

COVID-19 Results Briefing

Global

September 22, 2021

This document contains summary information on the latest projections from the IHME model on COVID-19 globally. The model was run on September 21, 2021, with data through September 20th.

Key metrics at the global level continue to improve, including estimated daily infections, reported cases, and reported deaths. Despite general global improvement, transmission is continuing to increase in four clusters: states in the northern US and some provinces of Canada, Central and much of Eastern Europe, a band of countries south of the Sahel in Africa, and northern South America, as well as in select other countries such as Egypt and Australia. Our reference scenario suggests that declines should continue until mid-October, and then global infections, cases, and deaths should begin to rise again due to increased winter transmission in the Northern Hemisphere. The late fall and winter increase should be modest compared to last year but will vary substantially within the Northern Hemisphere based on levels of past infection and levels of vaccination. While the magnitude of the winter increase should be smaller than last year in nearly all locations, the combined impact of flu and COVID-19 should create considerable stress on health systems. Three factors may make these forecasts optimistic. First, we do not explicitly take into account waning immunity from vaccination or natural infection. Evidence is quite clear from multiple countries that vaccine-derived immunity against infection wanes, but it is less clear when and if immunity against hospitalization and death wanes. Taking into account waning immunity against infection would increase the pool of susceptible individuals to sustain transmission in the Northern Hemisphere winter, potentially increasing even hospitalizations and deaths, particularly among the unvaccinated. Second, we have not explicitly modeled the increase in transmission due to school openings except through the increases observed in mobility during September. To date there have been varied experiences in how much school openings catalyze transmission, ranging from Scotland to some countries with no evidence yet of a school-linked increase. Third, we have not included in the reference scenario the emergence of a new variant with substantial immune escape. Given the large uncertainty in the trajectory over the next months, the main strategies for addressing the pandemic include 1) accelerating vaccination in those countries and communities with low levels of vaccination through vaccine donations to address supply issues and various efforts to increase vaccination in places without supply constraints, including outreach and employer mandates; 2) promoting seasonal mask use in the fall and winter or during surges in transmission: between now and the end of the year increased mask use could save 280,000 lives; 3) where there are ongoing surges, use of other policy interventions such as requirements to be vaccinated or recently tested for entrance into higher-risk settings including bars, restaurants, and larger events; 4) close monitoring of the impact of vaccination and potential waning of immunity through reporting of cases, hospitalizations, and deaths, disaggregated by vaccination status; 5) improved monitoring of seroprevalence to more accurately assess the epidemiological situation, particularly in low- and middle-income countries where the infection-detection rate continues to be low and considerable uncertainty exists about the extent of past infections.

Current situation

- Estimated daily infections in the last week decreased to 3.4 million per day on average compared to 3.7 million the week before (Figure 1).
- Estimated daily hospital census in the last week decreased to 750,000 per day on average compared to 810,000 the week before.
- Daily reported cases in the last week decreased to 530,100 per day on average compared to 553,600 the week before (Figure 2).
- Reported deaths due to COVID-19 in the last week decreased to 8,400 per day on average compared to 8,900 the week before (Figure 3).
- Excess deaths due to COVID-19 in the last week decreased to 22,300 per day on average compared to 23,800 the week before (Figure 3). This makes COVID-19 the number 2 cause of death globally this week (Table 1). Estimated excess daily deaths due to COVID-19 in the past week were 2.7 times larger than the reported number of deaths.
- The daily reported COVID-19 death rate is greater than 4 per million in 32 countries and multiple states in the United States (Figure 4).
- The daily rate of excess deaths due to COVID-19 is greater than 4 per million in 63 countries (Figure 4).
- We estimate that 35% of people globally have been infected as of September 20 (Figure 6).
- Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in five clusters of locations: northern US states and many provinces in Canada, northern South America, sub-Saharan Africa, Central Europe and parts of Eastern Europe, and Australia (Figure 7).
- The infection-detection rate globally was close to 14% on September 20 (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). The Delta variant is dominant in most parts of the world. There is considerable Alpha, Gamma, and Mu circulation in parts of South America.

Trends in drivers of transmission

- Mobility last week was 4% lower than the pre-COVID-19 baseline (Figure 11). Mobility was near baseline (within 10%) in 131 countries. Mobility was lower than 30% of baseline in Cambodia, Laos, Maldives, Myanmar, the Philippines, Sri Lanka, Timor-Leste, and Vietnam.
- As of September 20, in the COVID-19 Trends and Impact Survey, 59% of people self-report that they always wore a mask when leaving their home (Figure 13). Reported mask use is over 50% in most of Latin America, southern Africa, Eastern Canada, Portugal, Spain, and Italy, South Asia, and Southeast Asia.

- There were 159 diagnostic tests per 100,000 people on September 20 (Figure 15).
- As of September 20, 33 countries have reached 70% or more of the population who have received at least one vaccine dose, and 17 countries have reached 70% or more of the population who are fully vaccinated (Figure 17). Most countries with less than 10% vaccinated with a single dose are in sub-Saharan Africa, along with Venezuela and Egypt.
- Globally, 73.1% of adults say they would accept or would probably accept a vaccine for COVID-19. The proportion of the population who are open to receiving a COVID-19 vaccine ranges from 31% in Botswana to 98% in United Arab Emirates (Figure 19). Some of the lowest rates of vaccine acceptance are in Eastern Europe, with many countries below 50%.
- In our current reference scenario, we expect that 4.2 billion people will be vaccinated with at least one dose by January 1 (Figure 20). We expect that 46% of the population will be fully vaccinated by January 1.
- Based on the estimate of the population that have been infected with COVID-19 and vaccinated to date, combined with assumptions on protection against infection with the Delta variant provided by either natural infection, vaccination, or both, we estimate that 41% of the region is immune to the Delta variant. In our current reference scenario, we expect that by January 1, 49% of people will be immune to the Delta variant (Figure 21). These two calculations do not take into account waning of natural or vaccine-derived immunity.

Projections

- In our **reference scenario**, which represents what we think is most likely to happen, our model projects 5,477,000 cumulative reported deaths due to COVID-19 on January 1. This represents 749,000 additional deaths from September 20 to January 1. Daily reported deaths will decline to 6,200 by early November and then increase slowly to the end of the year (Figure 22).
- Under our **reference scenario**, our model projects 12,354,000 cumulative excess deaths due to COVID-19 on January 1. This represents 1,888,000 additional deaths from September 20 to January 1 (Figure 22).
- If **universal mask coverage (95%)** were attained in the next week, our model projects 280,000 fewer cumulative reported deaths compared to the reference scenario on January 1.
- Under our **worse scenario**, our model projects 6,324,000 cumulative reported deaths on January 1, an additional 847,000 deaths compared to our reference scenario. Daily reported deaths in the **worse scenario** will rise to over 26,500 by mid-December (Figure 22).
- Daily infections in the **reference scenario** decrease to a low of below 3.5 million by mid-October and then increase again to 4.8 million by mid-December (Figure 23). Daily infections in the **worse scenario** will rise to 11.5 million by late November (Figure 23).

- Daily cases in the **reference scenario** will decline to near 450,000 by mid-October and then increase to 900,000 by the end of December. Daily cases in the **worse scenario** will rise to 2.8 million by early December (Figure 24).
- Daily hospital census in the **reference scenario** will decline to 550,000 by the end of October (Figure 25). Daily hospital census in the **worse scenario** will rise to 2.3 million by mid-December (Figure 25).

Model updates

Previously, our global total for vaccinations was based only on the locations that we produce COVID estimates for. Starting this week, we are including vaccination in all locations in the world that report data on vaccinations. This will ensure vaccination numbers reflect what is happening around the world and are not impacted by the selection of locations that we publish COVID-19 estimates for. We currently only report COVID-19 estimates for locations that have reported greater than 500 cumulative COVID-19 deaths.

Projections

Figure 1. Daily COVID-19 hospital census and infections

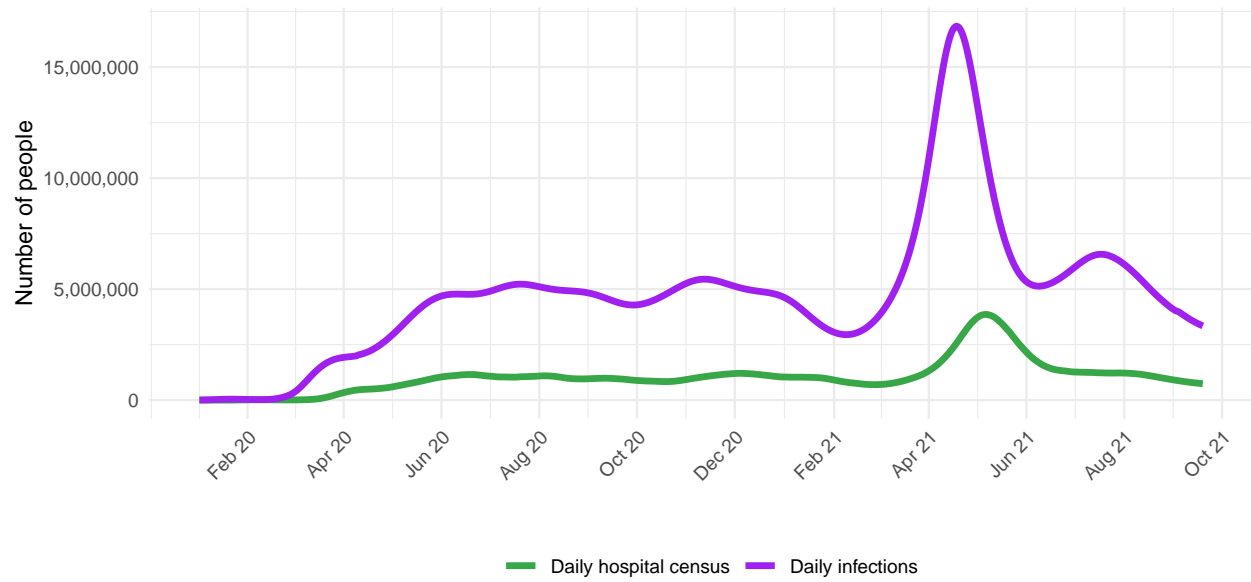


Figure 2. Reported daily COVID-19 cases, moving average

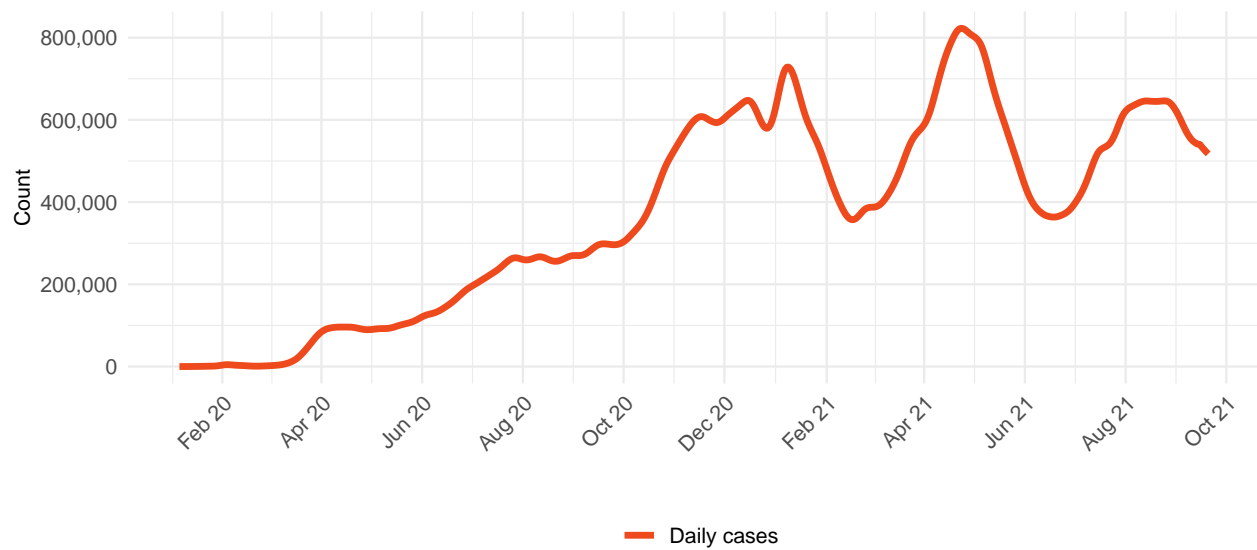


Table 1. Ranking of excess deaths due to COVID-19 among the leading causes of mortality this week, assuming uniform deaths of non-COVID causes throughout the year

Cause name	Weekly deaths	Ranking
Ischemic heart disease	175,727	1
COVID-19	156,169	2
Stroke	126,014	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 3. Smoothed trend estimate of reported daily COVID-19 deaths (blue) and excess daily deaths due to COVID-19 (orange)

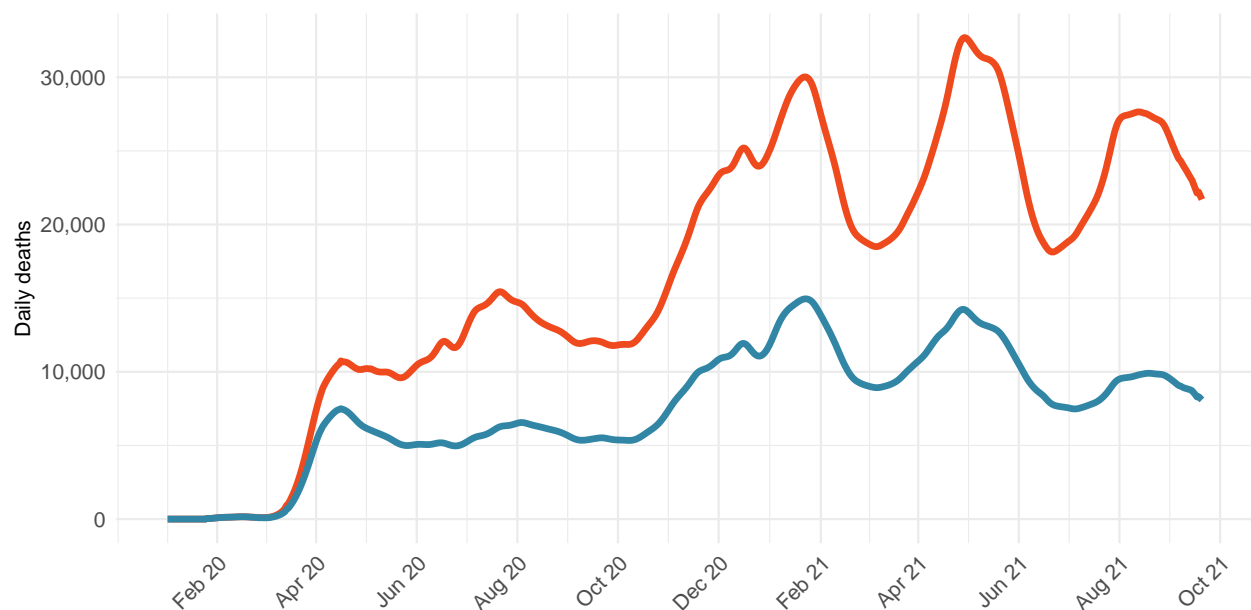
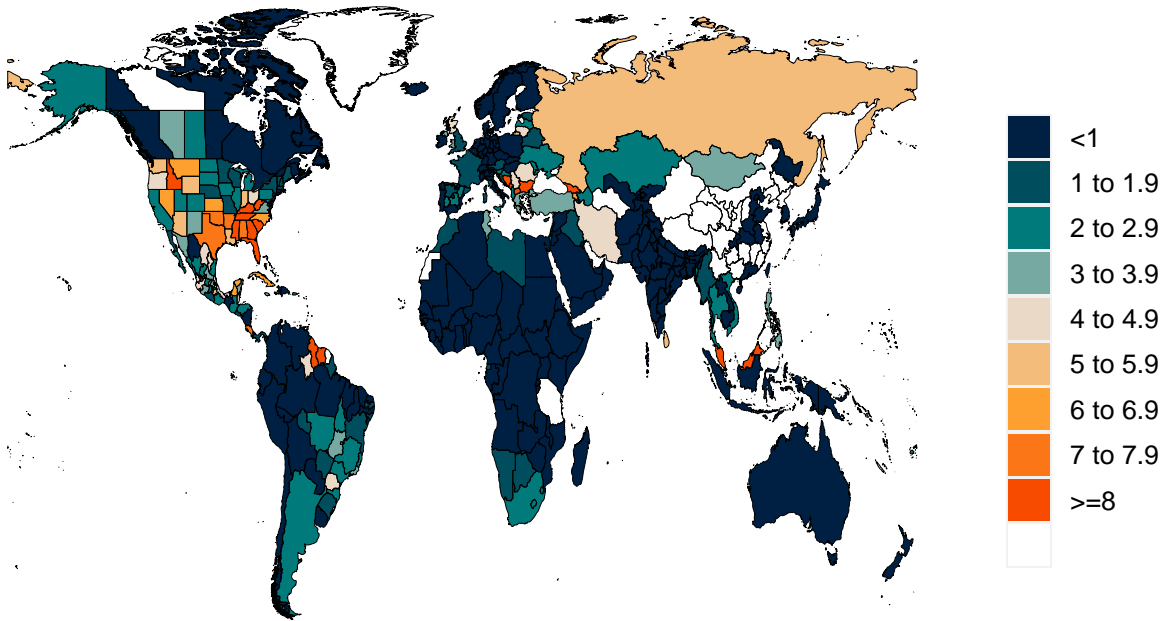


Figure 4. Daily COVID-19 death rate per 1 million on September 20, 2021

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



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

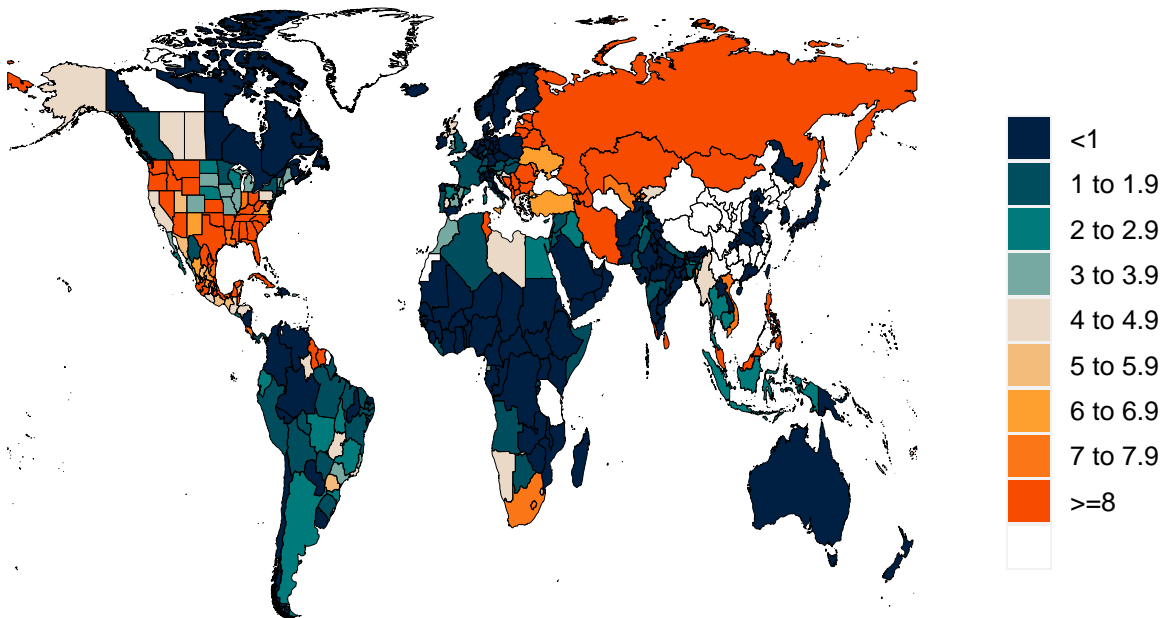
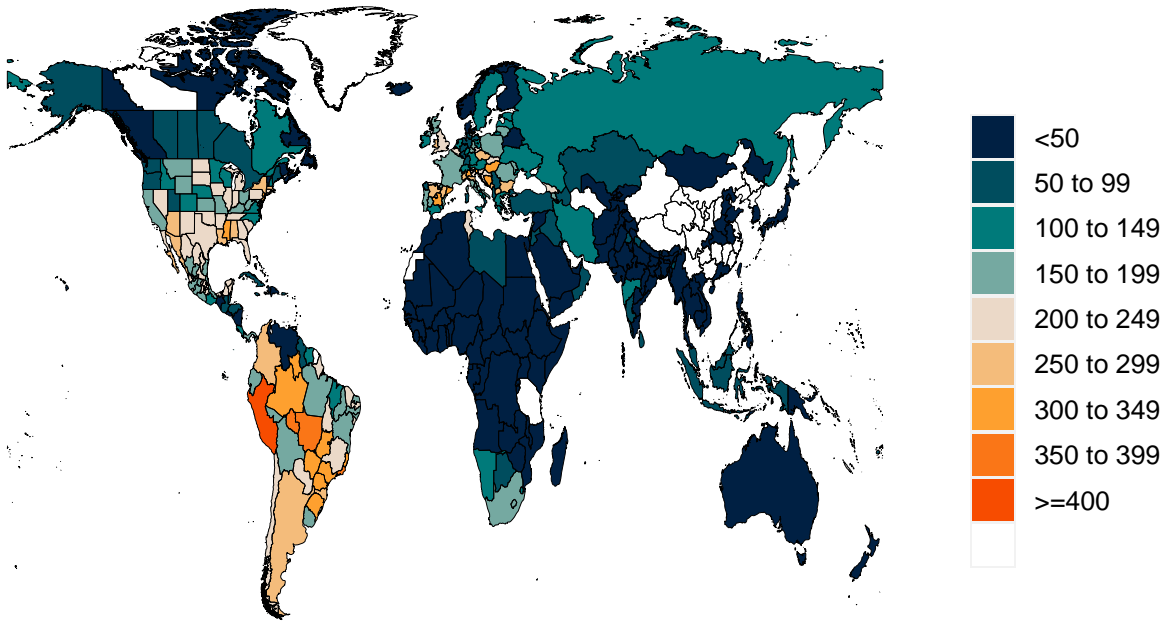


Figure 5. Cumulative COVID-19 deaths per 100,000 on September 20, 2021

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



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

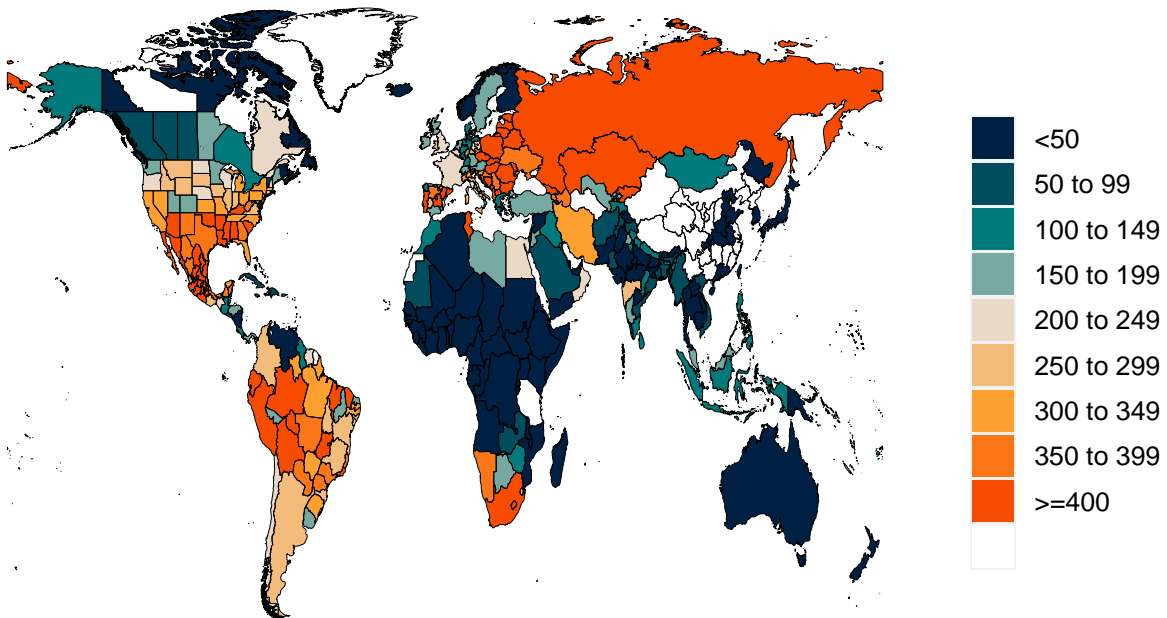


Figure 6. Estimated percent of the population infected with COVID-19 on September 20, 2021

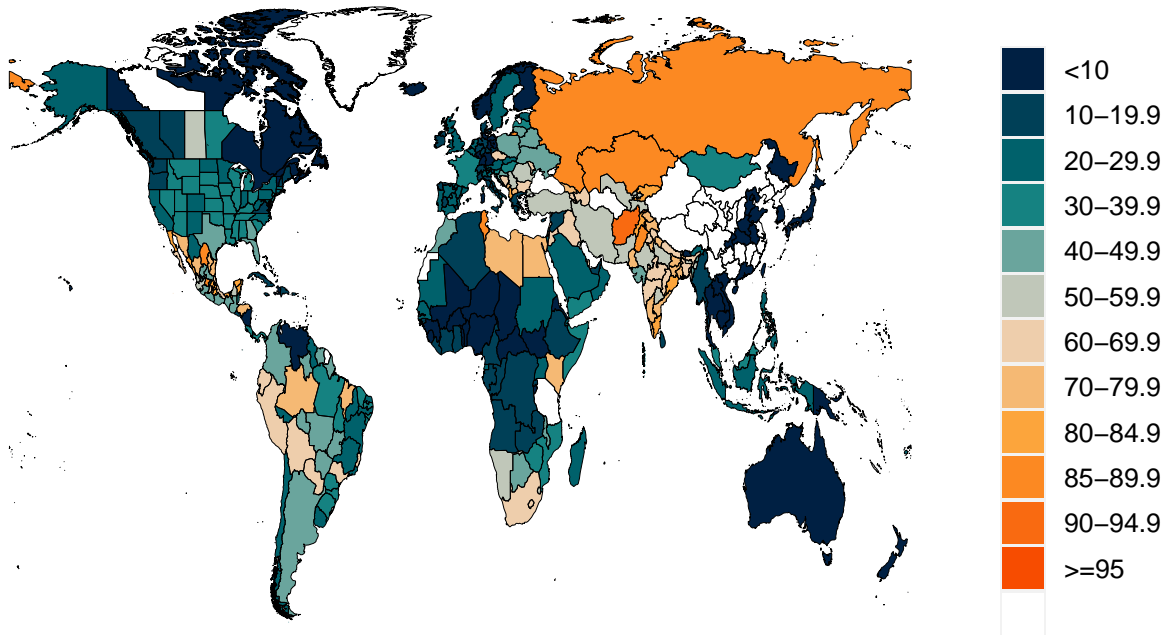


Figure 7. Mean effective R on September 9, 2021. Effective R less than 1 means that transmission should decline, all other things being held the same. The estimate of effective R is based on the combined analysis of deaths, case reporting, and hospitalizations where available. Current reported cases reflect infections 11-13 days prior, so estimates of effective R can only be made for the recent past.

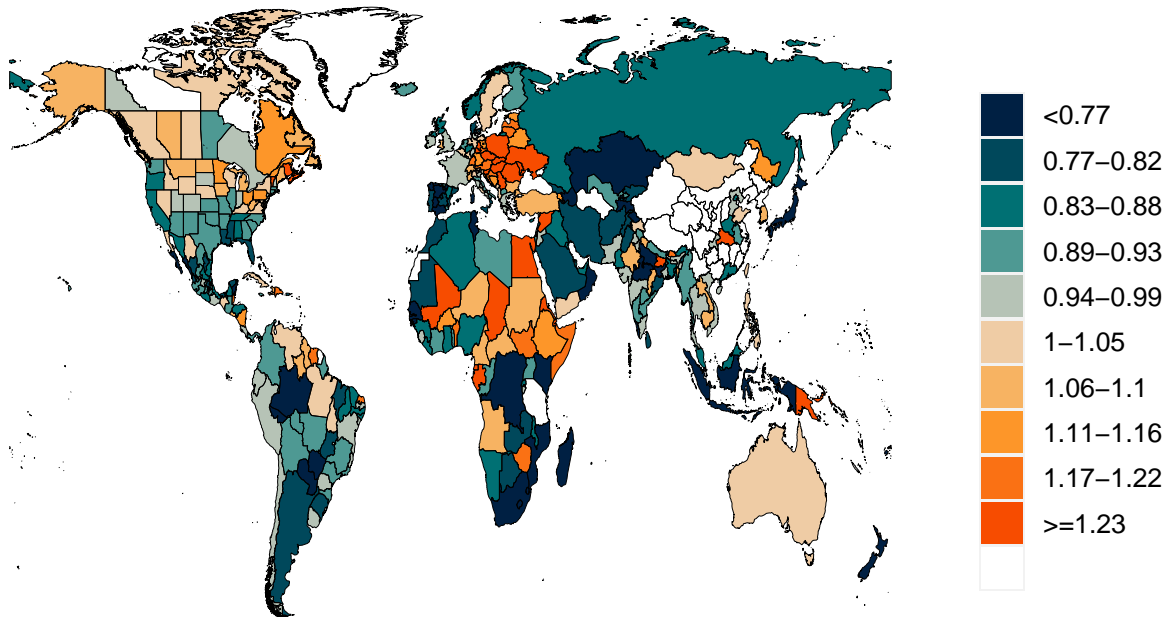


Figure 8. Percent of COVID-19 infections detected. This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model. Due to measurement errors in cases and testing rates, the infection-detection rate can exceed 100% at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

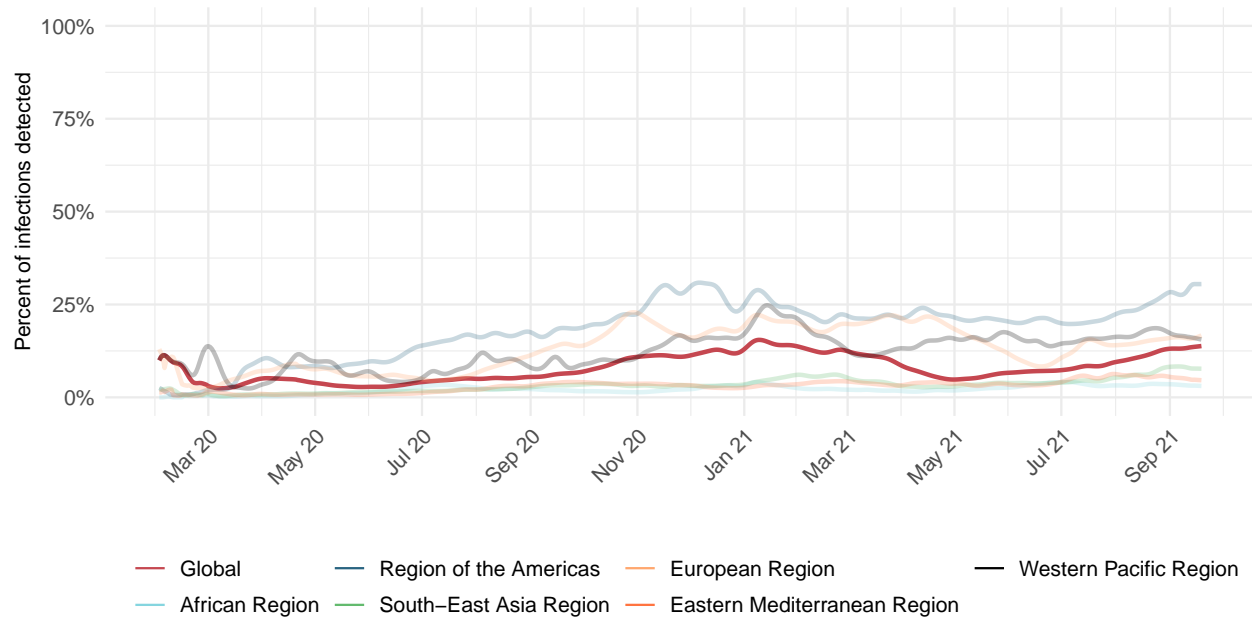
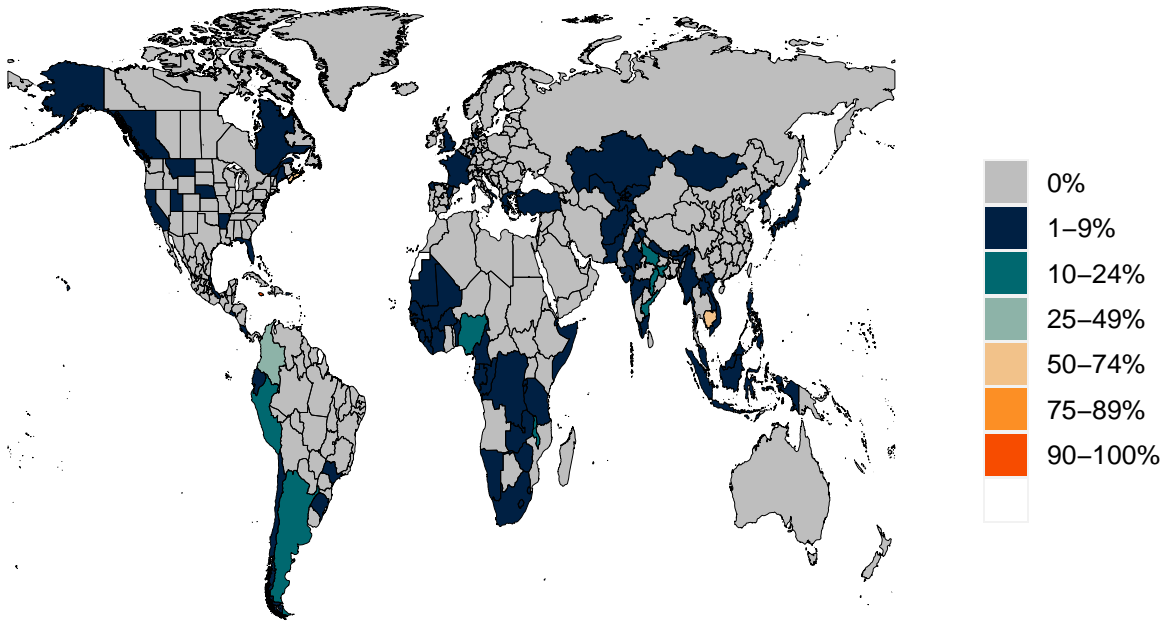
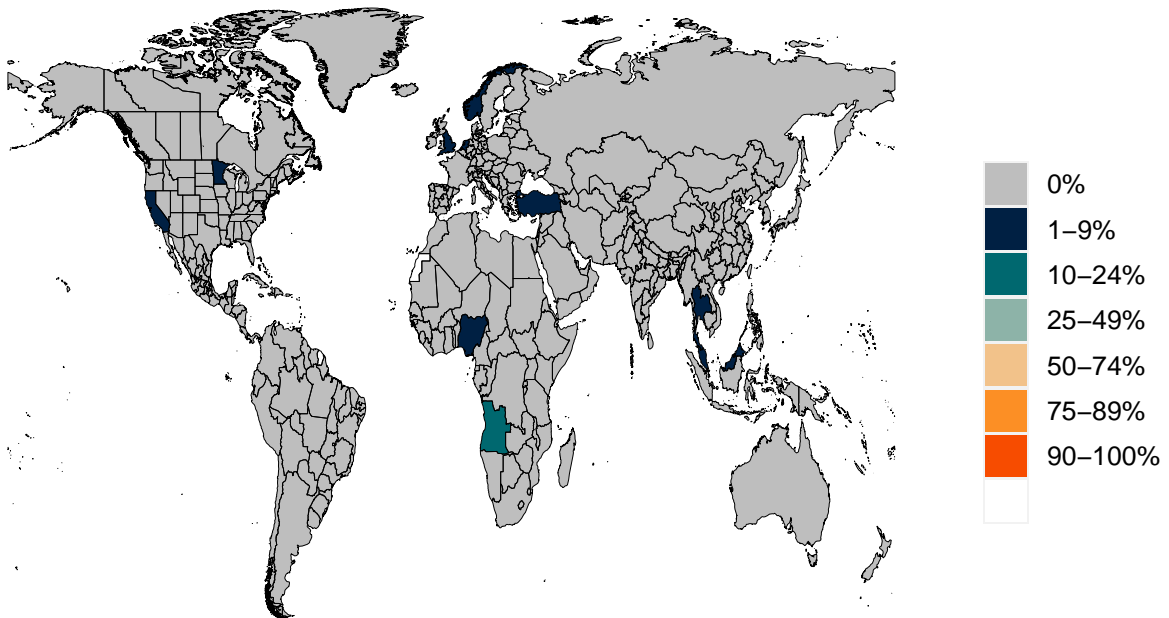


Figure 9. Estimated percent of circulating SARS-CoV-2 for primary variant families on September 20, 2021

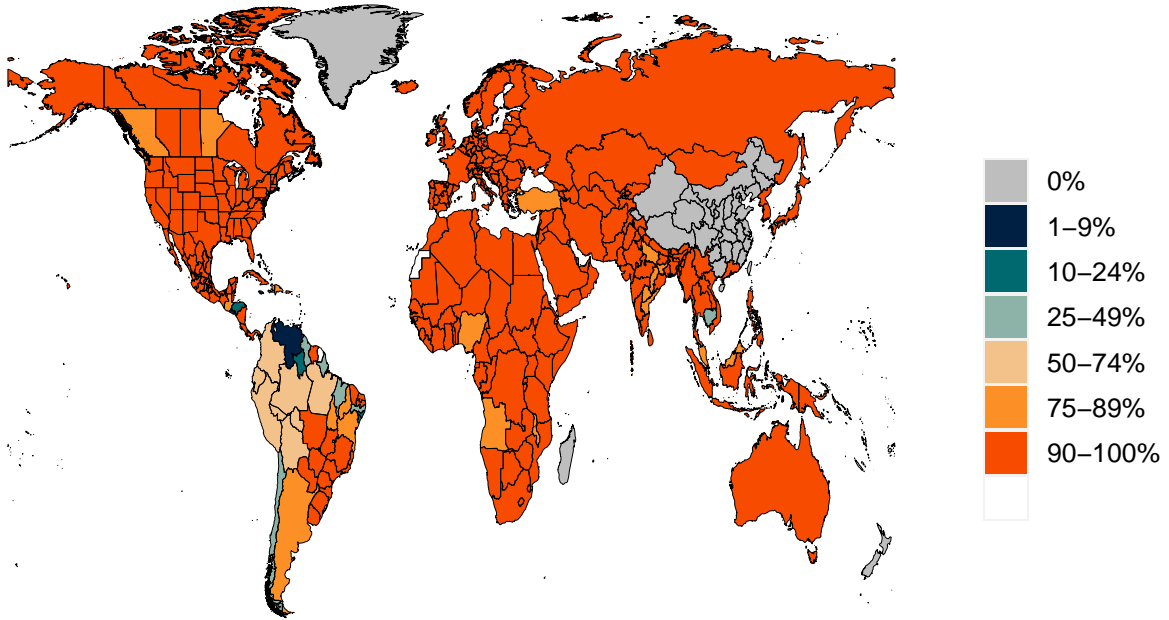
A. Estimated percent Alpha variant



B. Estimated percent Beta variant



C. Estimated percent Delta variant



D. Estimated percent Gamma variant

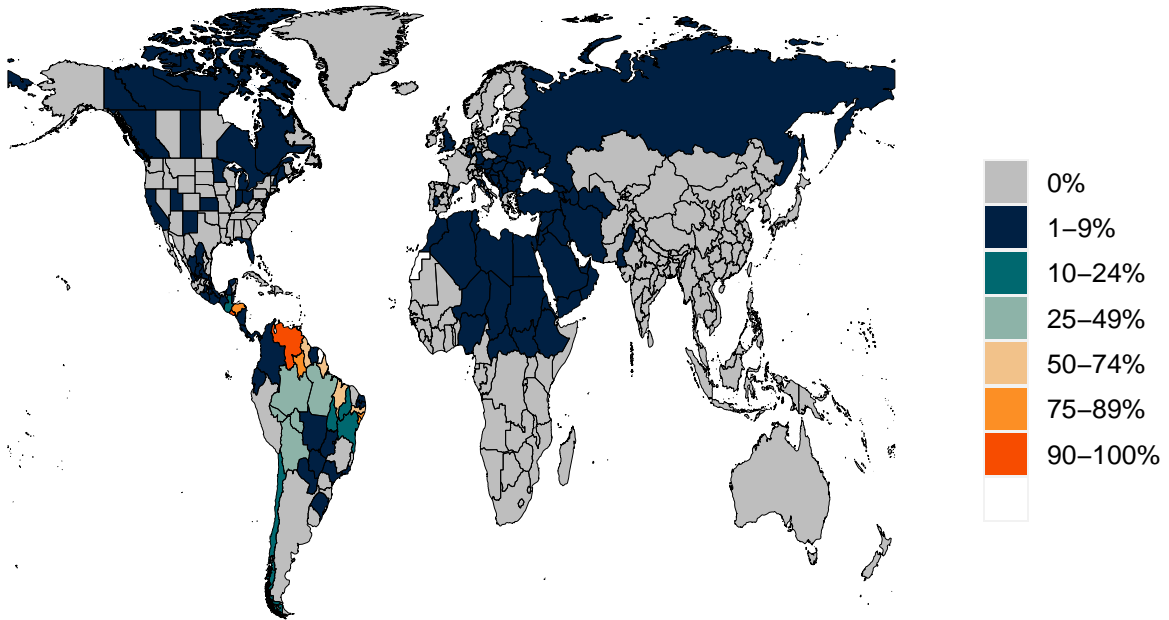
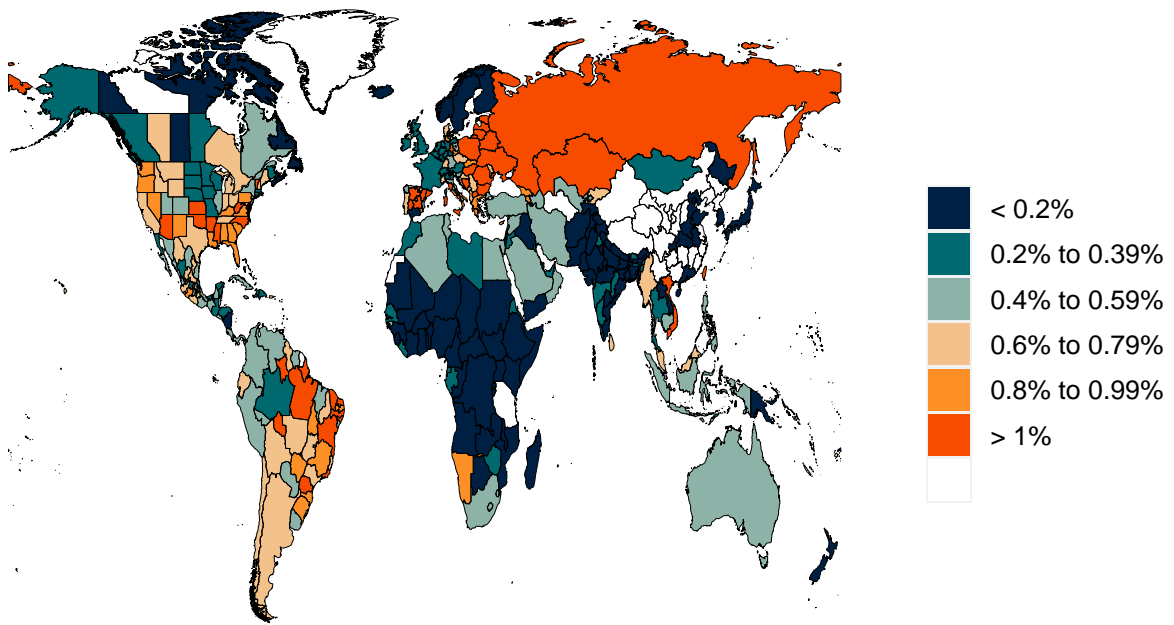


Figure 10. Infection-fatality rate on September 20, 2021. This is estimated as the ratio of COVID-19 deaths to estimated daily COVID-19 infections.



Critical drivers

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

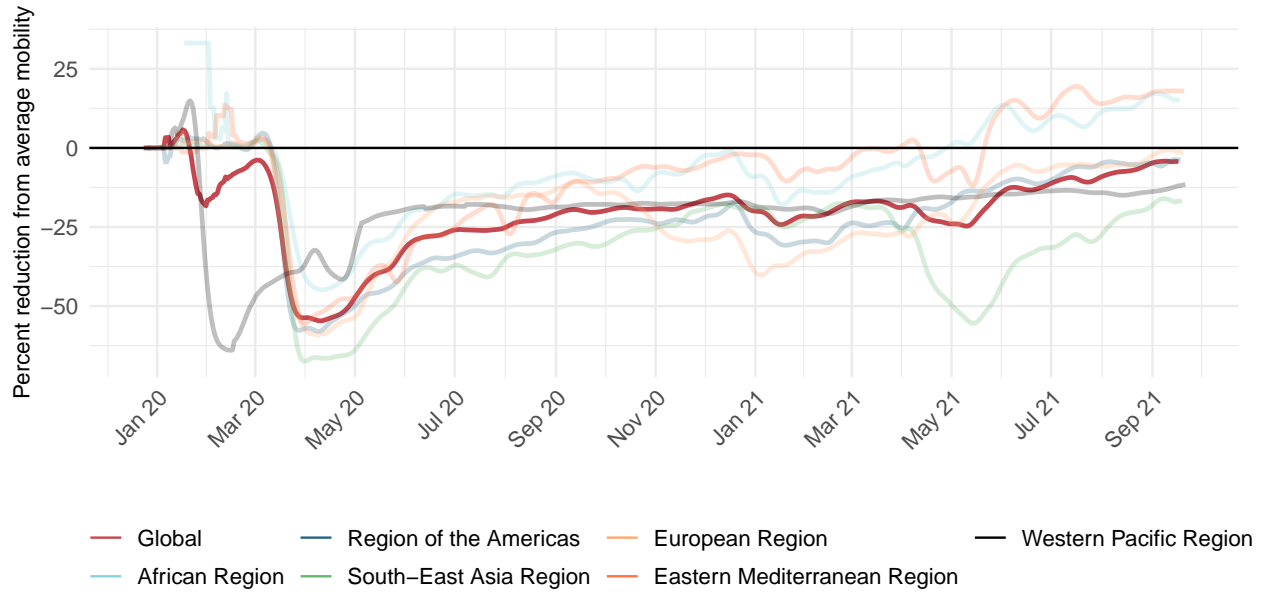


Figure 12. Mobility level as measured through smartphone app use, compared to January 2020 baseline (percent) on September 20, 2021

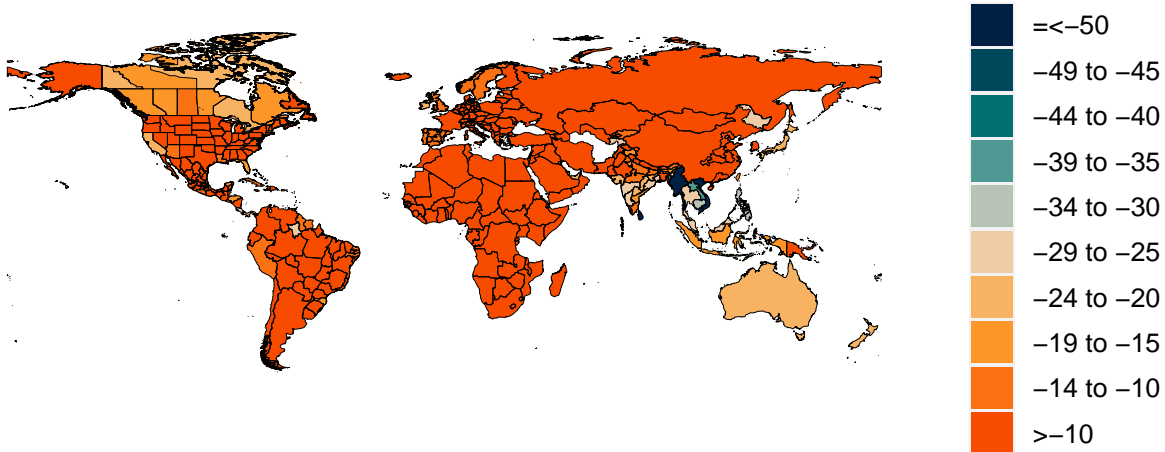


Figure 13. Trend in the proportion of the population reporting always wearing a mask when leaving home

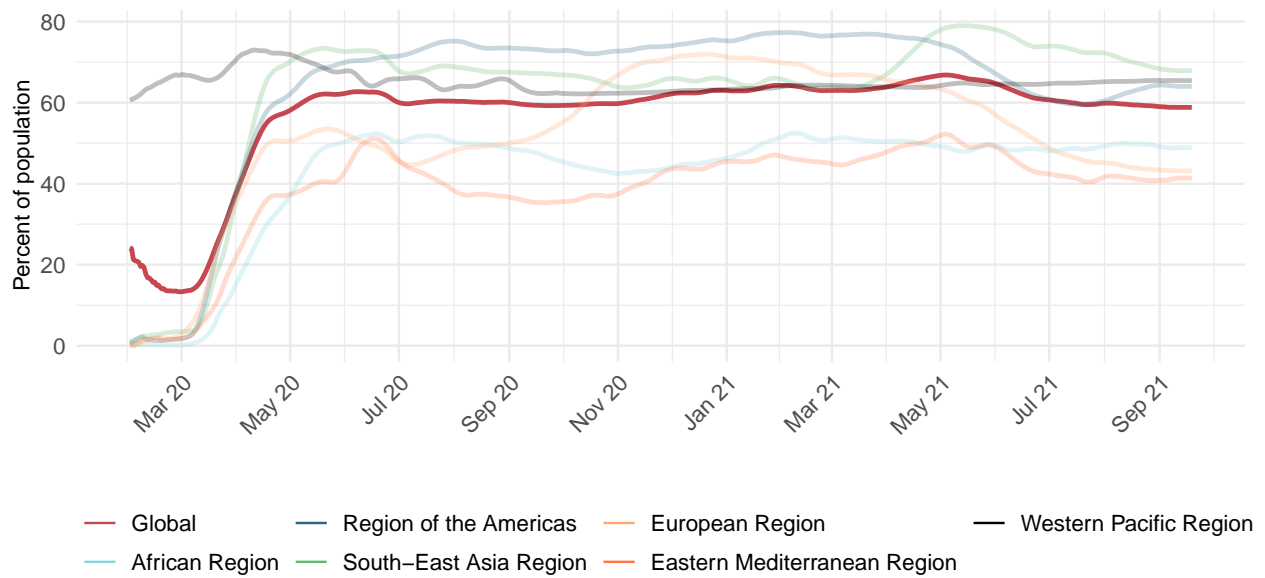


Figure 14. Proportion of the population reporting always wearing a mask when leaving home on September 20, 2021

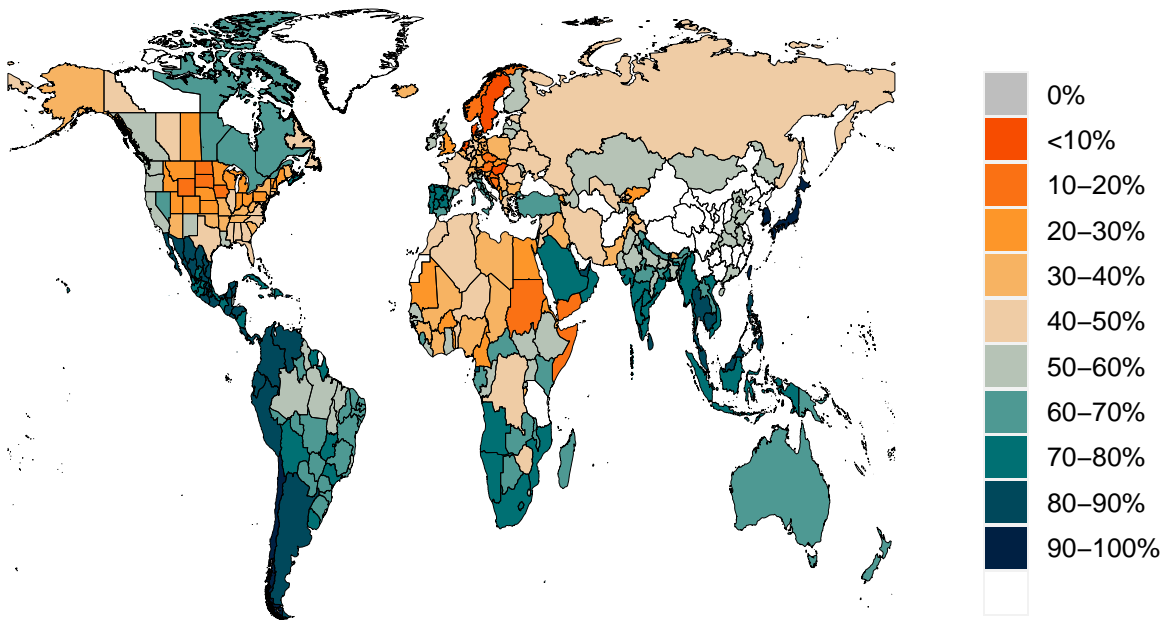


Figure 15. Trend in COVID-19 diagnostic tests per 100,000 people

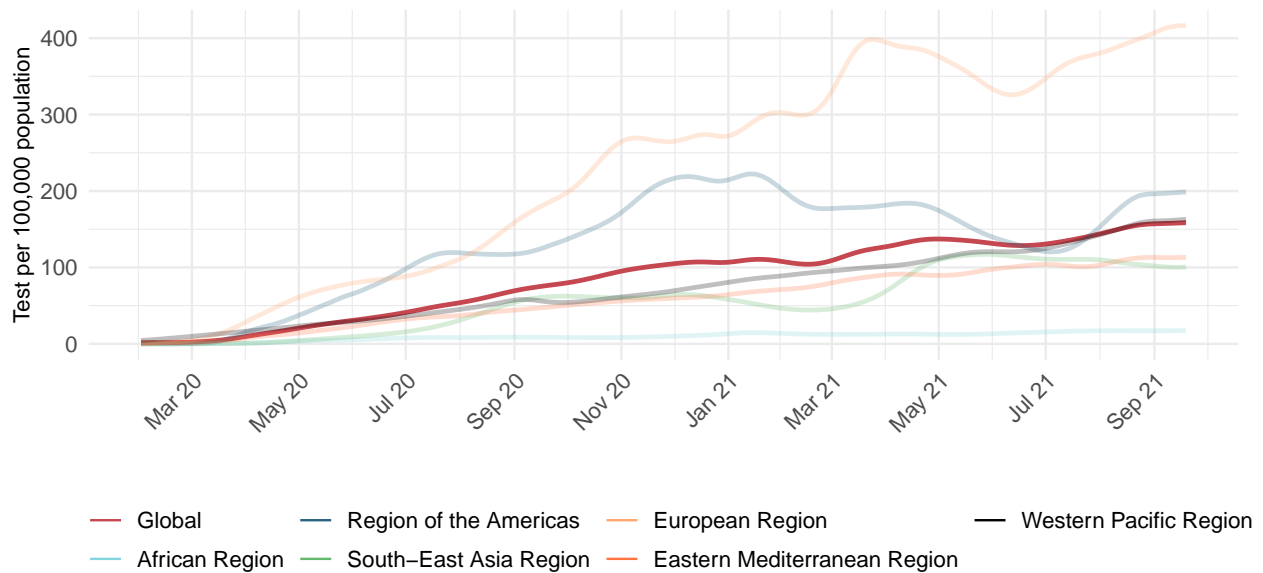


Figure 16. COVID-19 diagnostic tests per 100,000 people on September 20, 2021

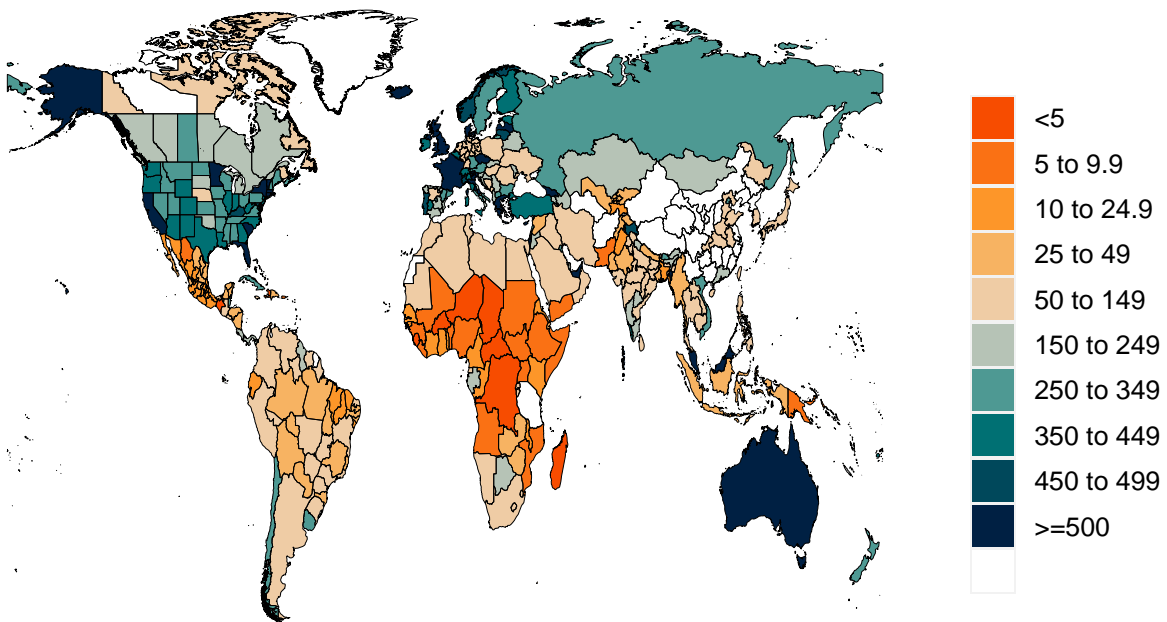
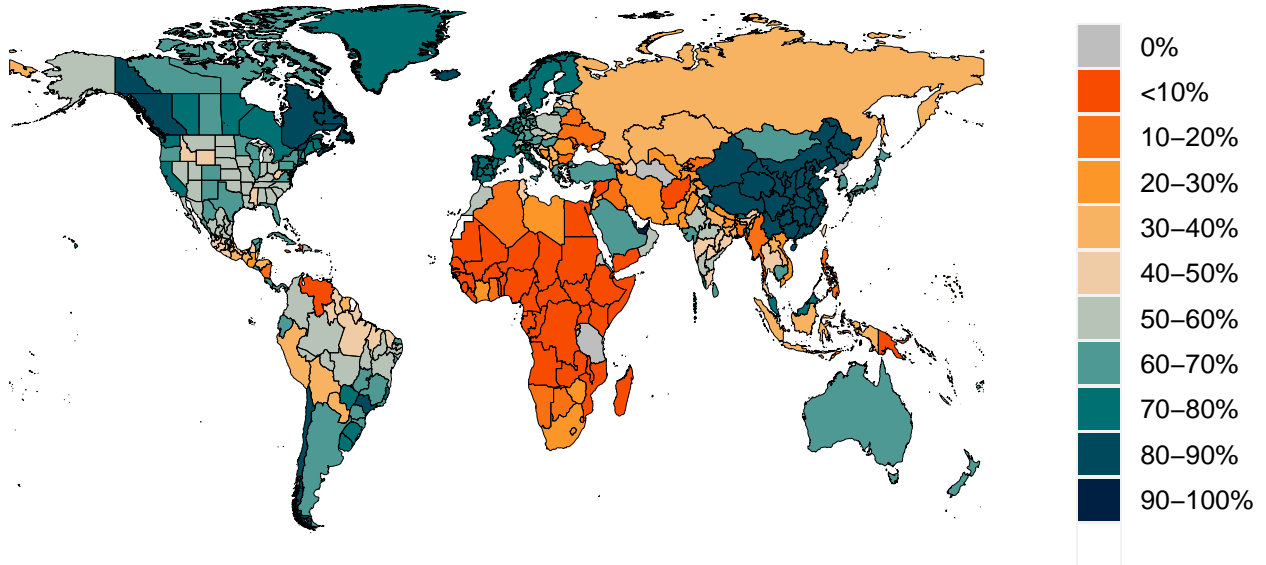


Table 3. Estimates of vaccine efficacy for specific vaccines used in the model at preventing disease and infection. The SEIR model uses variant-specific estimates of vaccine efficacy at preventing symptomatic disease and at preventing infection. We use data from clinical trials directly, where available, 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 20, 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

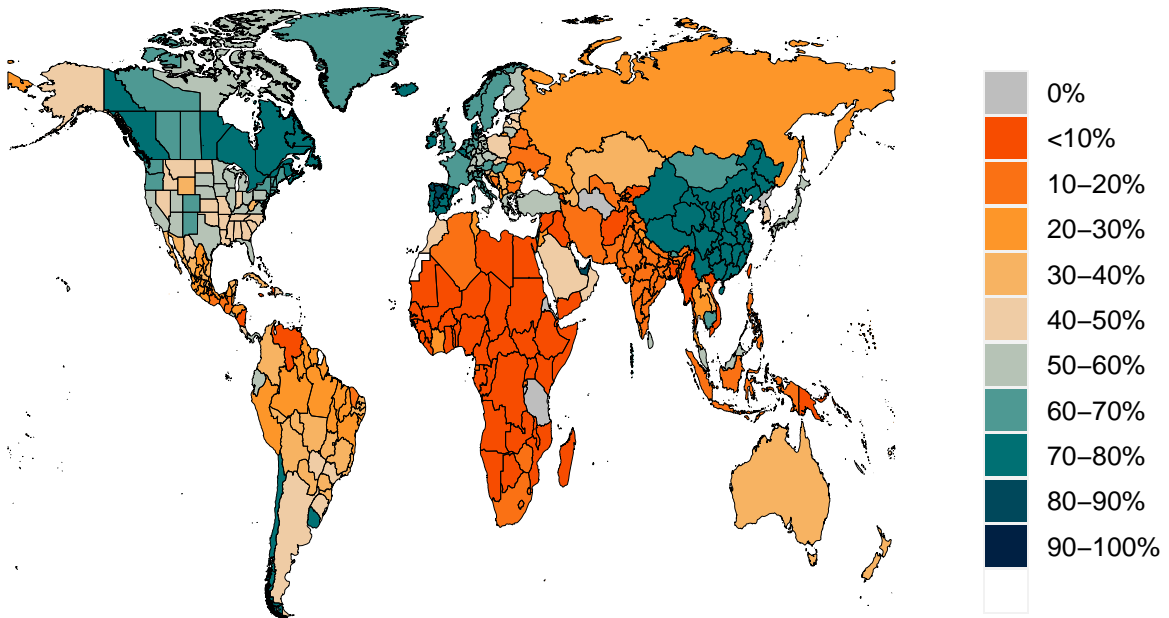


Figure 18. Trend in the estimated proportion of the adult (18+) population that have been vaccinated or would probably or definitely receive the COVID-19 vaccine if available

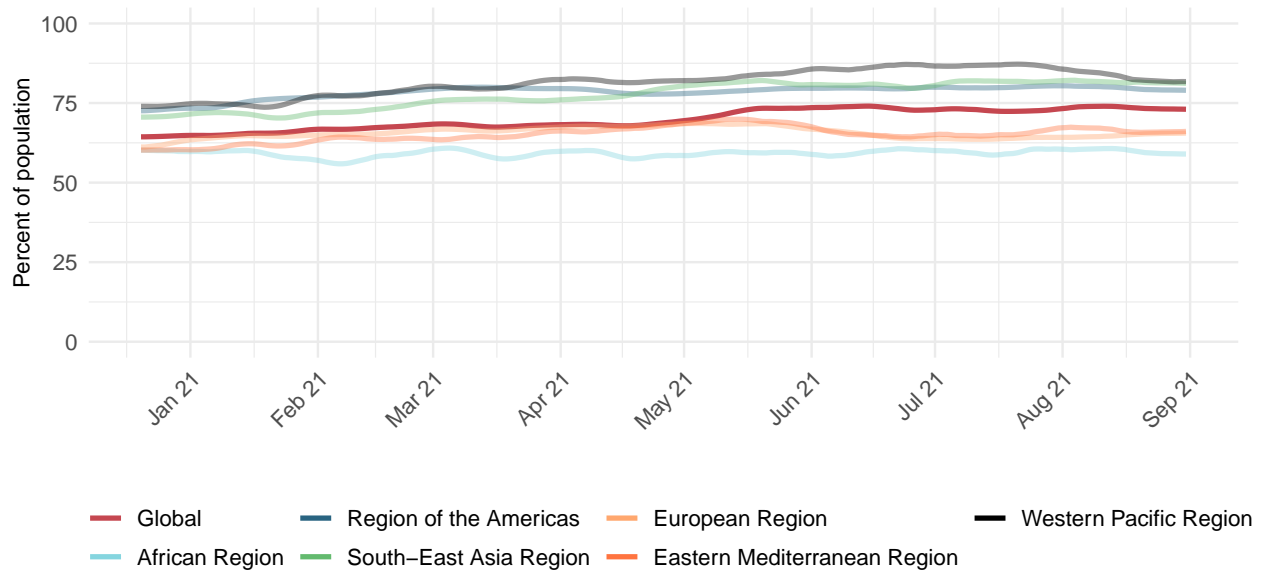


Figure 19. This figure shows the estimated proportion of the adult (18+) population that has been vaccinated or would probably or definitely receive the COVID-19 vaccine if available

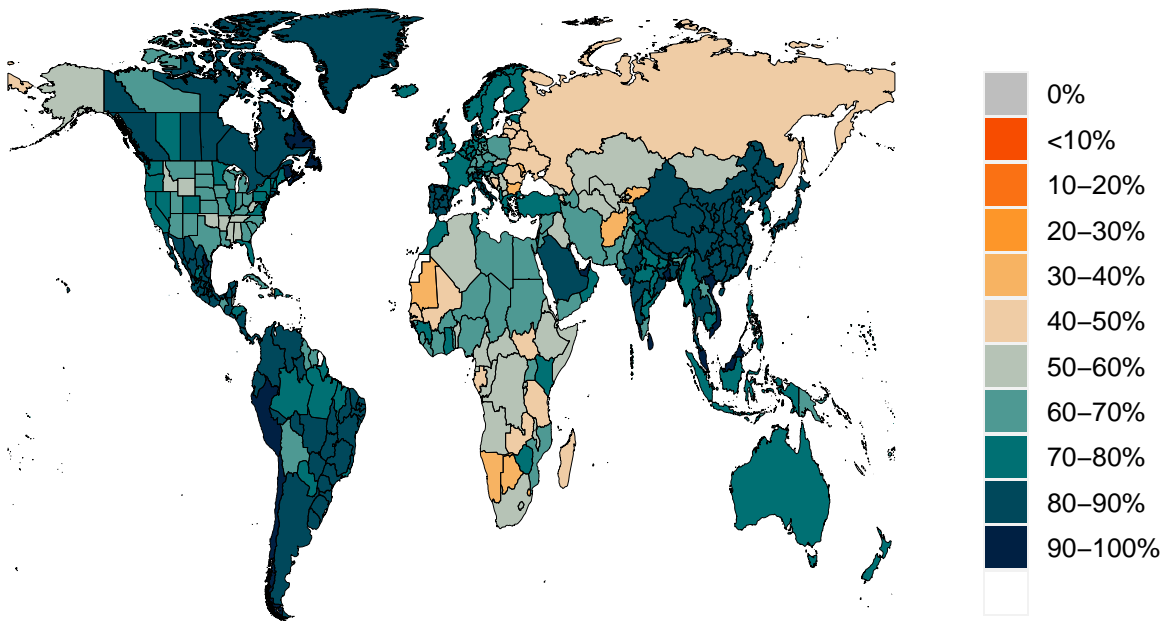


Figure 20. Percent of people who receive at least one dose of a COVID-19 vaccine and those who are fully vaccinated

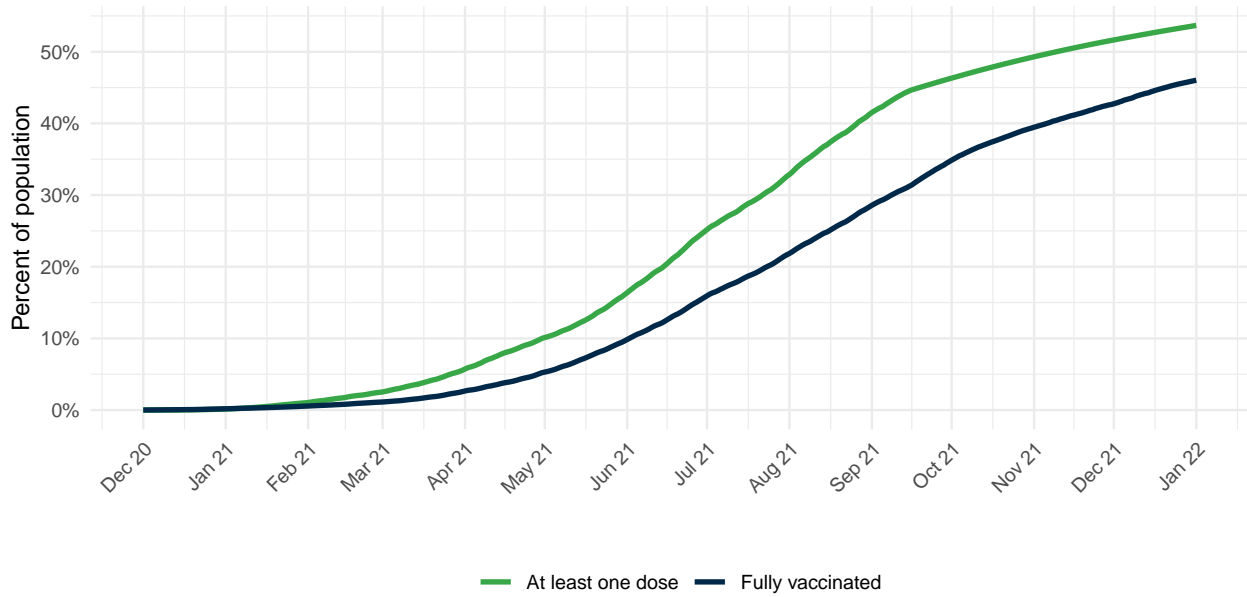
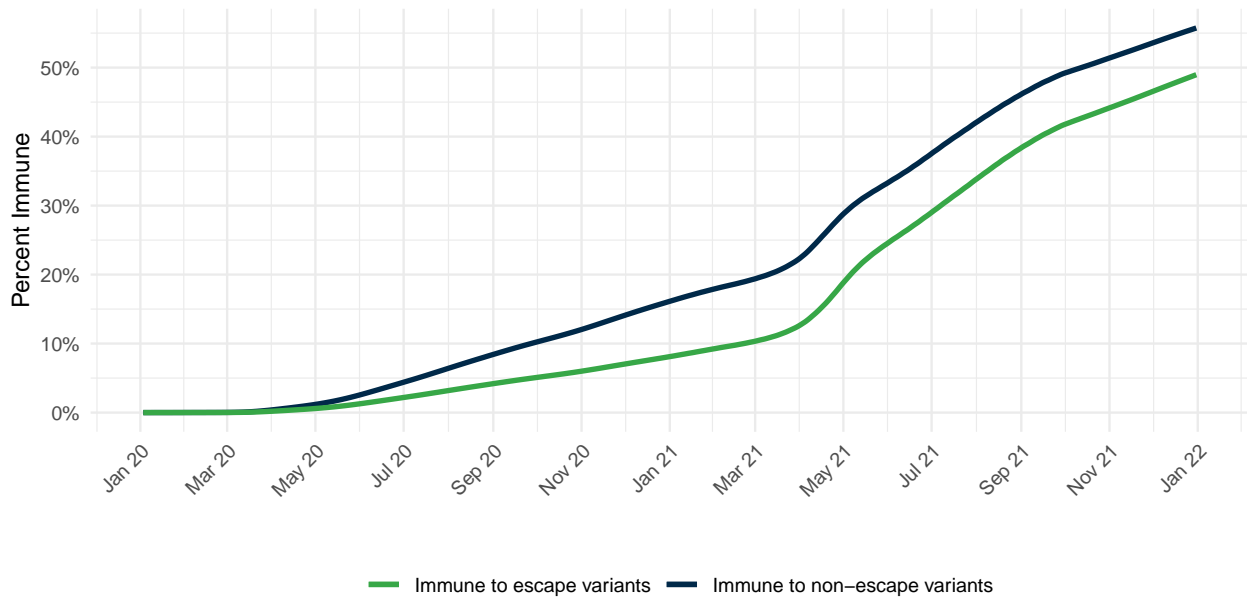


Figure 21. Percentage of people who are immune to non-escape variants and the percentage of people who are immune to escape variants



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.

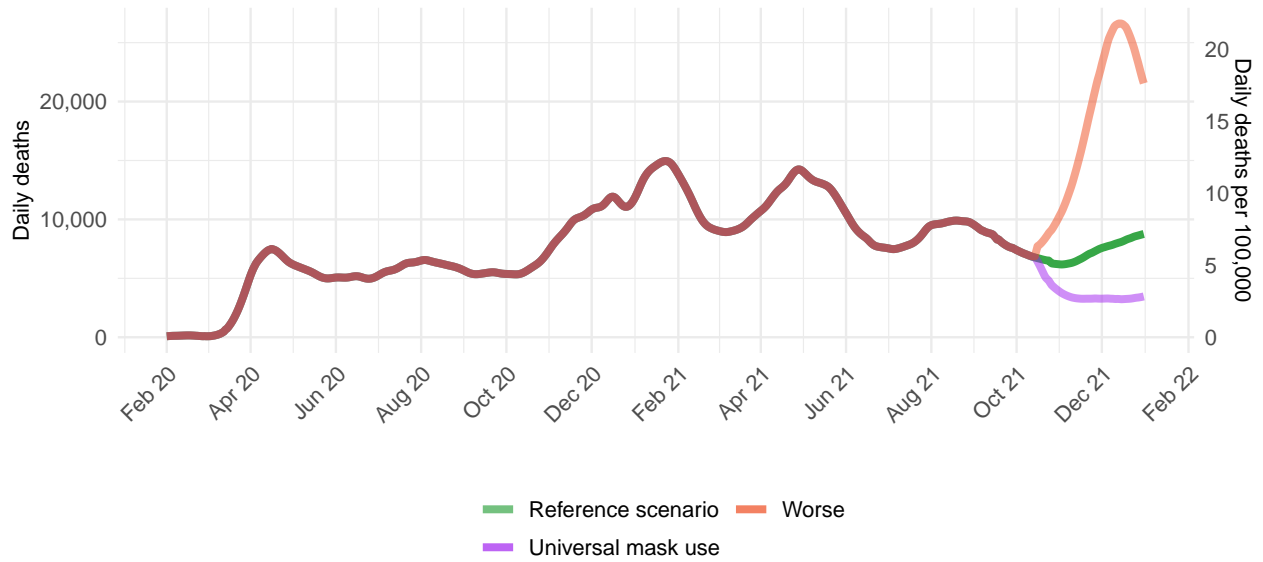
The **worse scenario** modifies the reference scenario assumption in four ways:

- 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

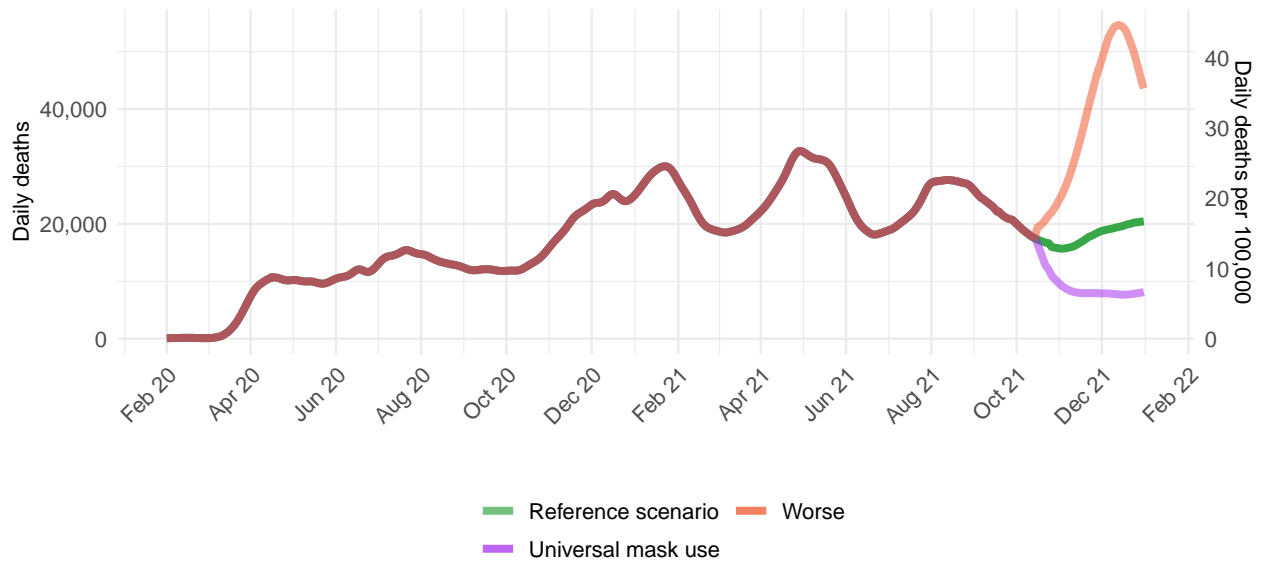


Figure 23. Daily COVID-19 infections until January 01, 2022 for three scenarios

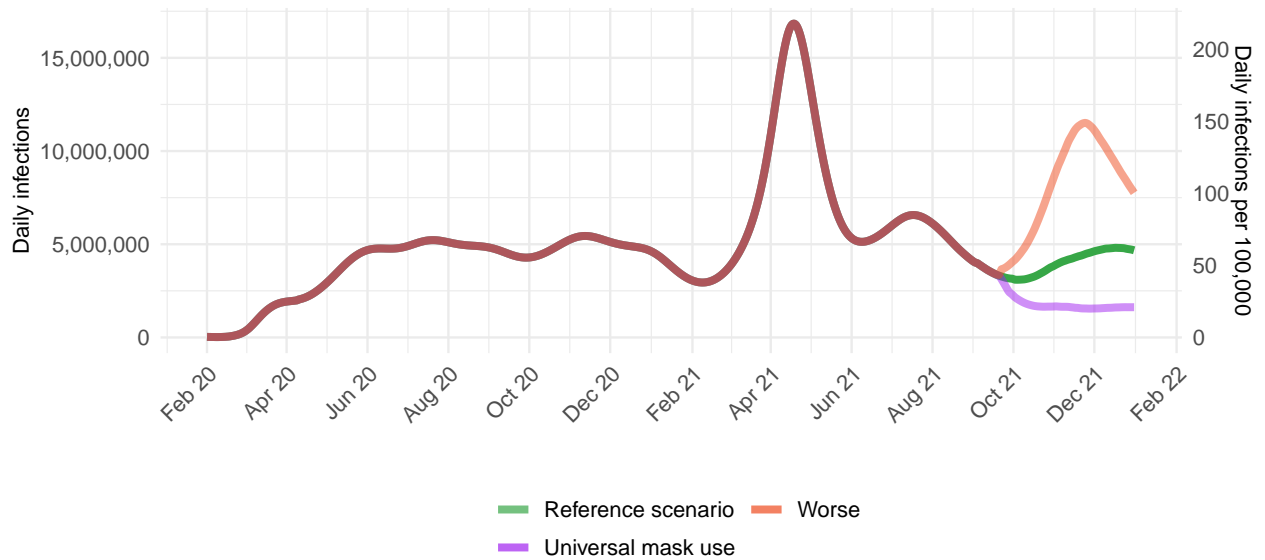


Figure 24. Daily COVID-19 reported cases until January 01, 2022 for three scenarios

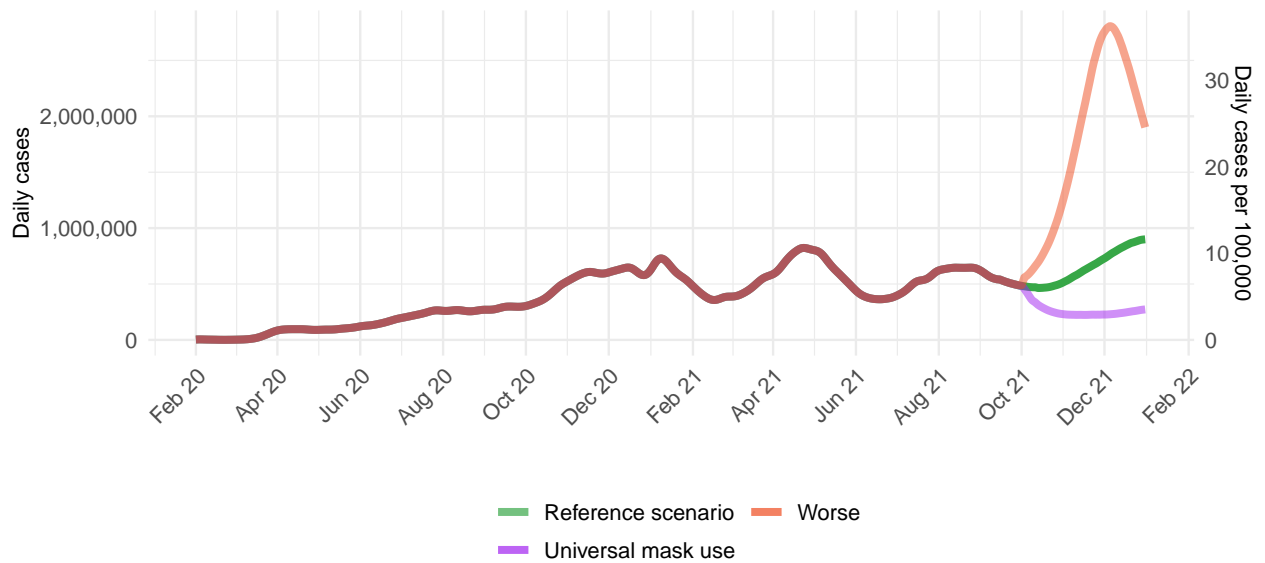
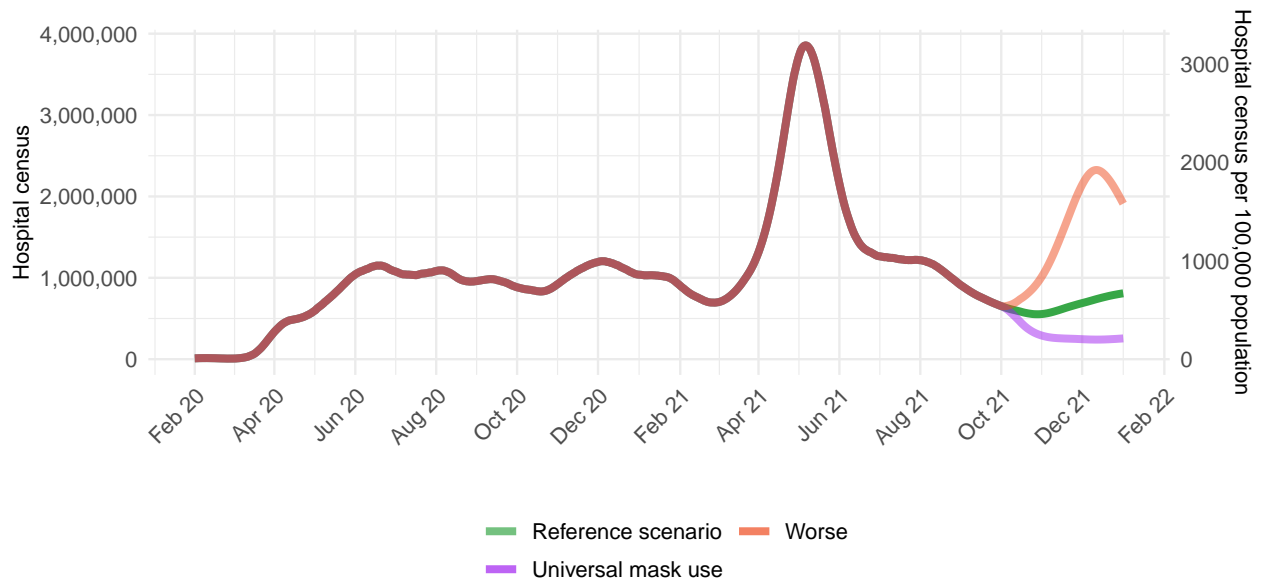


Figure 25. Daily COVID-19 hospital census until January 01, 2022 for three scenarios



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>.