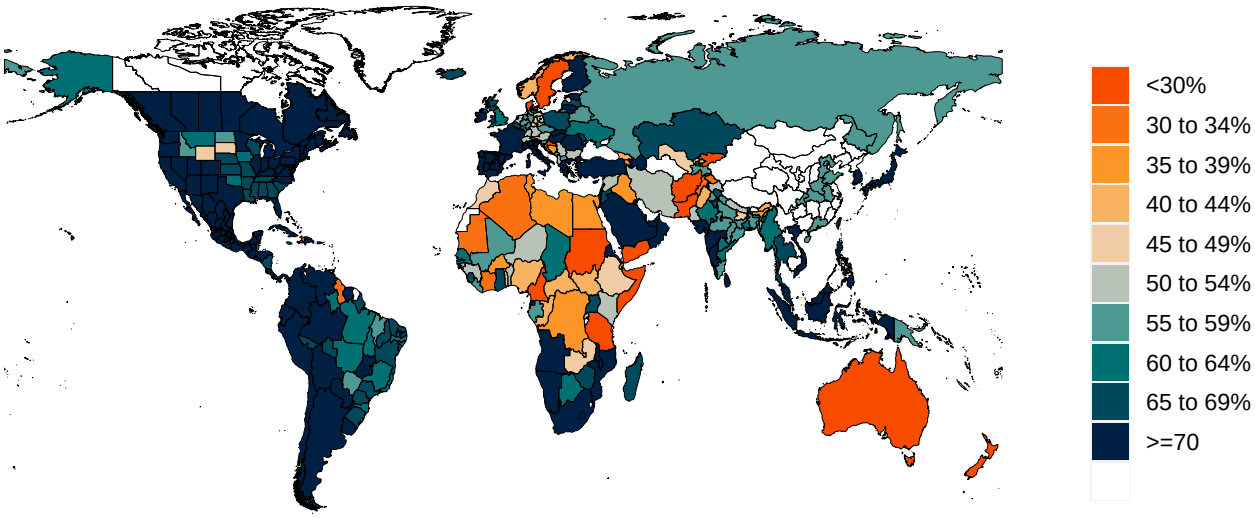


Figure 13. Trend in COVID-19 diagnostic tests per 100,000 people

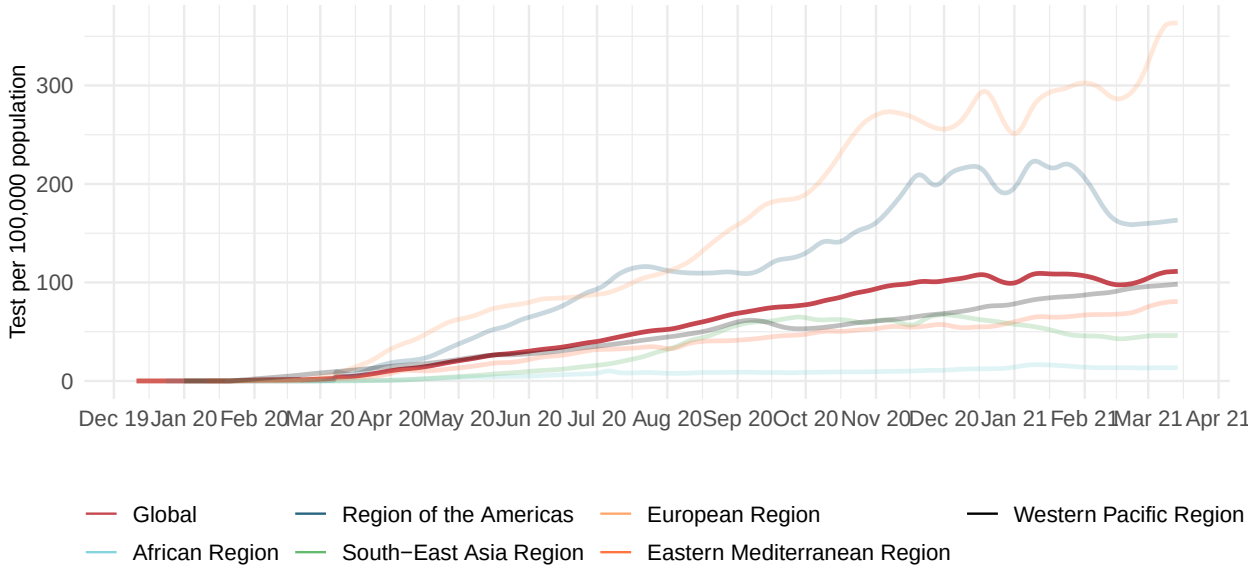


Figure 14. COVID-19 diagnostic tests per 100,000 people on March 12, 2021

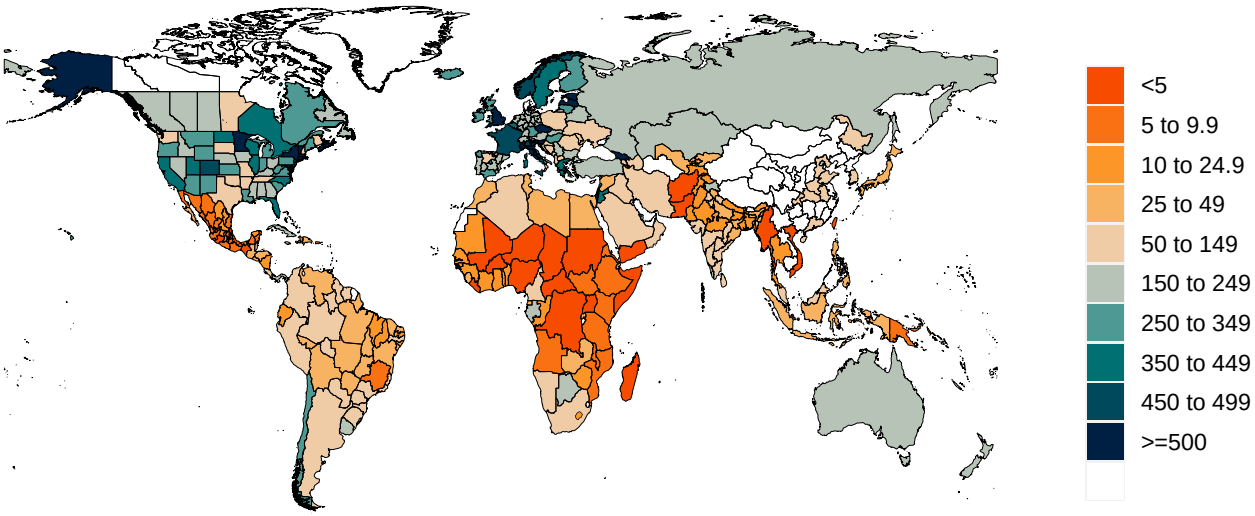


Figure 15. Increase in the risk of death due to pneumonia on February 1 2020 compared to August 1 2020

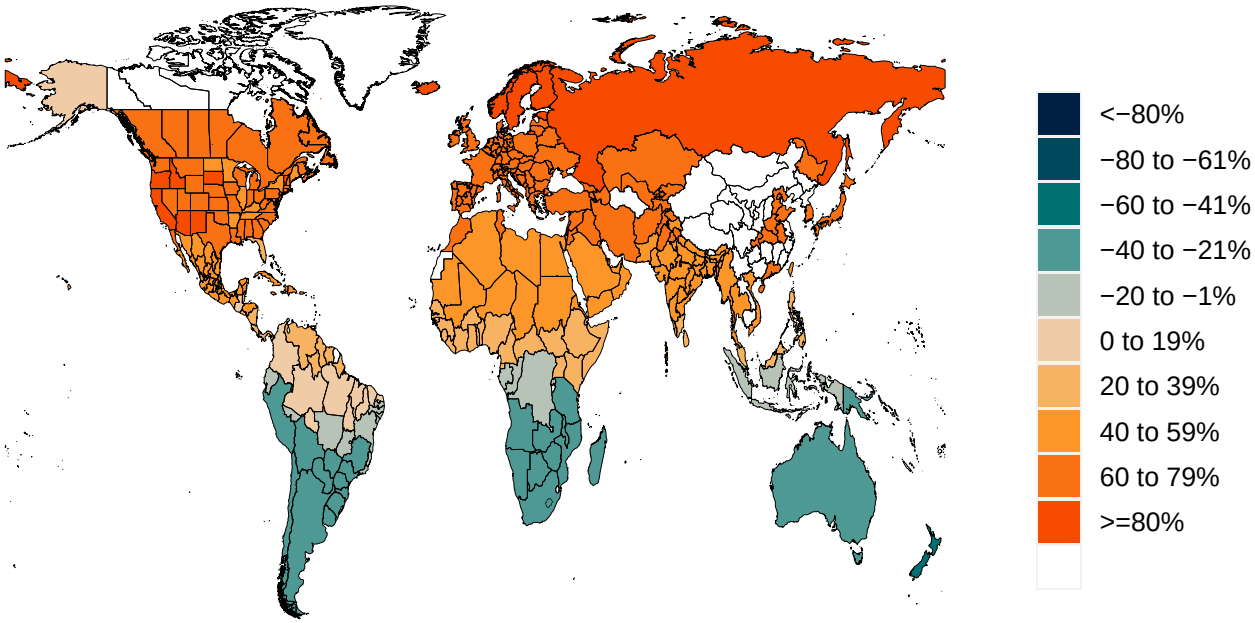


Table 3. The SEIR model uses variant-specific estimates of vaccine efficacy at preventing symptomatic disease and at preventing infection. We use data from clinical trials directly, where available, and make estimates otherwise. More information can be found on our website (http://www.healthdata.org/node/8584).

Vaccine	Efficacy at preventing disease: D614G & B.1.1.7	Efficacy at preventing infection: D614G & B.1.1.7	Efficacy at preventing disease: B.1.351 & P.1	Efficacy at preventing infection: B.1.351 & P.1
AstraZeneca	74%	52%	10%	7%
CanSinoBio	66%	57%	50%	44%
CoronaVac	50%	43%	38%	33%
Janssen (Johnson & Johnson)	72%	72%	64%	56%
Moderna	94%	85%	72%	62%
Novavax	89%	77%	49%	43%
Pfizer/BioNTech	95%	86%	72%	63%
Sinopharm	73%	63%	56%	48%
Sputnik V	92%	80%	70%	61%
Other mRNA vaccines	95%	83%	72%	63%
All other vaccines	75%	65%	57%	50%

Figure 16. 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).

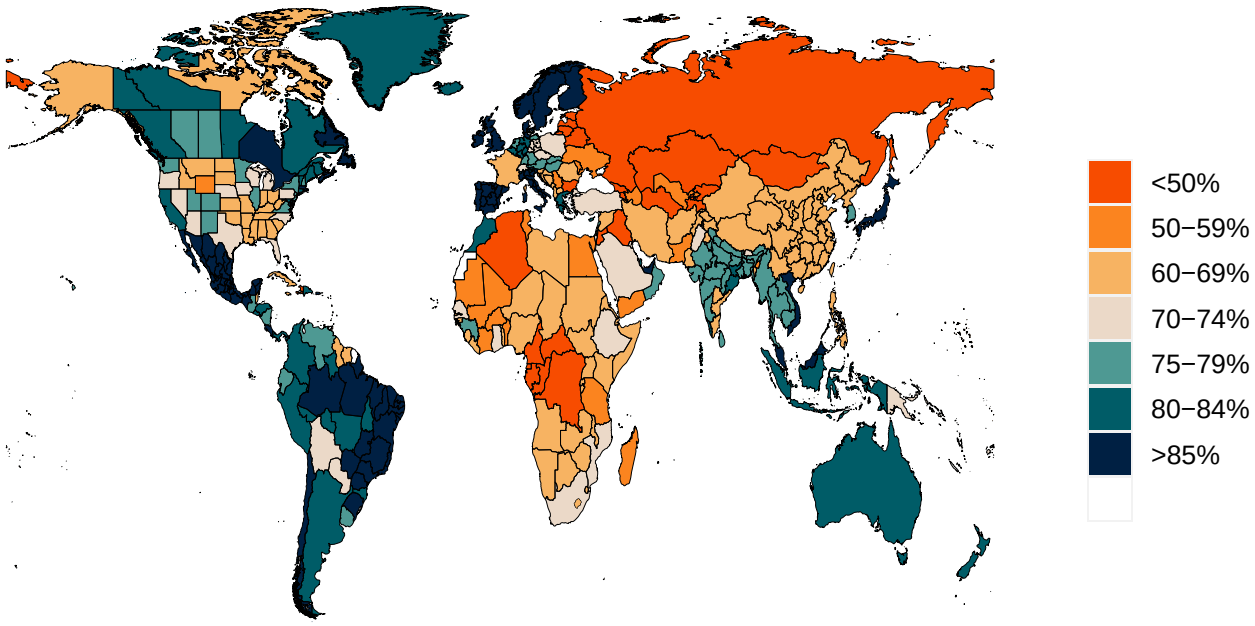
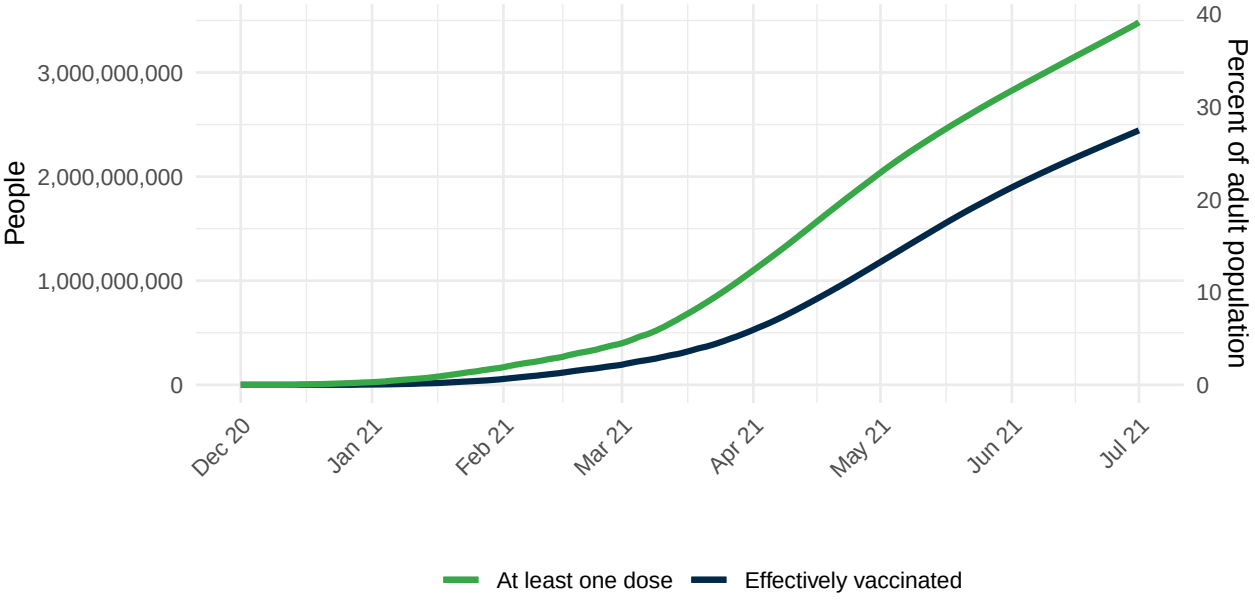


Figure 17. The number of people who receive any vaccine and those who are effectively vaccinated and protected against disease, accounting for efficacy, loss to follow up for two-dose vaccines, partial immunity after one dose, and immunity after two doses.



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 three ways:

- First, it assumes that variants B.1.351 or P1 begin to spread within 3 weeks in adjacent locations that do not already have B.1.351 or P1 community transmission.
- Second, it assumes that all those vaccinated increase their mobility toward pre-COVID-19 levels.
- Third, it assumes that among those vaccinated, mask use starts to decline exponentially one month after completed vaccination.

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 18. Cumulative COVID-19 deaths until July 01, 2021 for three scenarios.

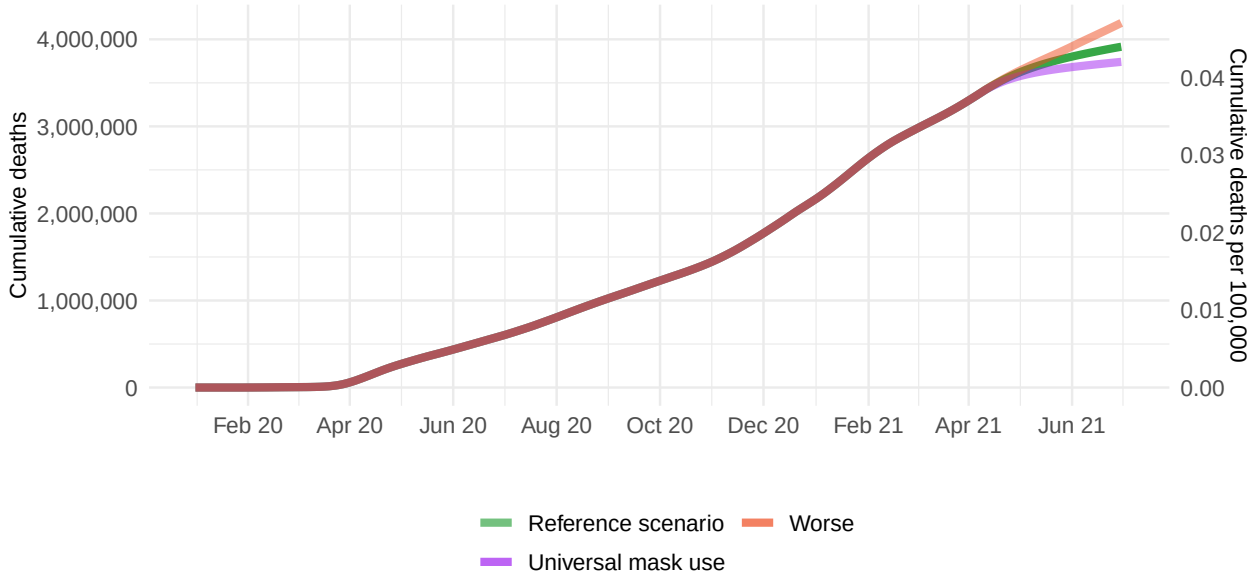


Figure 19. Daily COVID-19 deaths until July 01, 2021 for three scenarios,

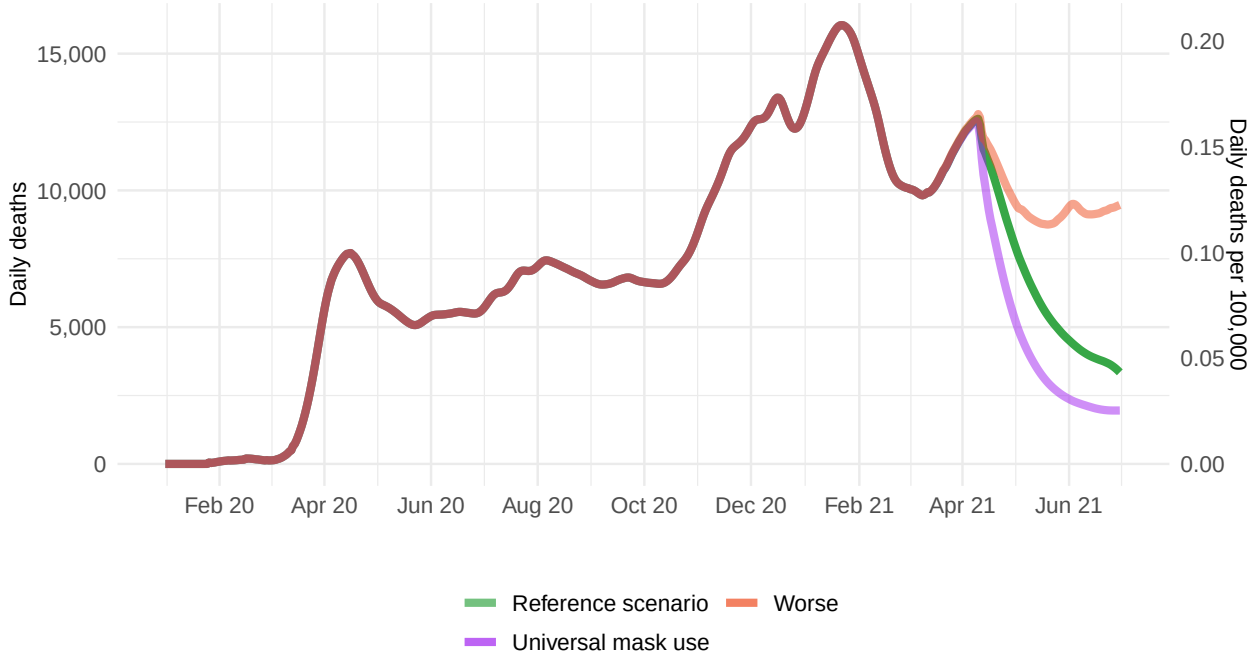
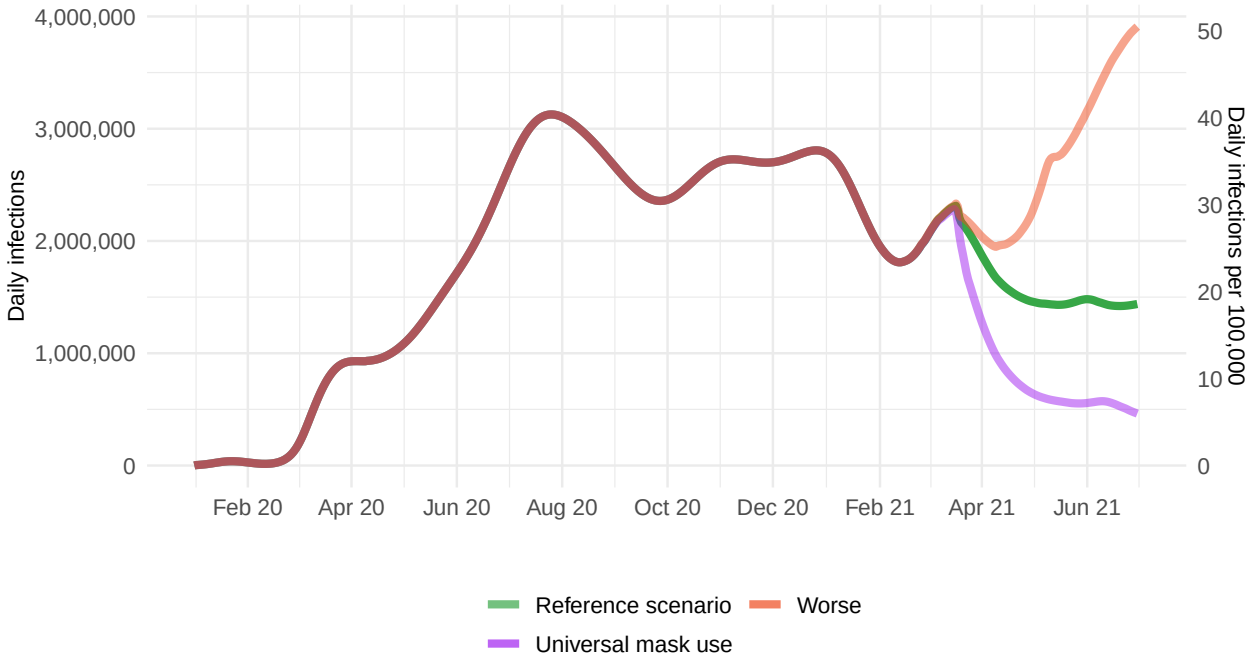


Figure 20. Daily COVID-19 infections until July 01, 2021 for three scenarios.



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.