COVID-19 Results Briefing

Global

September 9, 2022

This document contains summary information on the latest projections from the IHME model on COVID-19 globally. The model was run on September 9, 2022, with data through August 29, 2022.

Global infections peaked in August and are declining to an expected nadir in early October, followed by an increase driven by the Northern Hemisphere through to the end of the year. Due to high levels of immunity from past infection and vaccination, we do not expect the increase in infections to lead to major increases in severe disease and death. Nevertheless, our reference scenario forecasts 290,000 reported deaths and 539,000 total COVID deaths by the end of the year. These numbers suggest a very low infection-fatality rate, but the sheer volume of infections will lead to over half a million deaths.

These forecasts are subject to considerable uncertainty from three sources: First, the fraction of the population that is susceptible to infection is the key driver of transmission over the next four months. This fraction is critically dependent on the pace with which infection-acquired immunity and vaccine-derived immunity wanes. Available evidence suggests that protection against infection provided by vaccination and infection is similar and wanes relatively rapidly. Protection against severe disease is also similar for infection and vaccination and wanes more slowly. However, the evidence base for these waning immunity curves is limited and is essentially nonexistent for the BA.5 subvariant. Even slightly different waning immunity curves can alter the forecasts considerably. Second, China has the vast majority of the never infected, and the potential for substantial death if there is a widespread Omicron wave is high. We have assumed there will not be a major epidemic there because of the zero-COVID policy in place. If this policy were to change, the global forecasts would be very substantially changed. Third, our reference scenario does not include the emergence of a new variant or subvariant. The course of the epidemic in 2022 has been completely determined by the emergence of different Omicron subvariants. But there is a real possibility that a more severe variant with considerable immune escape could emerge. Such a variant would very substantially alter the projected death toll.

Governments can adopt a number of strategies to manage the epidemic at this point: First, the wider use of at-home rapid antigen tests has made reported case trends difficult to interpret. The UK ONS Infection Survey is the only example of a direct measurement of infection in the community. Comparison of the ONS data with our metrics suggests that the best measure at this point is hospital admissions with COVID. This is not, however, routinely reported to WHO and is available from only a limited number of governments. More emphasis should be placed on reporting hospital admissions with COVID and breaking this number into hospital admissions for COVID and hospital admissions for another cause but who test positive for COVID. Both are useful, the latter for tracking community infection rates and the former for tracking severe COVID. Second, efforts should continue to offer boosters for those who desire to have them and are in high-risk groups.

Boosters should be seen as a strategy to reduce severe disease and death but not as a transmission control strategy. Third, efforts to ensure wider access, especially in low- and middle-income countries, to antivirals should continue. Finally, in the absence of the emergence of a new variant, there does not seem to be a role for population social distancing mandates. Governments, however, should be prepared to use these tools if a dangerous variant emerges. It would be very important to evaluate in each country which mandates appeared to have the greatest impact to ground future action on the evidence to date.

Current situation

- Estimated daily infections in the last week decreased to 32.2 million per day on average compared to 40.5 million the week before (Figure 1.1).
- Estimated daily hospital census in the last week (through August 29) decreased to 353,000 per day on average compared to 388,000 the week before.
- Daily reported cases in the last week decreased to 654,000 per day on average compared to 737,000 the week before (Figure 2.1).
- Reported deaths due to COVID-19 in the last week decreased to 2,200 per day on average compared to 2,300 the week before (Figure 3.1).
- Total deaths due to COVID-19 in the last week decreased to 4,700 per day on average compared to 4,900 the week before (Figure 3.1). This makes COVID-19 the number seven cause of death globally this week (Table 1). Estimated total daily deaths due to COVID-19 in the past week were 2.2 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 two locations and two subnational locations (Figure 4.1).
- The daily rate of total deaths due to COVID-19 is greater than 4 per million in nine locations and eight subnational locations (Figure 4.2).
- We estimate that 77% of people globally have been infected at least once as of August 29 (Figure 6.1).
- Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 77 locations and 76 subnational locations (Figure 7.1). The vast majority of the uninfected are in China.
- The infection-detection rate globally was close to 2% on August 29 (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). Omicron is the dominant variant around the globe.

Trends in drivers of transmission

- Mobility last week was 19% higher than the pre-COVID-19 baseline (Figure 11.1). Mobility was 15% or more below baseline in nine locations and 10 subnational locations (Figure 12.1).

- As of August 28, in the COVID-19 Trends and Impact Survey, 24% of people self-reported that they always wore a mask when leaving their home (Figure 13.1).
- There were 248 diagnostic tests per 100,000 people on August 29 (Figure 15.1).
- As of August 29, 89 locations and 187 subnational locations have reached 70% or more of the population who have received at least one vaccine dose, and 74 locations and 153 subnational locations have reached 70% or more of the population who are fully vaccinated (Figures 17.1 and 17.2). 68% of people globally have received at least one vaccine dose, and 63% are fully vaccinated.
- In our current reference scenario, we expect that 5.3 billion people will be vaccinated with at least one dose by January 1 (Figure 19.1). We expect that 64% of the population will be fully vaccinated by January 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 will decline to 50% of the minimum level it reached between January 1, 2021, and May 1, 2022. This decline begins after the last observed data point in each location and transitions linearly to the minimum over a period of six weeks.
- Mobility increases as vaccine coverage increases.
- 80% of those who are fully vaccinated (two doses for most vaccines, or one dose for Johnson & Johnson) receive an additional dose six months after becoming fully vaccinated, and 80% of those who receive an additional dose receive a second additional dose six months later.
- Antiviral utilization for COVID-19 risk prevention has reached 80% in high-risk populations and 50% in low-risk populations between March 1, 2022, and June 1, 2022. This applies in high-income countries, but not low- and middle-income countries, and this rollout assumption follows a similar pattern to global vaccine rollouts.

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 **antiviral access scenario** makes all the same assumptions as the reference scenario but assumes globally distributed antivirals and extends coverage to all low- and middle-income countries between August 15, 2022, and September 15, 2022.

Infections

- Daily estimated infections in the **reference scenario** reach a low of nearly 15.0 million by the end of September and then will rise to 45.0 million by the end of the year (Figure 21.1).
- Daily estimated infections in the **80% mask use scenario** will drop to less than 6 million by early October and then rise to 34.0 million by January 1, 2023 (Figure 21.1).
- Daily estimated infections in the **antiviral access scenario** follows the reference scenario pattern (Figure 21.1).

Cases

- Daily estimated cases in the **reference scenario** drop to a low in early October and then rise to over 900,000 by January 1, 2023 (Figure 21.2).
- Daily estimated cases in the **80% mask use scenario** will rise to just over 625,000 by January 1, 2023 (Figure 21.2).
- Daily estimated cases in the **antiviral access scenario** follows the pattern in the reference scenario (Figure 21.2).

Hospitalizations

- Daily hospital census in the **reference scenario** will rise to over 400,000 by January 1, 2023 (Figure 21.3).
- Daily hospital census in the **80% mask use scenario** will decline to near 60,000 by mid-October and then increase slowly (Figure 21.3).
- Daily hospital census in the **antiviral access scenario** will rise to over 350,000 by January 1, 2023 (Figure 21.3).

Deaths

- In our **reference scenario**, our model projects 7,329,000 cumulative reported deaths due to COVID-19 on January 1. This represents 290,000 additional deaths from August 29 to January 1. Daily reported COVID-19 deaths in the **reference scenario** will rise to 5,000 by January 1, 2023 (Figure 21.4).
- Under our **reference scenario**, our model projects 18,025,000 cumulative total deaths due to COVID-19 on January 1. This represents 539,000 additional deaths from August 29 to January 1 (Figure 21.5).
- In our **80% mask use scenario**, our model projects 7,211,000 cumulative reported deaths due to COVID-19 on January 1. This represents 173,000 additional deaths from August 29 to January 1. Daily reported COVID-19 deaths in the **80% mask use scenario** will rise to 2,830 by January 1, 2023 (Figure 21.4).
- In our **antiviral access scenario**, our model projects 7,296,000 cumulative reported deaths due to COVID-19 on January 1. This represents 257,000 additional deaths from August 29 to January 1. Daily reported COVID-19 deaths in the **antiviral access scenario** will rise to 4,220 by January 1, 2023 (Figure 21.4).

Model updates

To estimate vaccine-derived immunity to infection we systematically compiled data from several studies estimating vaccine efficacy as a function of time since the second dose. For each vaccine and outcome separately (infection symptoms and severe disease, defined as hospitalization or death), we used Bayesian meta-regression with a monotonically decreasing spline on time since second dose to estimate waning curves by vaccine and outcome. We fit these models in bounded logit (efficacy) space with a constraint that efficacy cannot decline below 10%. We used a spline on time since vaccination and time since booster dose analysis. Values that were not biologically plausible were excluded from this analysis (e.g., negative values for vaccine effectiveness). To estimate infection-derived waning immunity, risk measures of SARS-CoV-2 infection in individuals with previous infection compared with infection-naïve individuals were extracted from relevant study data. We used a Bayesian meta-regression approach similar to estimating waning vaccine protection to estimate time since infection and including studies based on the study population's mean time since infection. We estimated 95% uncertainty intervals (UI) from fixed effects and between-study heterogeneity using simulation analysis (1,000 draws). We previously modeled all Omicron variants as one, without differentiating between variant surges. The model is now updated to distinguish between the BA.1/BA.2 and BA.5 invasion dates of Omicron.

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

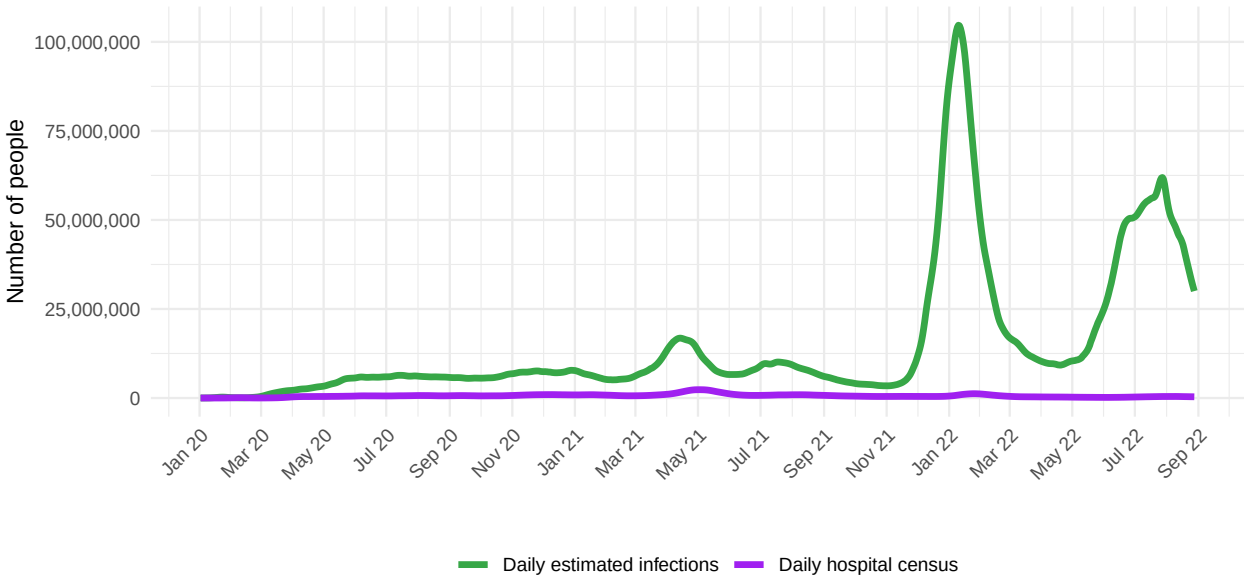


Figure 2.1: Reported daily COVID-19 cases, moving average

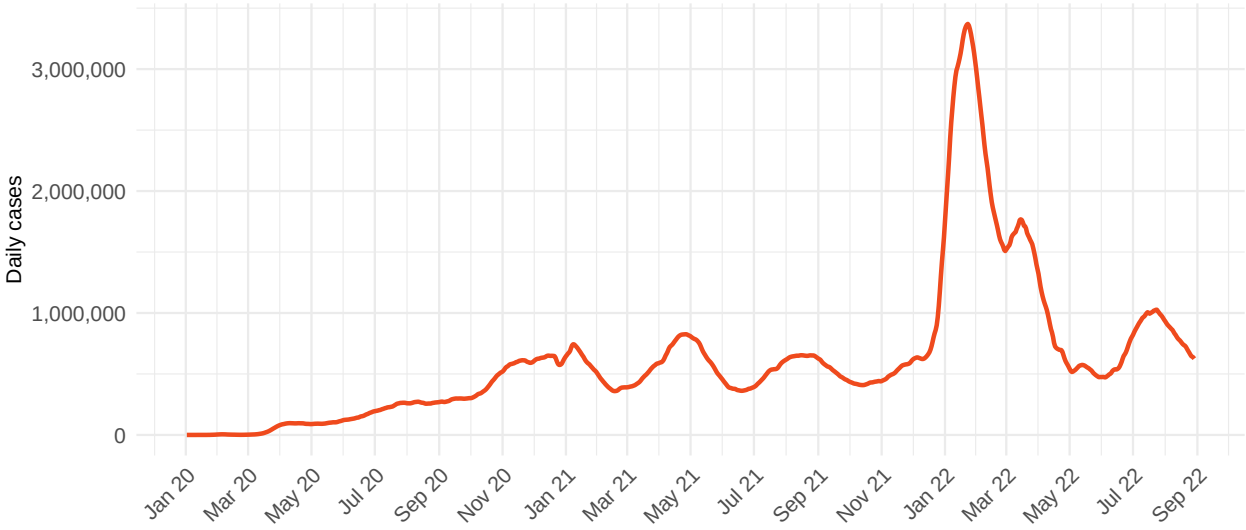
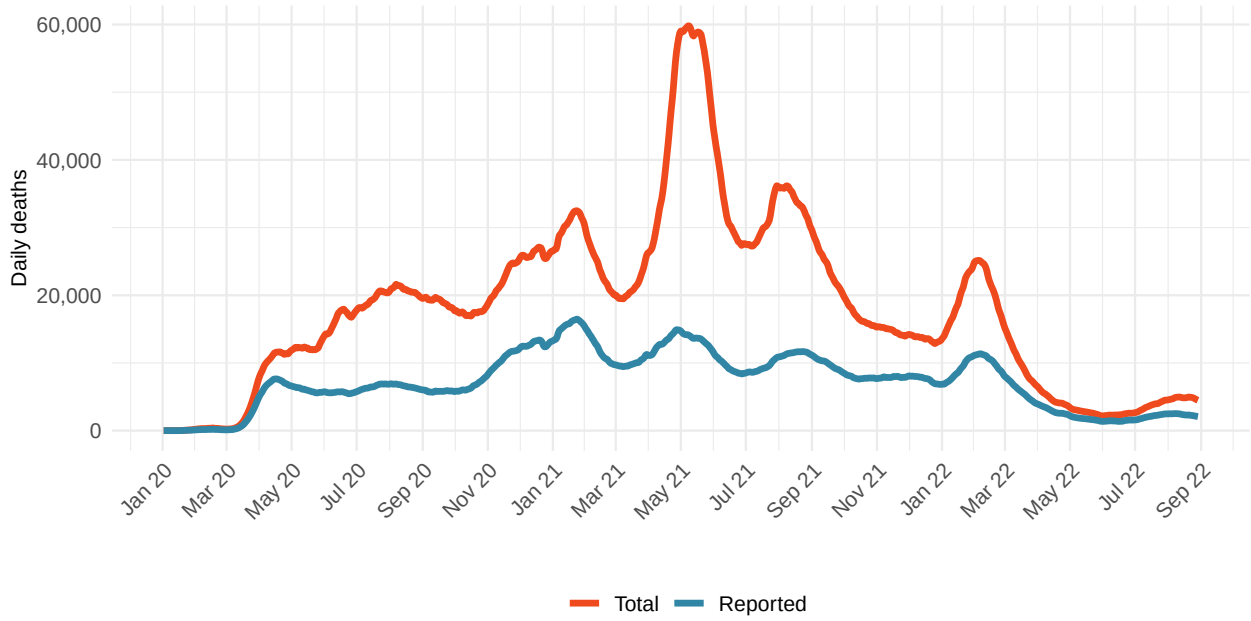


Table 1: Ranking of total deaths due to COVID-19 among the leading causes of mortality this week, assuming uniform deaths of non-COVID causes throughout the year

Cause name	Weekly deaths	Ranking
Ischemic heart disease	175,727	1
Stroke	126,014	2
Chronic obstructive pulmonary disease	63,089	3
Lower respiratory infections	47,946	4
Tracheal, bronchus, and lung cancer	39,282	5
Neonatal disorders	36,201	6
COVID-19	33,006	7
Alzheimer's disease and other dementias	31,217	8
Diabetes mellitus	29,830	9
Diarrheal diseases	29,509	10

Figure 3.1: Smoothed trend estimate of daily COVID-19 deaths



Daily COVID-19 death rate per 1 million on August 29, 2022

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

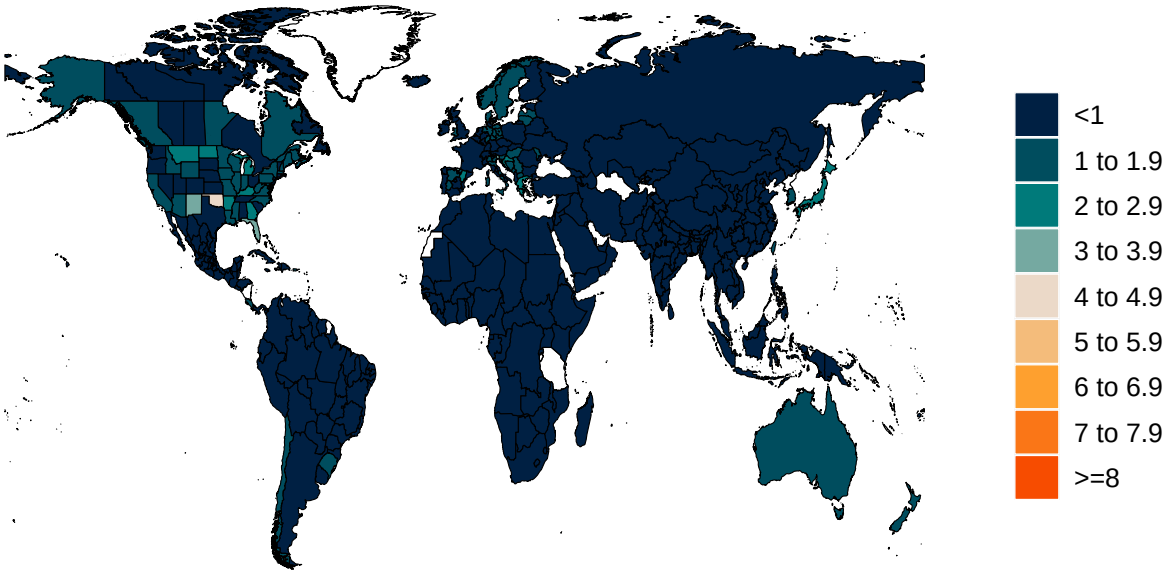
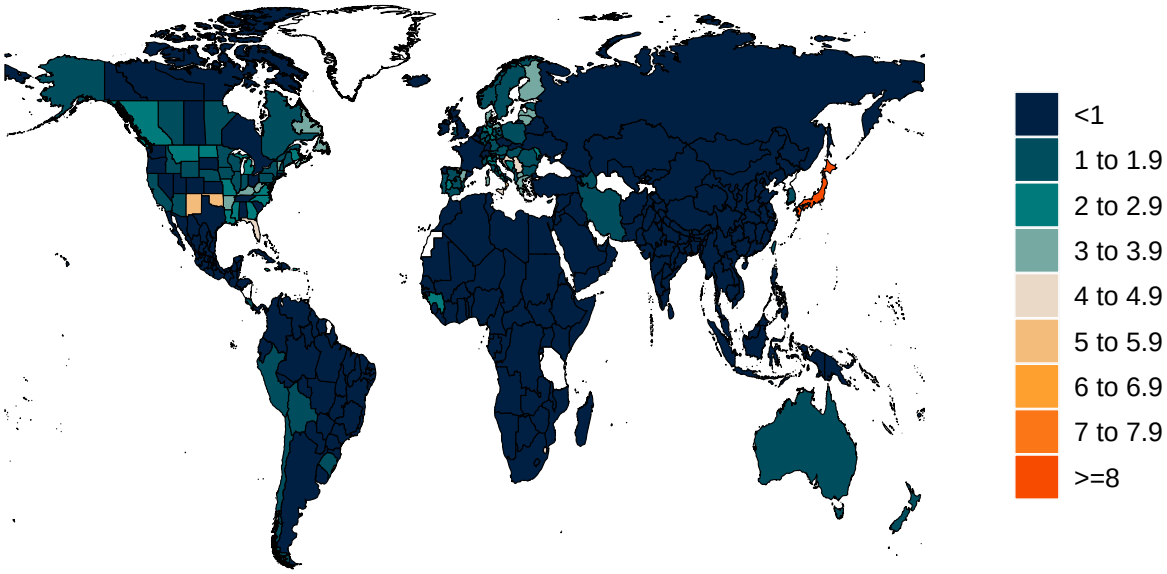


Figure 4.2: Daily total COVID-19 death rate per 1 million



Cumulative COVID-19 deaths per 100,000 on August 29, 2022

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

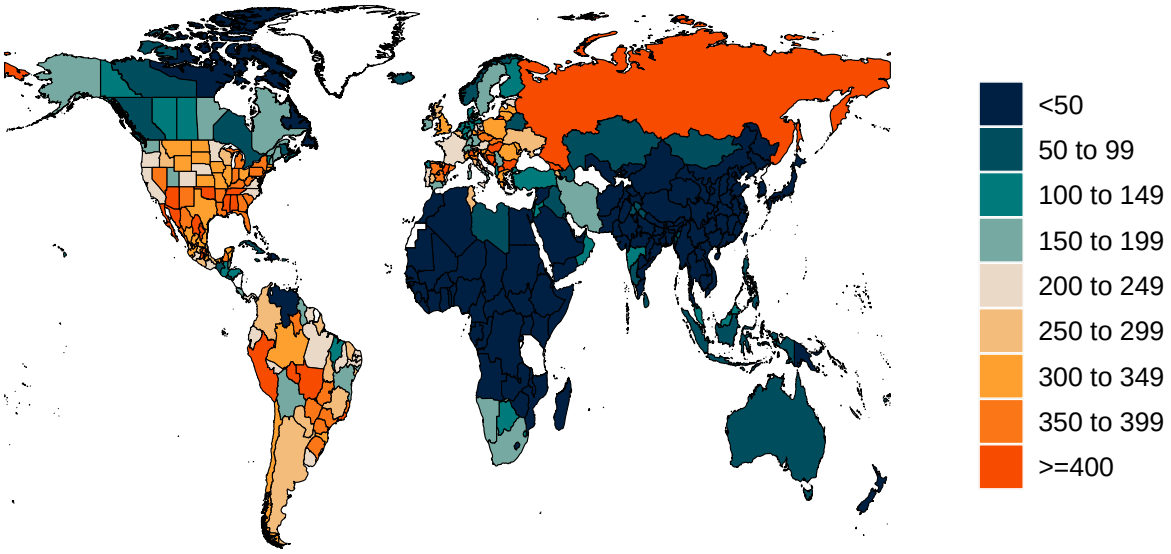


Figure 5.2: Total cumulative COVID-19 deaths per 100,000

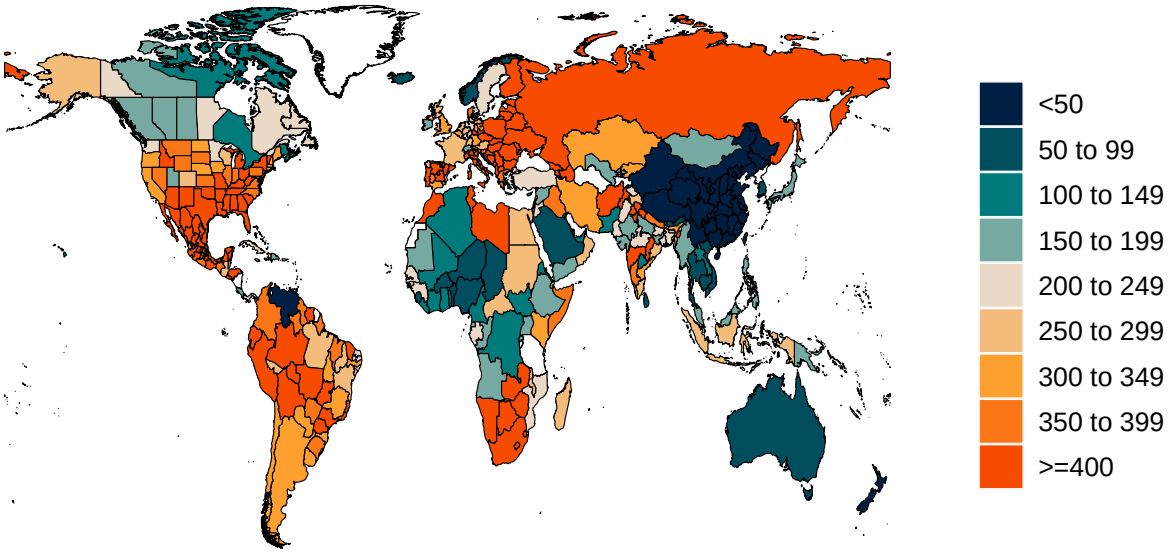


Figure 6.1: Estimated percent of the population infected with COVID-19 on August 29, 2022

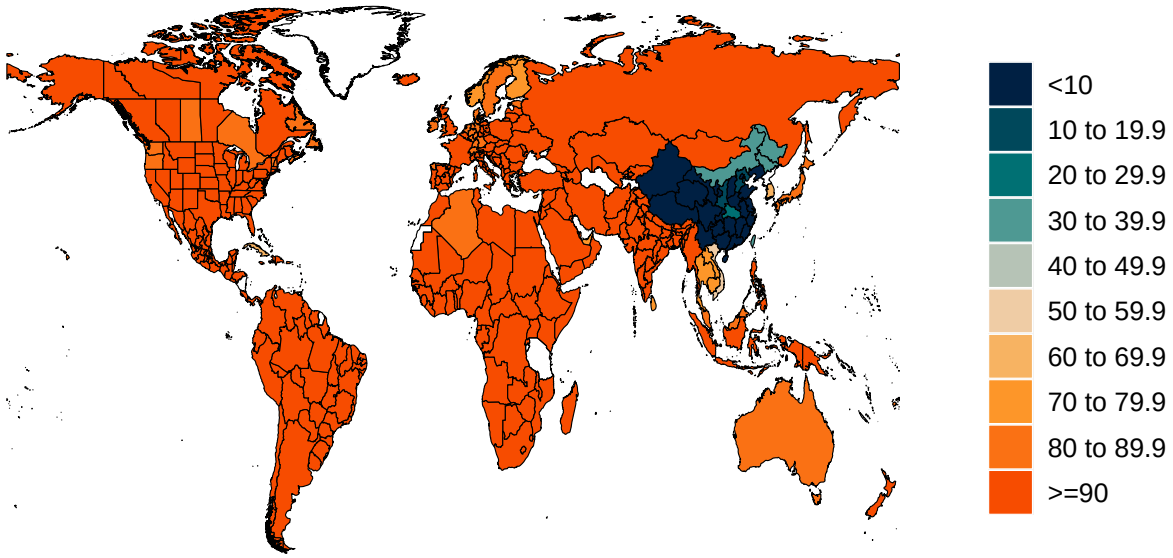


Figure 7.1: Mean effective R on August 18, 2022. Effective R less than 1 means that transmission should decline, all other things being held the same. The estimate of effective R is based on the combined analysis of deaths, case reporting, and hospitalizations where available. Current reported cases reflect infections 11-13 days prior, so estimates of effective R can only be made for the recent past.

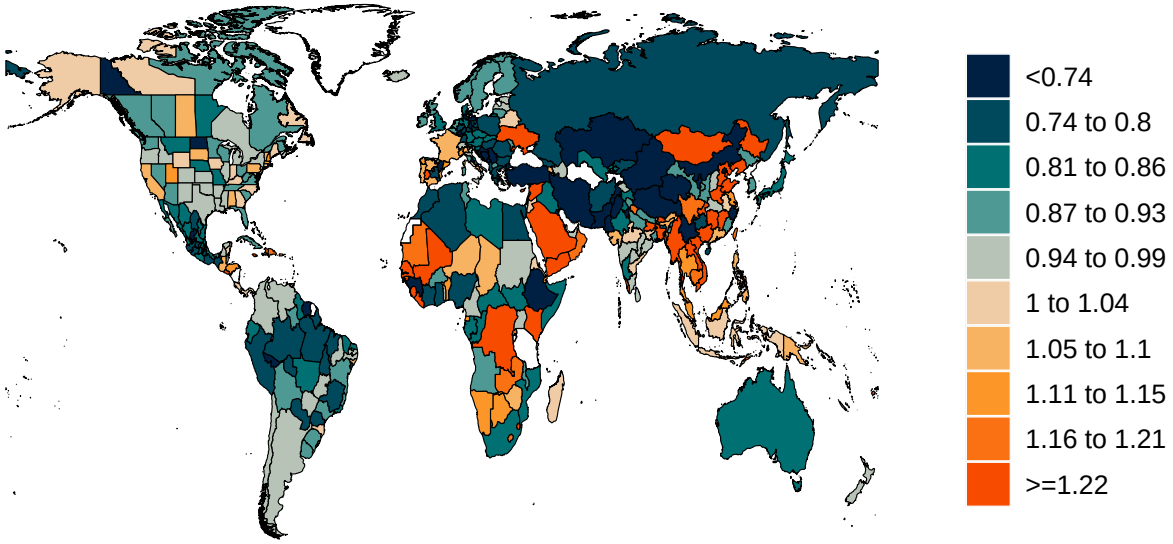
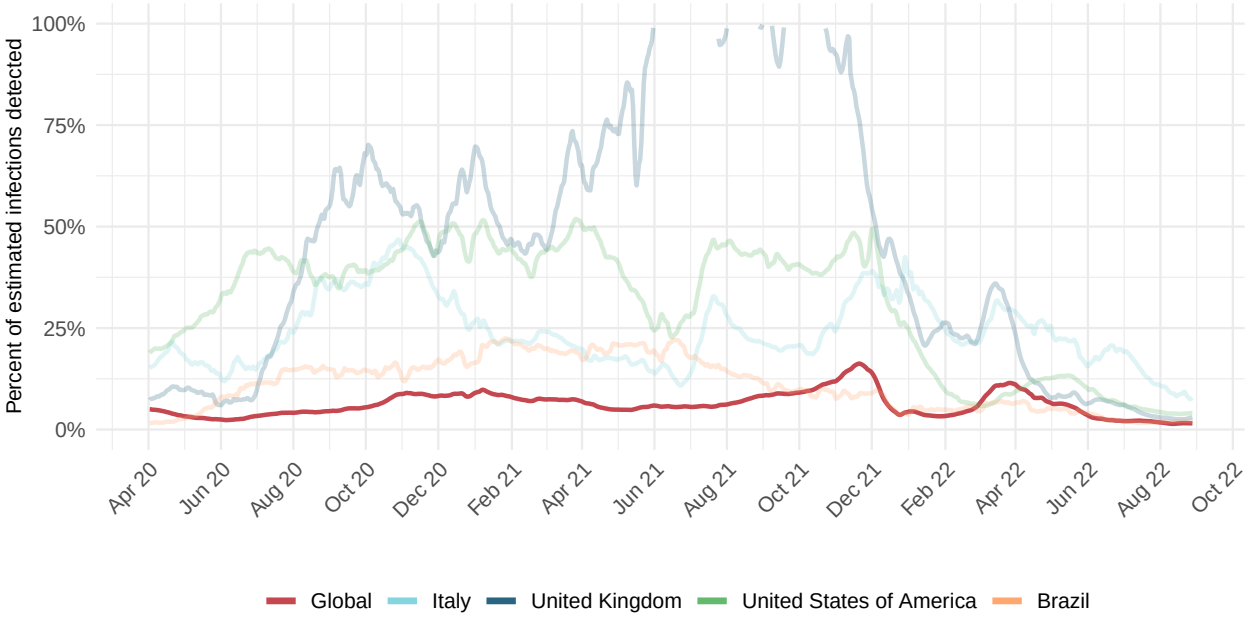


Figure 8.1: Percent of estimated COVID-19 infections detected. This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model. Due to measurement errors in cases and testing rates, the infection-detection rate can exceed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



Estimated percent of circulating SARS-CoV-2 for primary variant families on August 29, 2022

Figure 9.1: Estimated percent of new infections that are Alpha variant

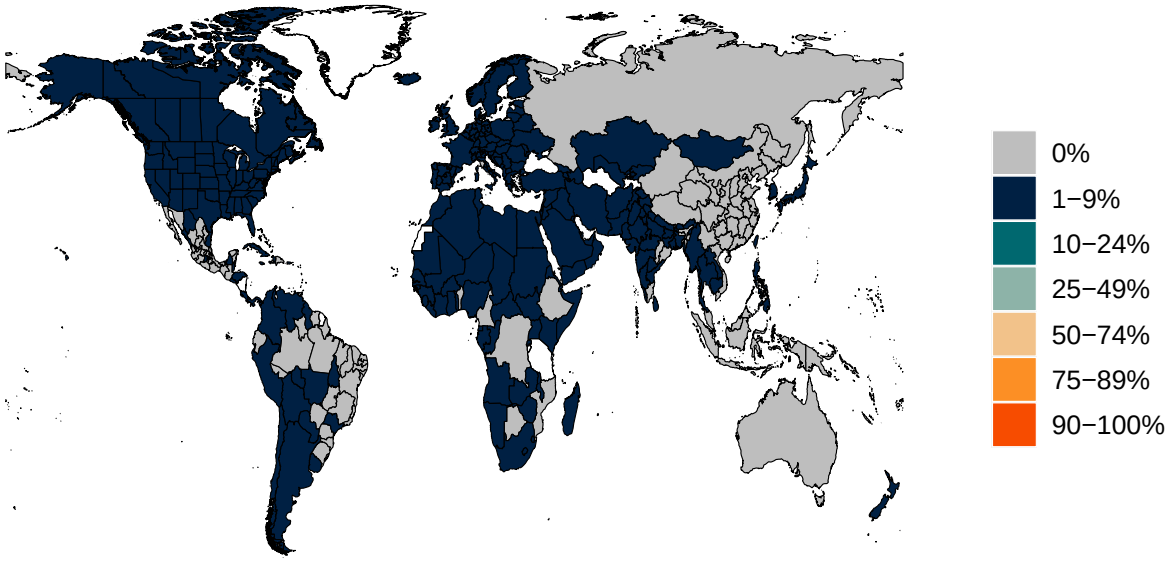


Figure 9.2: Estimated percent of new infections that are Beta variant

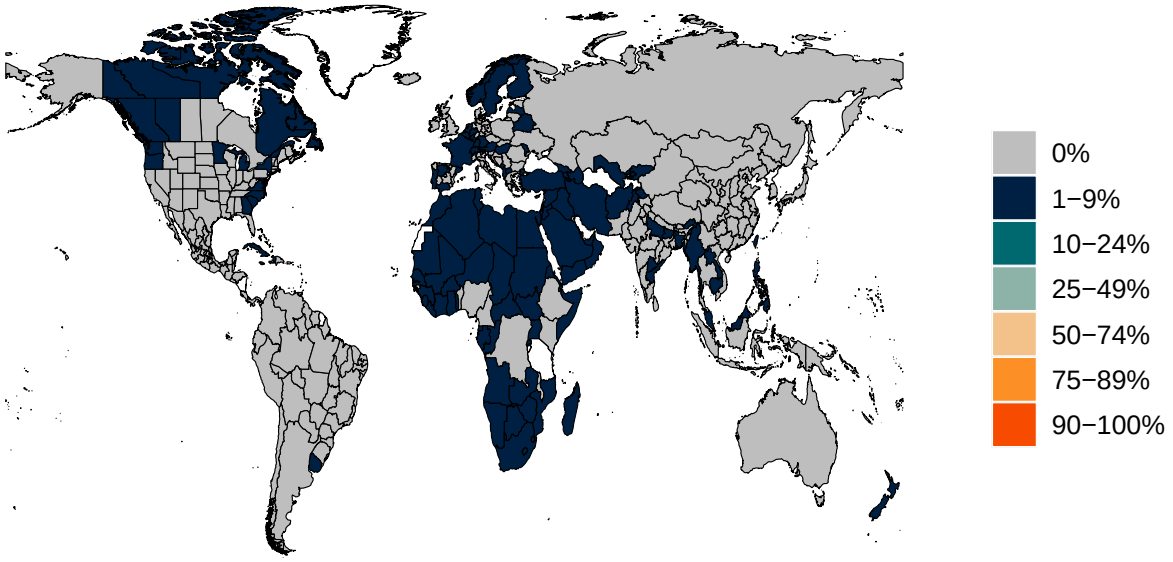


Figure 9.3: Estimated percent of new infections that are Delta variant

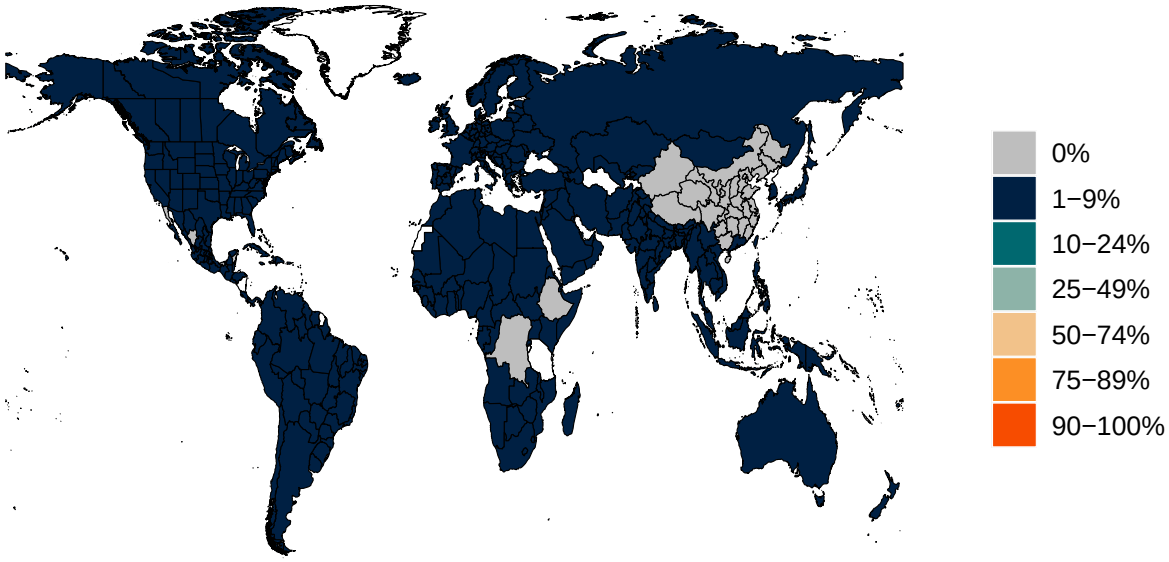


Figure 9.4: Estimated percent of new infections that are Gamma variant

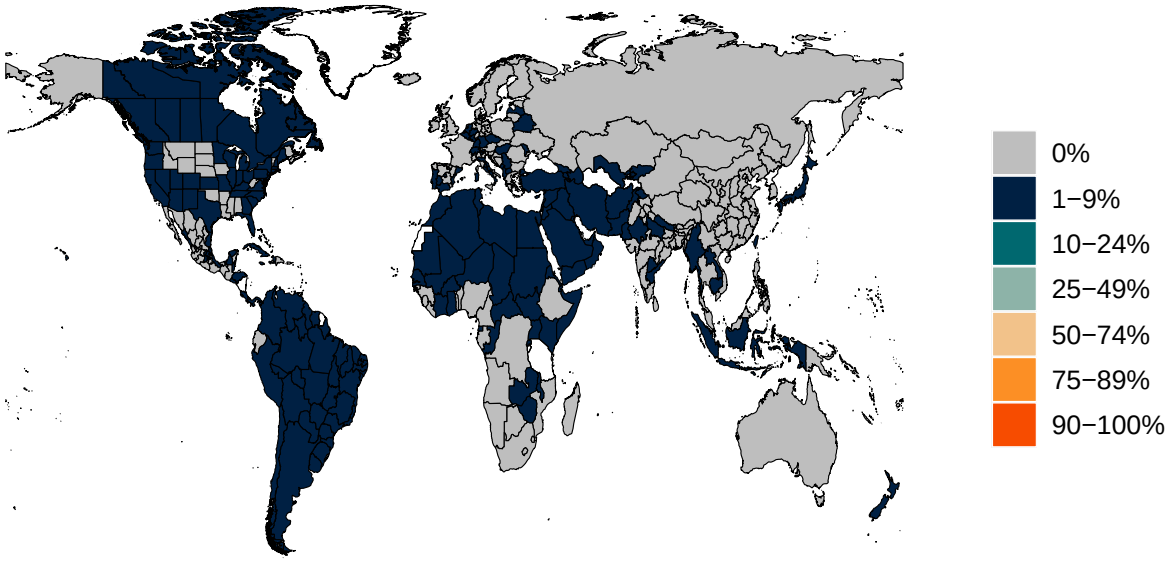


Figure 9.5: Estimated percent of new infections that are Omicron variant

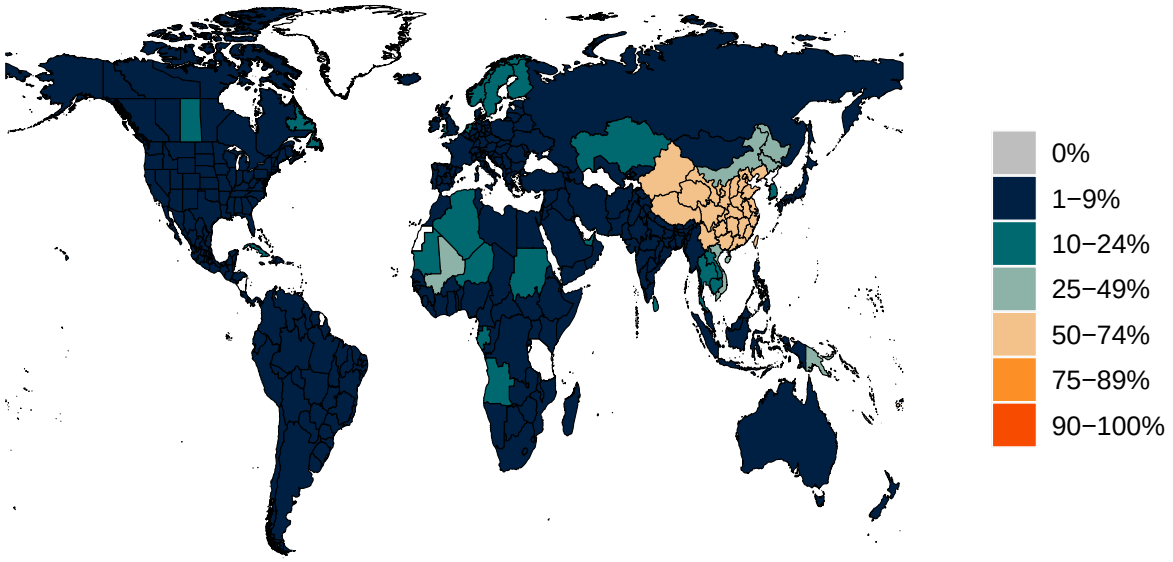


Figure 10.1: Infection-fatality rate on August 29, 2022. This is estimated as the ratio of COVID-19 deaths to estimated daily COVID-19 infections.

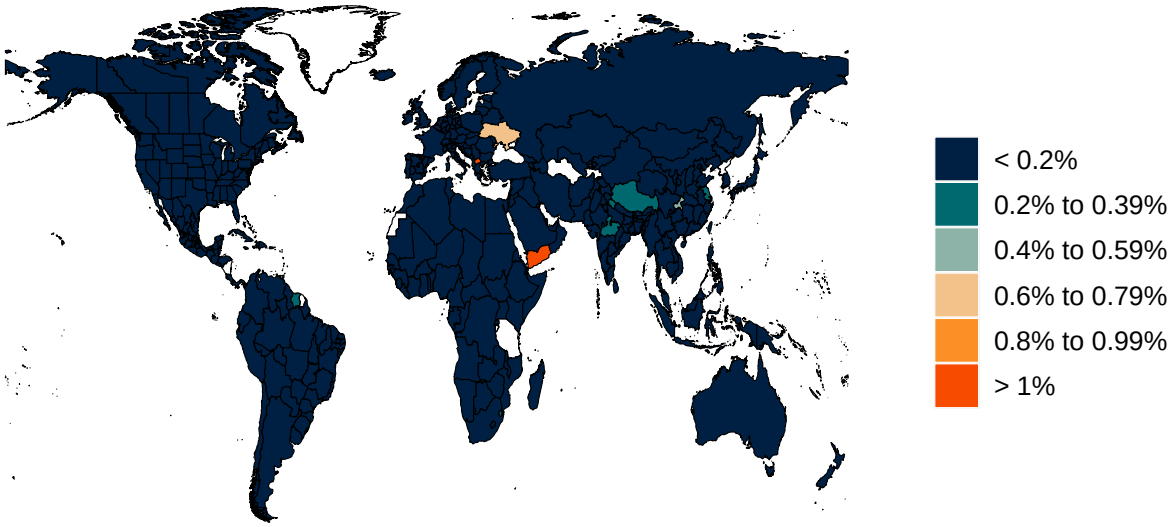


Figure 11.1: Trend in mobility as measured through smartphone app use, compared to January 2020 baseline

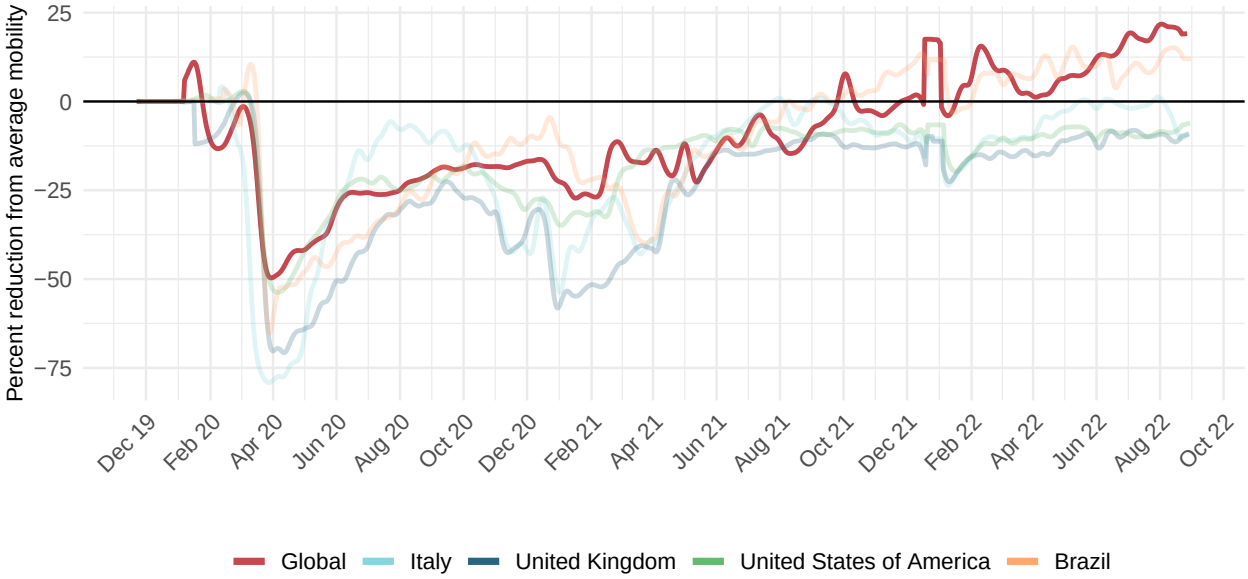


Figure 12.1: Mobility level as measured through smartphone app use, compared to January 2020 baseline (percent) on August 29, 2022

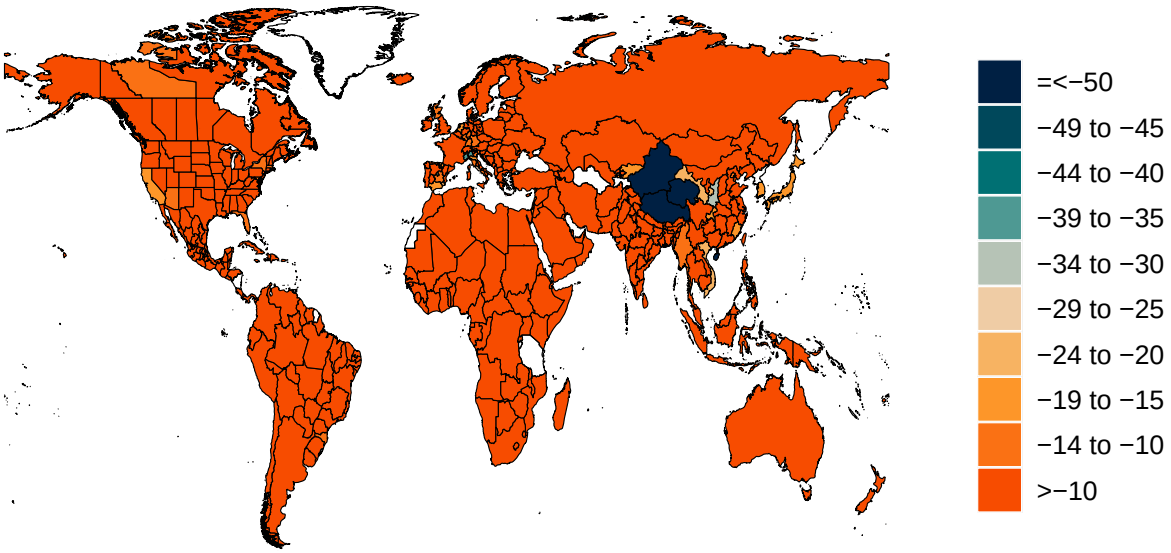


Figure 13.1: Trend in the proportion of the population reporting always wearing a mask when leaving home

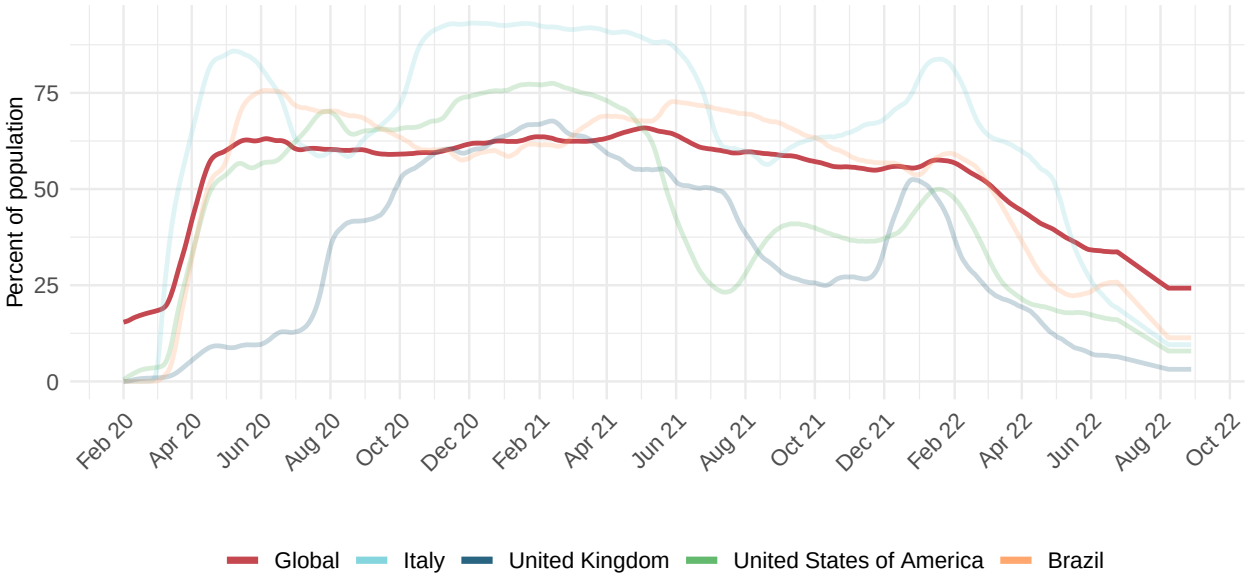


Figure 14.1: Proportion of the population reporting always wearing a mask when leaving home on August 29, 2022

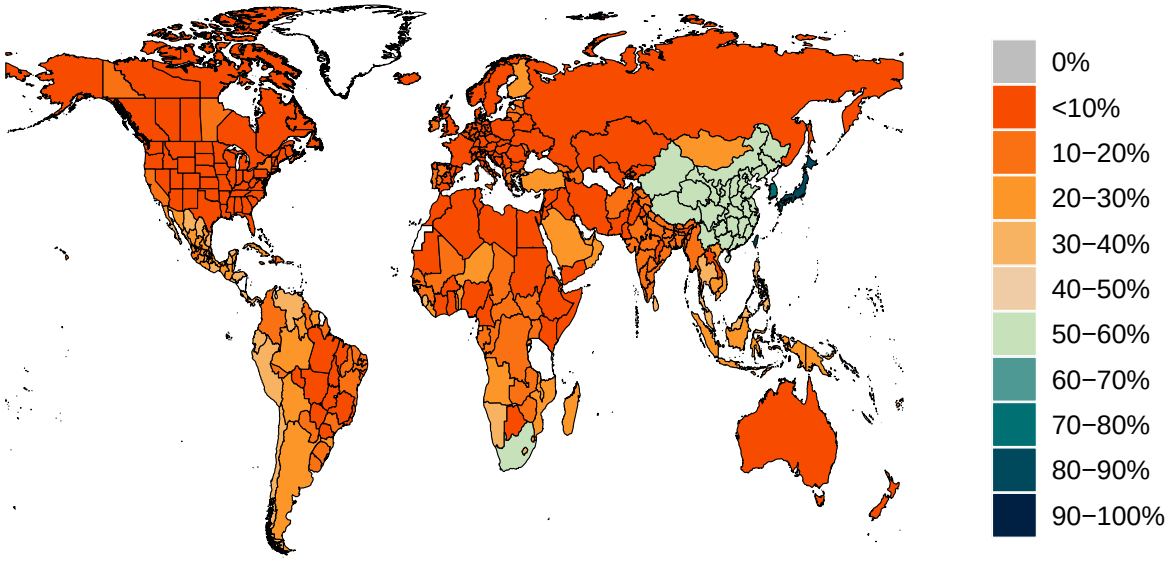


Figure 15.1: Trend in COVID-19 diagnostic tests per 100,000 people

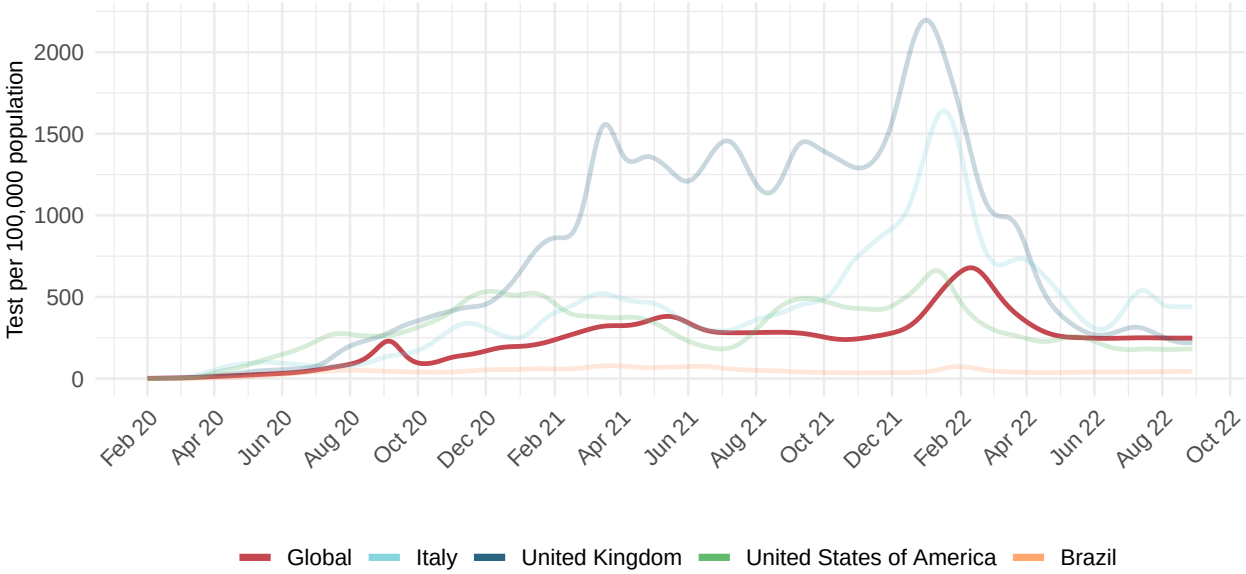


Figure 16.1: COVID-19 diagnostic tests per 100,000 people on August 29, 2022

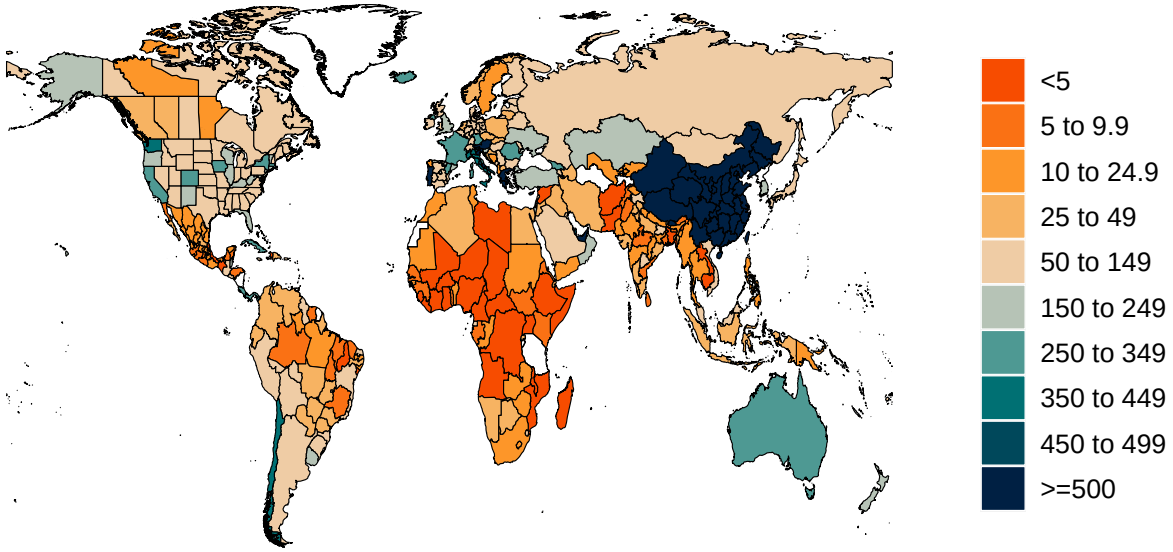


Table 3: Estimates of vaccine effectiveness for specific vaccines used in the model at preventing severe disease and infection. We use data from clinical trials directly, where available, and make estimates otherwise. More information can be found on our website.

	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%	0.9400000	69%	0.9400000	69%	94%	69%	71%	36%
CanSino	66%	62%	66%	62%	0.6408140	61%	0.6408140	61%	64%	61%	48%	32%
CoronaVac	50%	47%	50%	47%	0.4854651	46%	0.4854651	46%	49%	46%	37%	24%
Covaxin	78%	73%	78%	73%	0.7573256	72%	0.7573256	72%	76%	72%	57%	38%
Johnson & Johnson	86%	72%	86%	72%	0.7600000	64%	0.7600000	64%	76%	64%	57%	33%
Moderna	97%	92%	97%	92%	0.9700000	91%	0.9700000	91%	97%	91%	73%	48%
Novavax	89%	83%	89%	83%	0.8641279	82%	0.8641279	82%	86%	82%	65%	43%
Pfizer/BioNTech	95%	86%	95%	86%	0.9500000	84%	0.9500000	84%	95%	84%	72%	44%
Sinopharm	73%	68%	73%	68%	0.7087791	67%	0.7087791	67%	71%	67%	53%	35%
Sputnik-V	92%	86%	92%	86%	0.8932558	85%	0.8932558	85%	89%	85%	67%	44%
Other vaccines	75%	70%	75%	70%	0.7281977	69%	0.7281977	69%	73%	69%	55%	36%
Other vaccines (mRNA)	91%	86%	91%	86%	0.8835465	85%	0.8835465	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 August 29, 2022

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

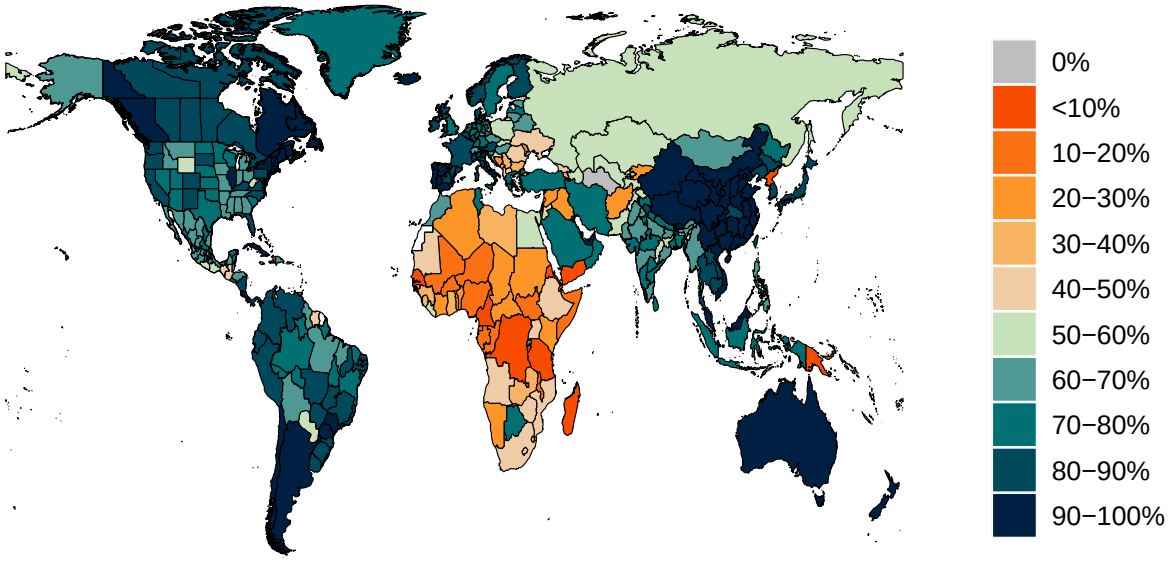


Figure 17.2: Percent of the population fully vaccinated against SARS-CoV-2

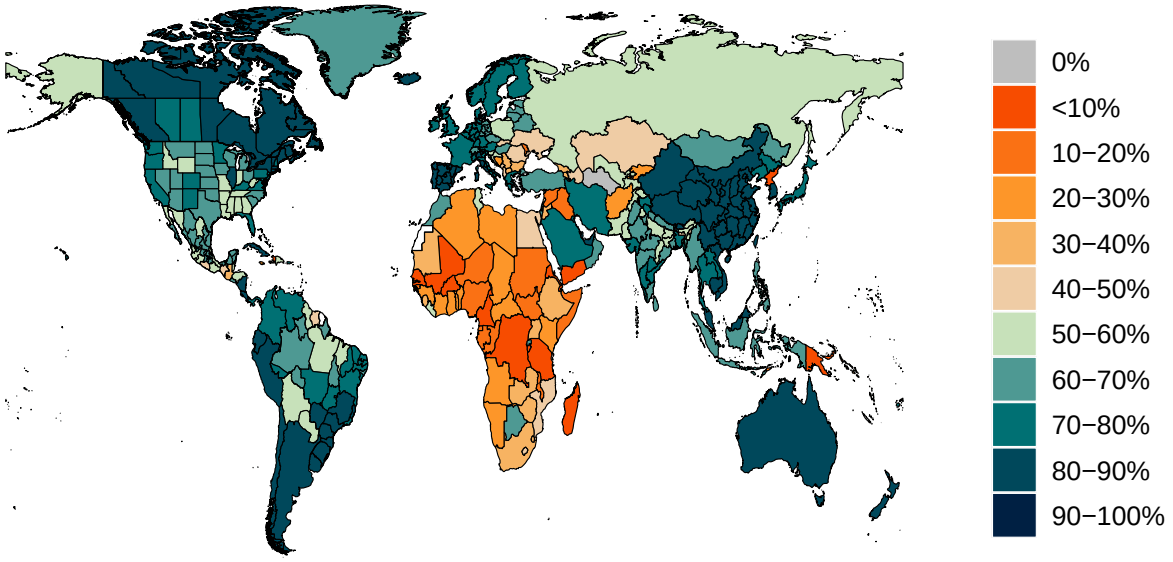


Figure 18.1: Estimated proportion of the total population that is not vaccinated but willing to be vaccinated as of June 24, 2022

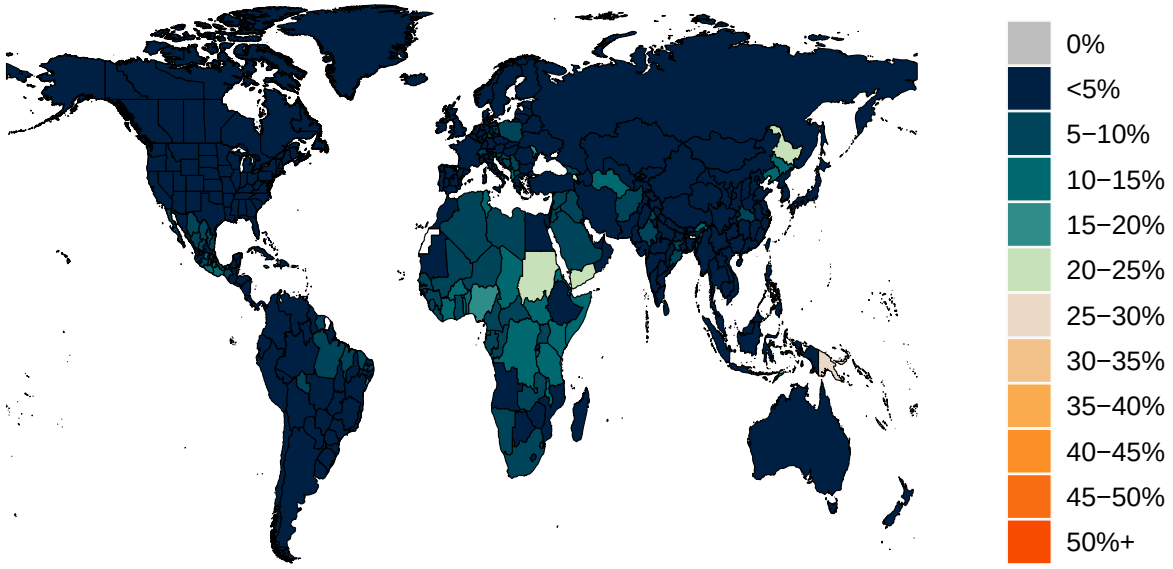


Figure 19.1: Percent of people who receive at least one dose of a COVID-19 vaccine and those who are fully vaccinated

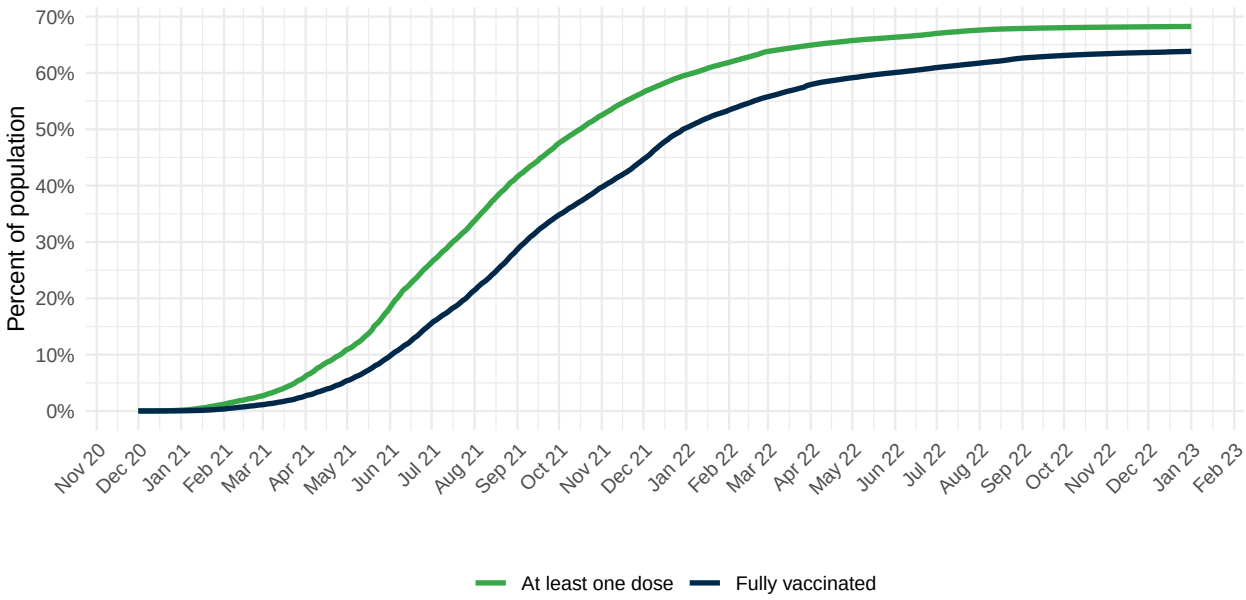
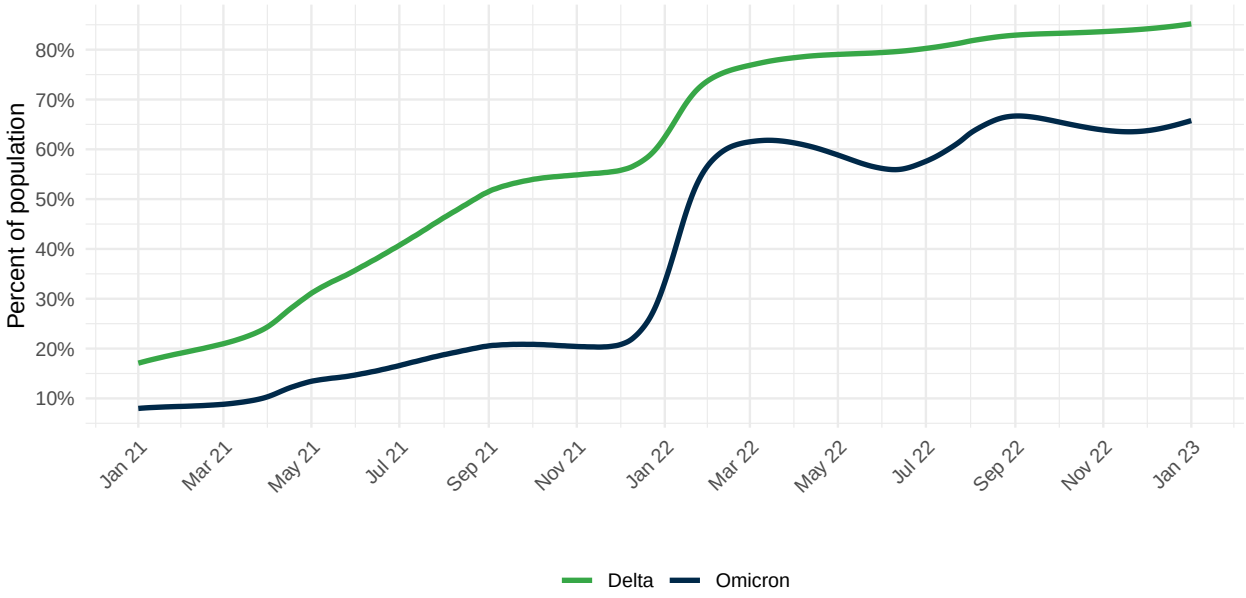


Figure 20.1: Percent of people who are immune to Delta or Omicron. Immunity is based on protection due to prior vaccination and infection(s). Moreover, variant-specific immunity is also based on variant-variant specific protection.



Projections and scenarios

Figure 21.1: Daily COVID-19 infections until January 01, 2023 for three scenarios

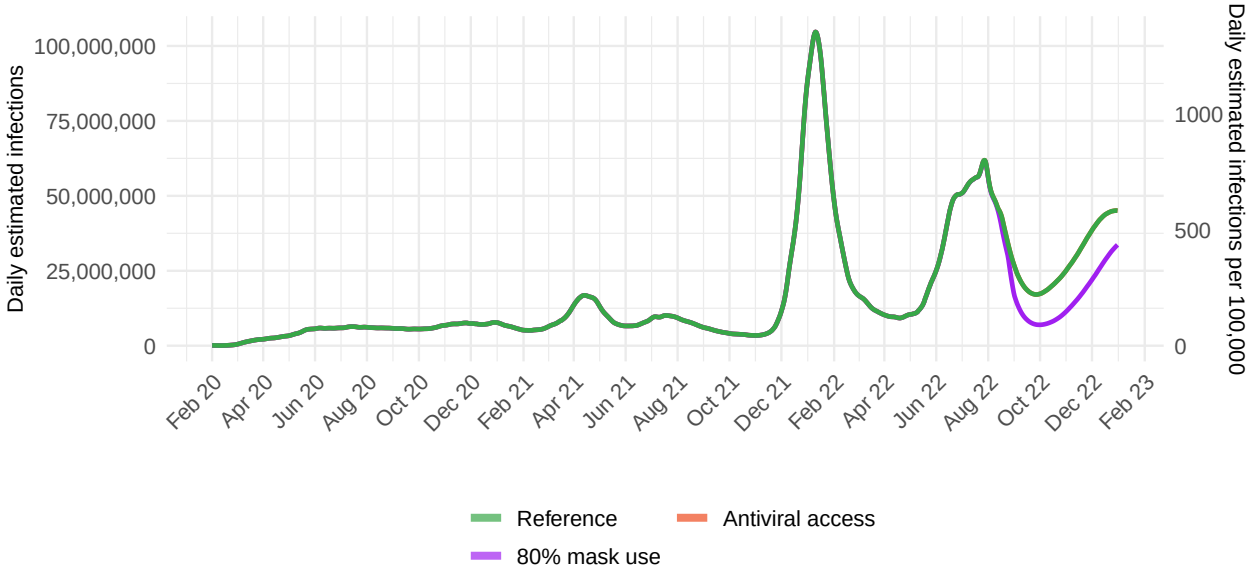


Figure 21.2: Daily COVID-19 reported cases until January 01, 2023 for three scenarios

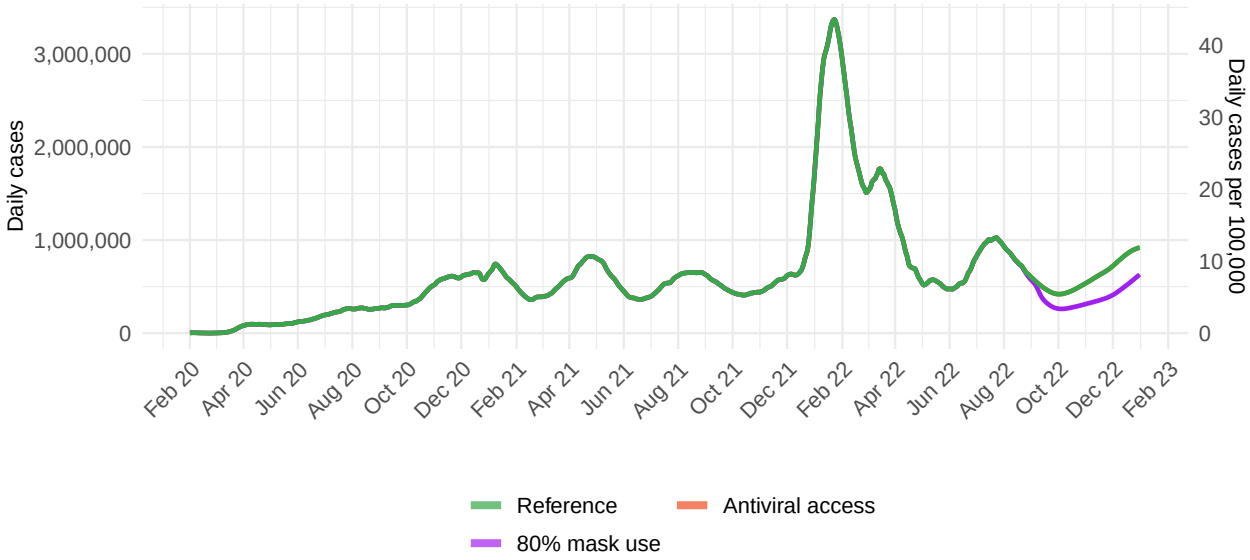


Figure 21.3: Daily COVID-19 hospital census until January 01, 2023 for three scenarios

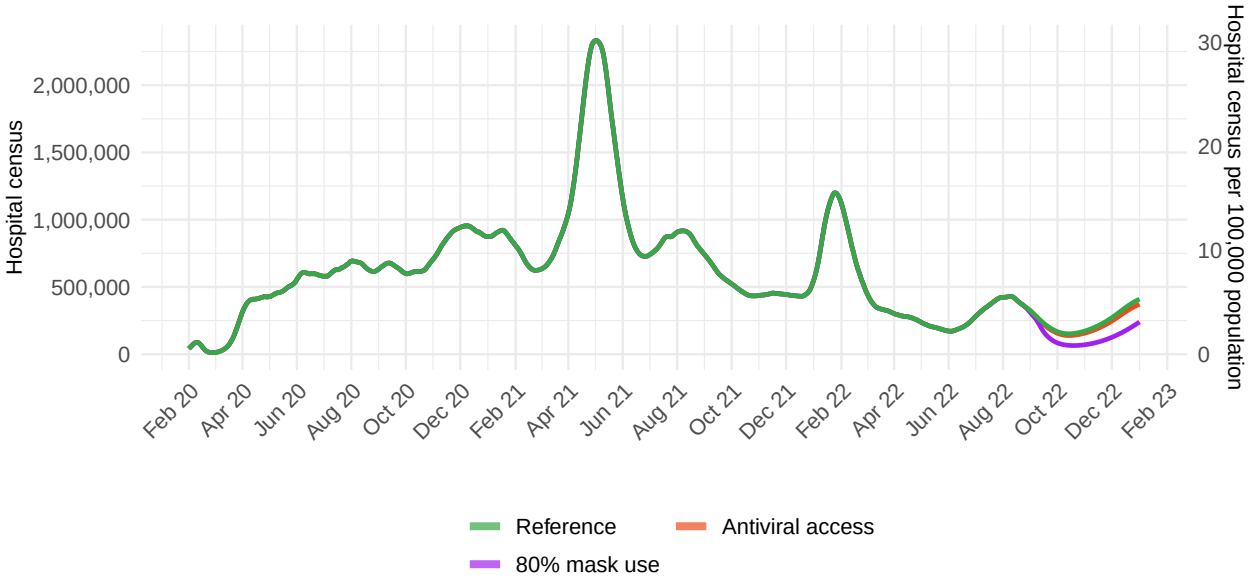


Figure 21.4: Reported daily COVID-19 deaths per 100,000

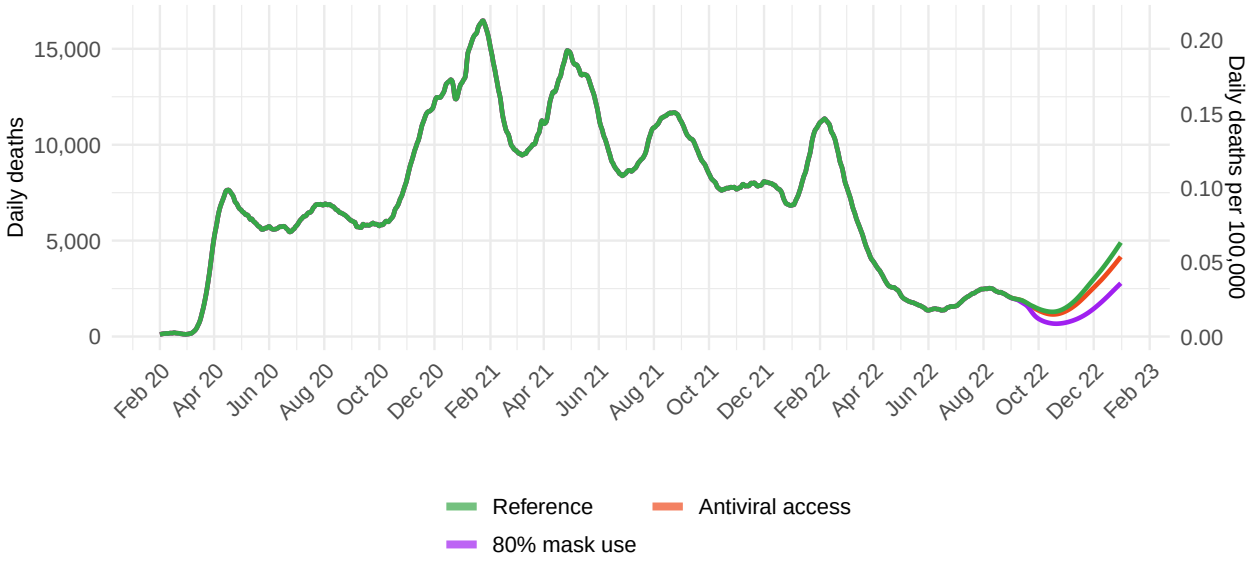
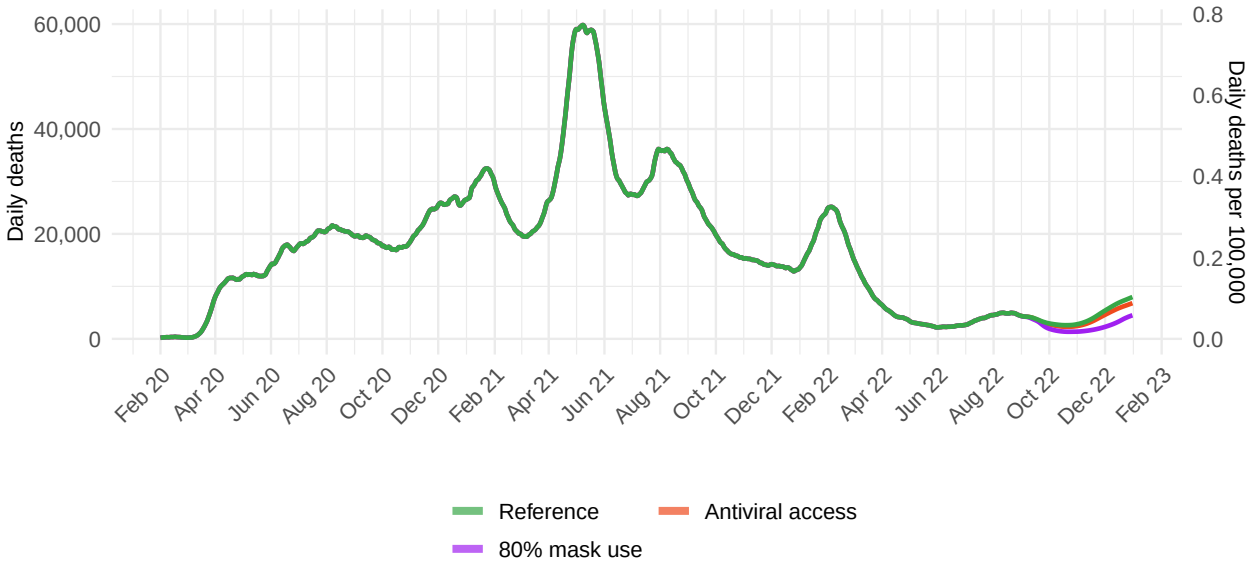


Figure 21.5: Total daily COVID-19 deaths per 100,000



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.