

COVID-19 Results Briefing

The European Region

September 22, 2021

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

Delta surges have peaked and are declining in many countries in the western parts of the region and in Central Asia. Notably, the double Delta surge in Scotland linked to school openings without sufficient mitigation in schools appears to have peaked. A block of countries from Germany to the Baltics and south to Turkey have increasing transmission. After many weeks of slow declines, the Russian Federation is reporting an increase in case numbers again. Levels of immunity against the Delta variant are a function of vaccination and past levels of infection; the gradients in these are opposite, with higher vaccination in the western parts of the region and higher past infection rates in the eastern parts. In our reference forecast, we expect that daily infections will decline until late October and then increase again due to seasonality. Given levels of likely immunity, we expect increases in the western parts of the region in the winter to be larger than in the eastern parts. Given the higher infection-detection rate in the west of the region, this suggests that daily reported cases may stay steady until mid-October and then increase steadily, reaching 500,000 by end of the year. Given that levels of immunity keep increasing due to both vaccination and the ongoing Delta infections, the effect of reducing transmission through increased mask use in the region can be very substantial. The major factors that can influence the trajectory of the epidemic this fall and winter include the extent of waning vaccine-derived and natural immunity both for infection as well as hospitalization and death, the emergence of new variants with substantial immune escape, and the extent to which behavioral mitigation continues through mask use mandates and avoiding gatherings, particularly for the unvaccinated. We continue to expect the combined impact of COVID-19 and flu on hospitals this winter.

Current situation

- Estimated daily infections in the last week decreased to 901,900 per day on average compared to 983,300 the week before (Figure 1).
- Estimated daily hospital census in the last week (through September 20) increased slightly to 227,200 per day on average compared to 223,300 the week before.
- Daily reported cases in the last week increased slightly to 166,400 per day on average compared to 165,600 the week before (Figure 2).
- Reported deaths due to COVID-19 in the last week increased to 2,100 per day on average compared to 2,000 the week before (Figure 3).

- Excess deaths due to COVID-19 in the last week decreased to 9,300 per day on average compared to 9,400 the week before (Figure 3). **This makes COVID-19 the number 1 cause of death in the European Region this week** (Table 1). Estimated excess daily deaths due to COVID-19 in the past week were 4.4 times larger than the reported number of deaths.
- The daily reported COVID-19 death rate is greater than 4 per million in 10 countries (Figure 4). These countries are mostly in southeastern Europe.
- The daily rate of excess deaths due to COVID-19 is greater than 4 per million in 23 countries (Figure 4).
- We estimate that 44% of people in the European Region have been infected as of September 20 (Figure 6).
- Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 25 countries. (Figure 7). These countries include most of the European region east of France and Italy.
- The infection-detection rate in the European Region was close to 17% 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). Delta is the dominant variant in all countries of the region, although Turkey reports other variants circulating as well.

Trends in drivers of transmission

- There is little change in mandates from last week (Table 2). Most countries continue to have mask mandates and some form of gathering restrictions in place.
- Mobility last week was 1% lower than the pre-COVID-19 baseline (Figure 11). Mobility was near baseline (within 10%) in 43 countries. No countries had mobility levels lower than 30% of baseline.
- As of September 20, in the COVID-19 Trends and Impact Survey, 43% of people in the region self-report that they always wore a mask when leaving their home (Figure 13). Mask use remains over 60% in Portugal, Spain, Italy, and Turkey.
- There were 416 diagnostic tests per 100,000 people on September 20 (Figure 15).
- As of September 20, 16 countries have reached 70% or more of the population who have received at least one vaccine dose and 8 countries have reached 70% or more of the population who are fully vaccinated (Figure 17). The strong west to east declining trend in vaccination rates remains.
- In the European Region, 65.5% of adults say they would accept or would probably accept a vaccine for COVID-19. The proportion of the population open to receiving a COVID-19 vaccine ranges from 34% in the Republic of Moldova to 87% in Portugal (Figure 19).

- In our current reference scenario, we expect that 525 million people in the region will be vaccinated with at least one dose by January 1 (Figure 20). **We expect that 54% of the region's 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 55% of the region is immune to the Delta variant. In our current reference scenario, we expect that by January 1, 66% of people will be immune to the Delta variant (Figure 21). These two calculations do not take into account the 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 1,595,000 cumulative reported deaths due to COVID-19 on January 1. This represents 252,000 additional deaths from September 20 to January 1. Daily reported deaths will rise to over 3,000 on January 1, 2022 (Figure 22).
- Under our **reference scenario**, our model projects 4,386,000 cumulative excess deaths due to COVID-19 on January 1. This represents 704,000 additional deaths from September 20 to January 1 (Figure 22).
- If **universal mask coverage (95%)** were attained in the next week, our model projects 126,000 fewer cumulative reported deaths compared to the reference scenario on January 1.
- Under our **worse scenario**, our model projects 1,826,000 cumulative reported deaths on January 1, an additional 231,000 deaths compared to our reference scenario. Daily reported deaths in the **worse scenario** will rise to over 7,500 by mid-December (Figure 22).
- Daily infections in the **reference scenario** will rise to nearly 1.0 million by mid-December (Figure 23). Daily infections in the **worse scenario** will rise to 2.4 million by late November and then decline (Figure 23).
- Daily cases in the **reference scenario** will rise to 475,000 by the end of the year (Figure 24). Daily cases in the **worse scenario** will rise to 1.2 million by early December (Figure 24). The larger increase expected in reported cases than in infections is due to larger increases in the Western parts of the region with higher infection-detection rates than in the East.
- Daily hospital census in the **reference scenario** will decline to 180,000 by early November (Figure 25). Daily hospital census in the **worse scenario** will rise to nearly 750,000 by mid-December (Figure 25).
- Figure 26 compares our reference scenario forecasts to other publicly archived models. These models suggest daily deaths around 2,500 until early November; after that point they diverge widely.

- At some point from September through January 1, 19 countries in the region will have high or extreme stress on hospital beds (Figure 27). At some point from September through January 1, 47 countries in the region will have high or extreme stress on intensive care unit (ICU) capacity (Figure 28).

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.

Figure 1. Daily COVID-19 hospital census and infections

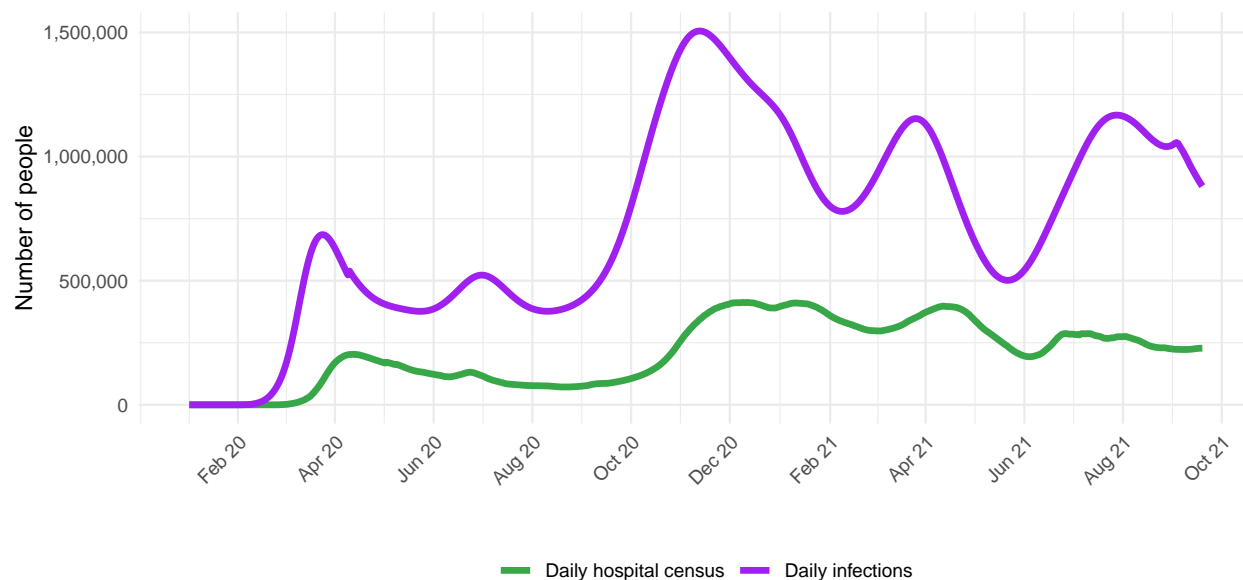


Figure 2. Reported daily COVID-19 cases, moving average

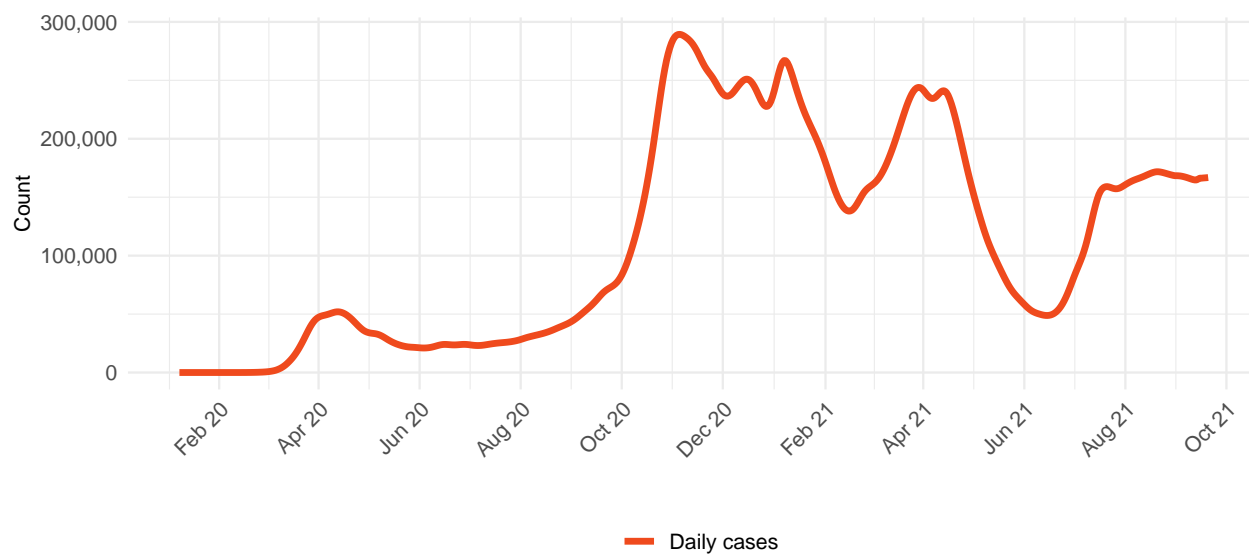


Table 1. Ranking of excess deaths due to COVID-19 among the leading causes of mortality this week, assuming uniform deaths of non-COVID causes throughout the year

Cause name	Weekly deaths	Ranking
COVID-19	64,797	1
Ischemic heart disease	44,253	2
Stroke	22,622	3
Tracheal, bronchus, and lung cancer	8,918	4
Alzheimer's disease and other dementias	8,022	5
Chronic obstructive pulmonary disease	6,719	6
Colon and rectum cancer	5,881	7
Lower respiratory infections	5,254	8
Cirrhosis and other chronic liver diseases	4,290	9
Hypertensive heart disease	3,949	10

Figure 3. Smoothed trend estimate of reported daily COVID-19 deaths (blue) and excess daily deaths due to COVID-19 (orange)

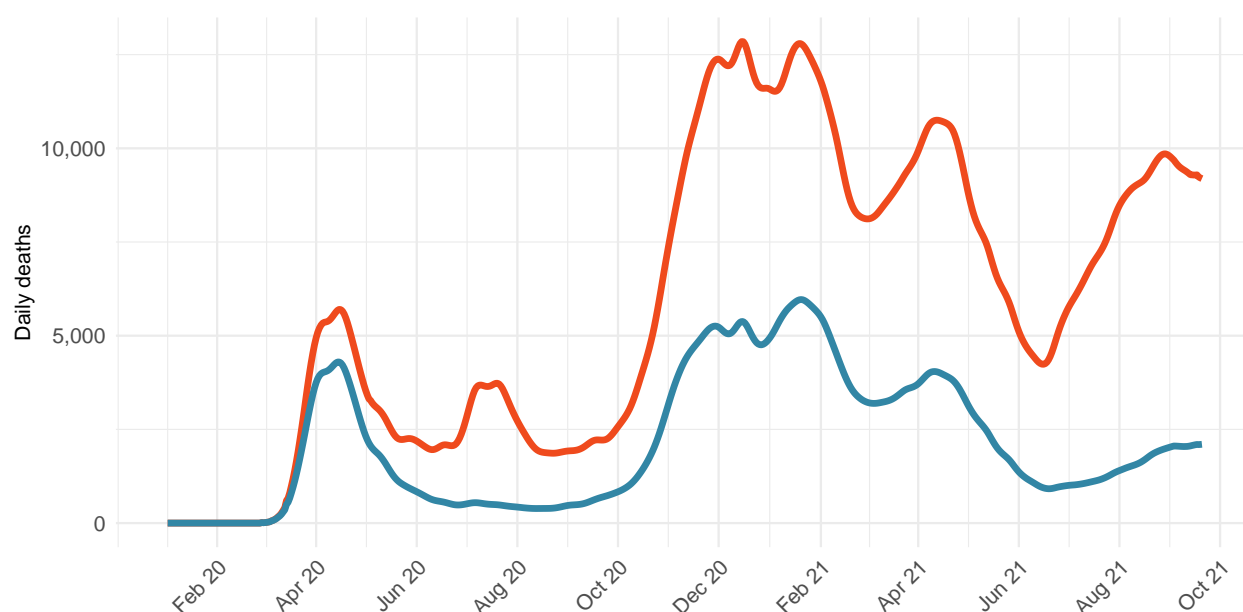
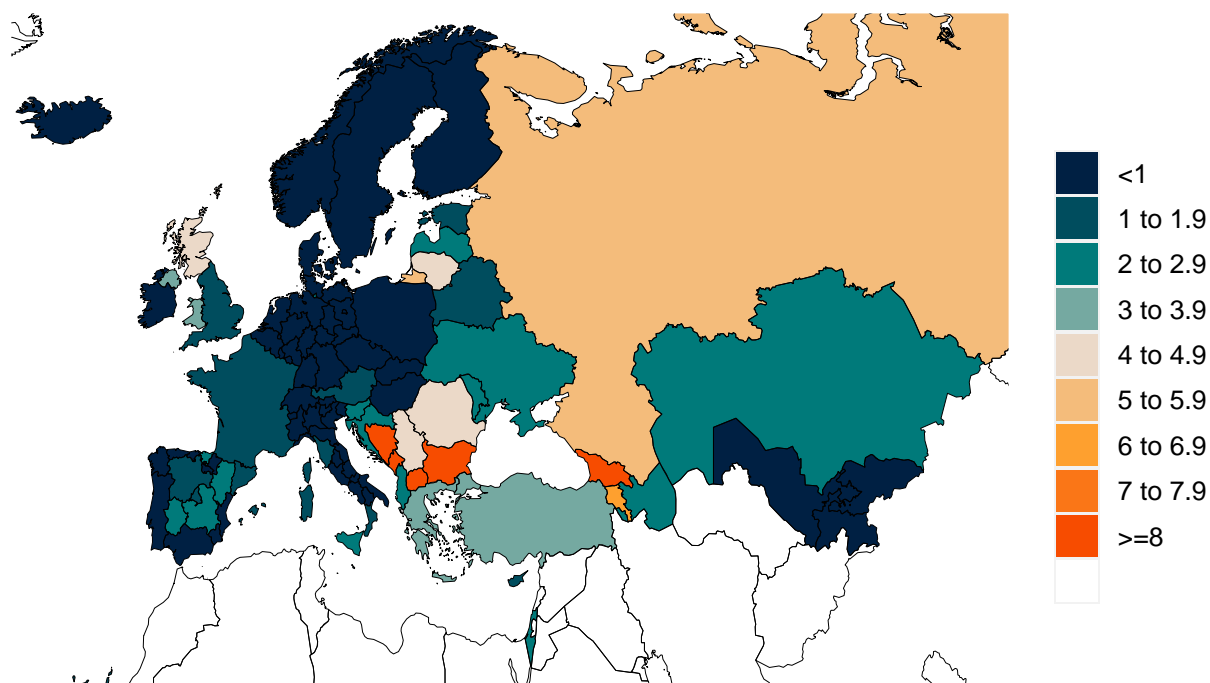


Figure 4. Daily COVID-19 death rate per 1 million on September 20, 2021

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



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

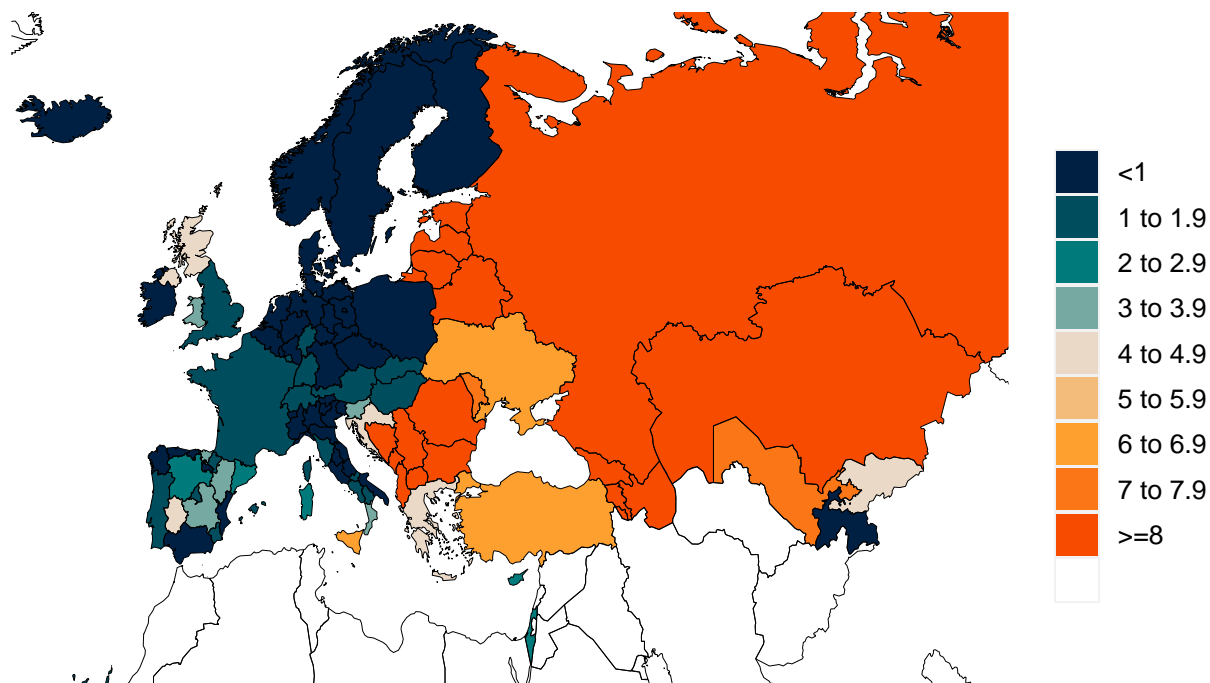
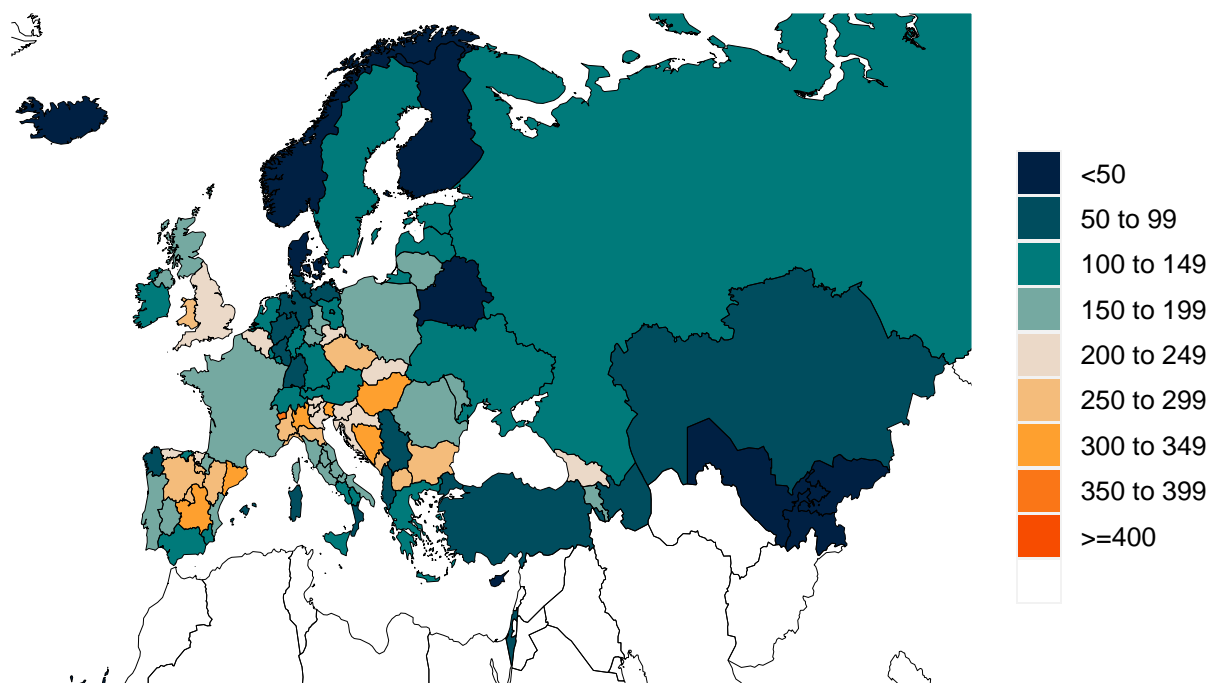


Figure 5. Cumulative COVID-19 deaths per 100,000 on September 20, 2021

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



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

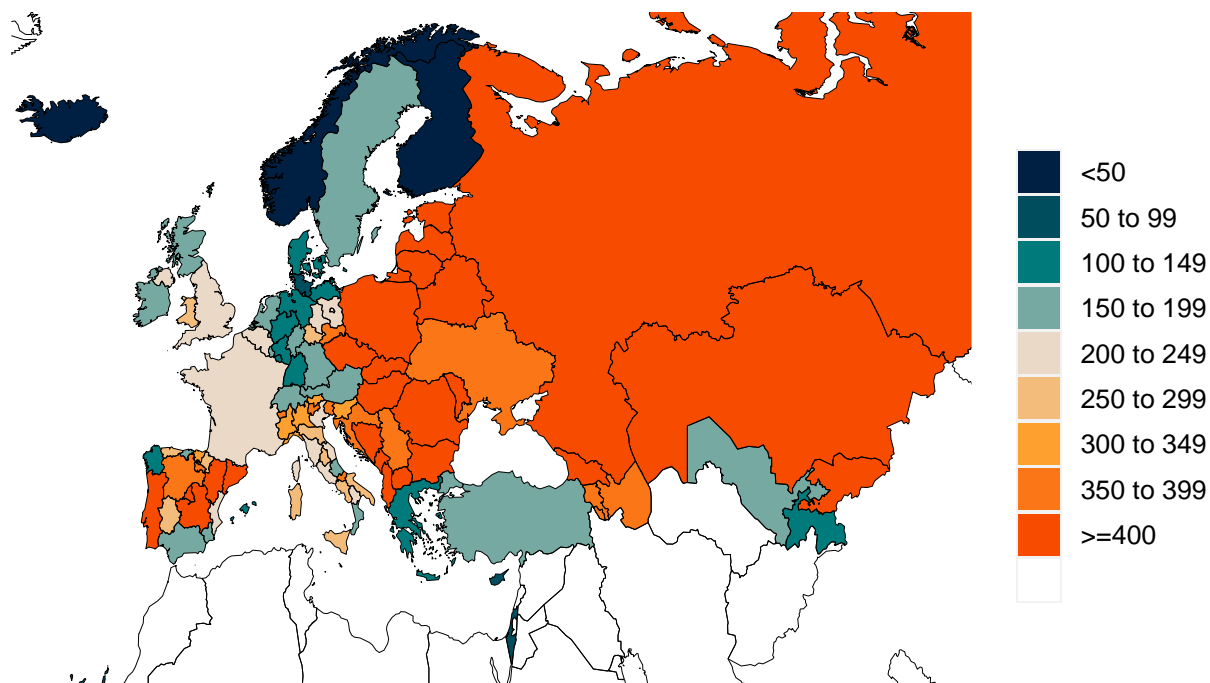


Figure 6. Estimated percent of the population infected with COVID-19 on September 20, 2021

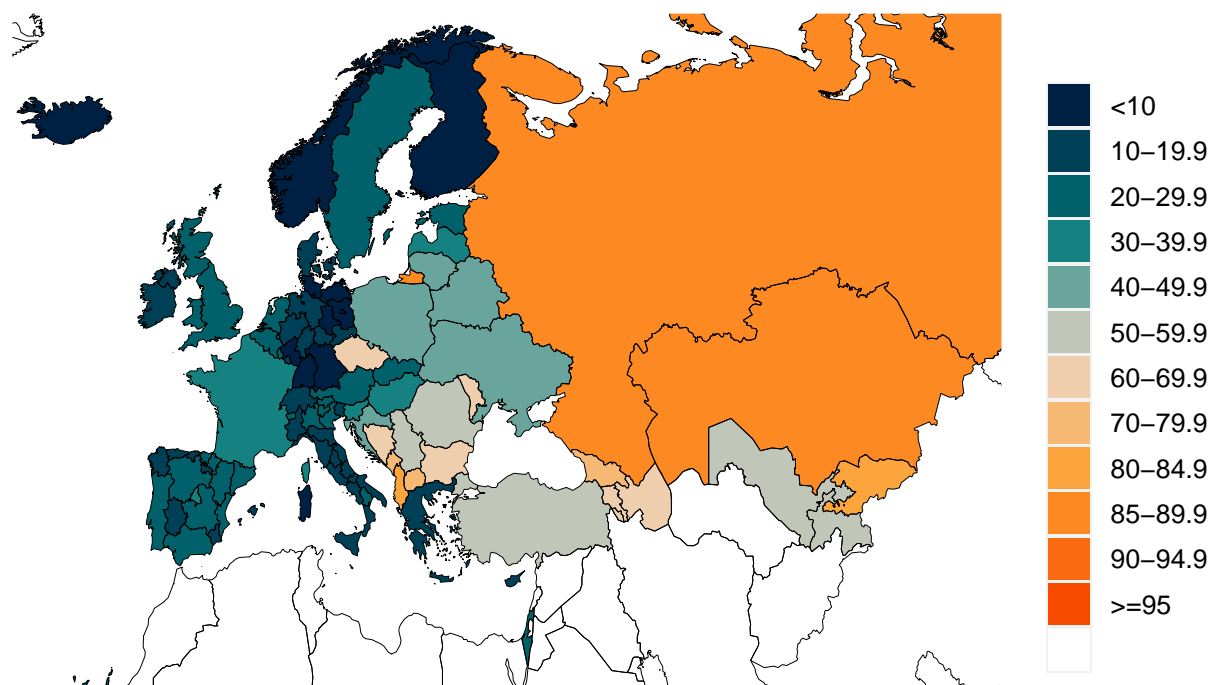


Figure 7. Mean effective R on September 9, 2021. Effective R less than 1 means that transmission should decline, all other things being held the same. The estimate of effective R is based on the combined analysis of deaths, case reporting, and hospitalizations where available. Current reported cases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

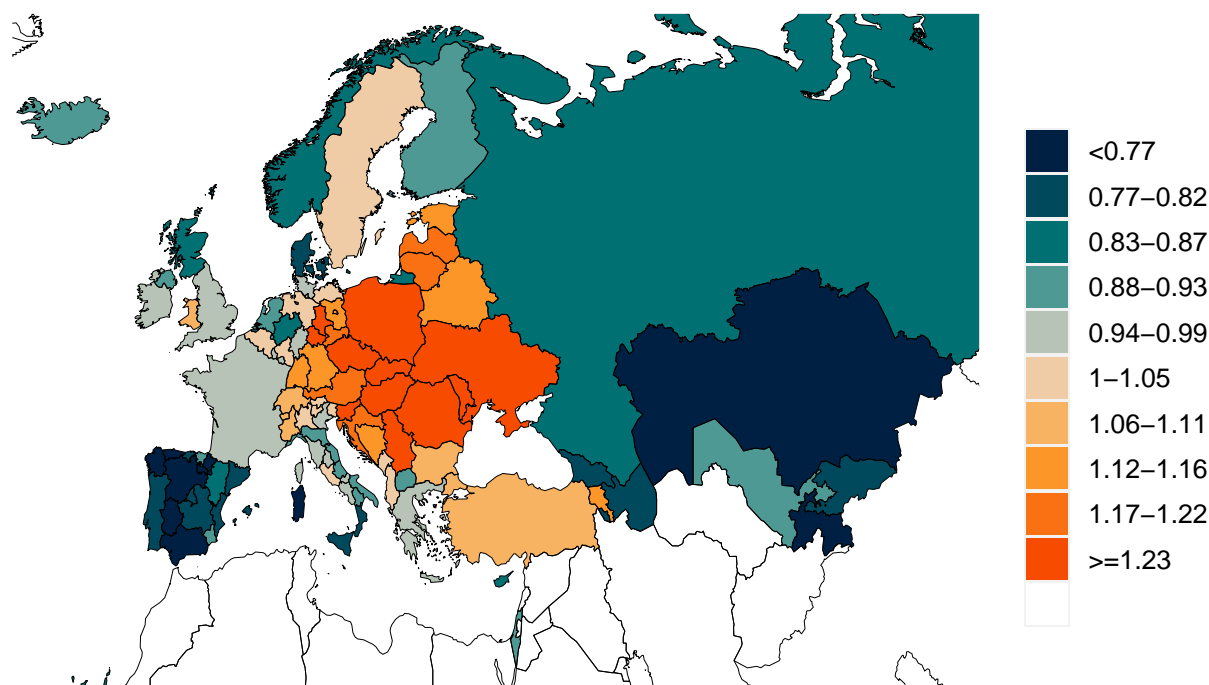


Figure 8. Percent of COVID-19 infections detected. This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model. Due to measurement errors in cases and testing rates, the infection-detection rate can exceed 100% at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

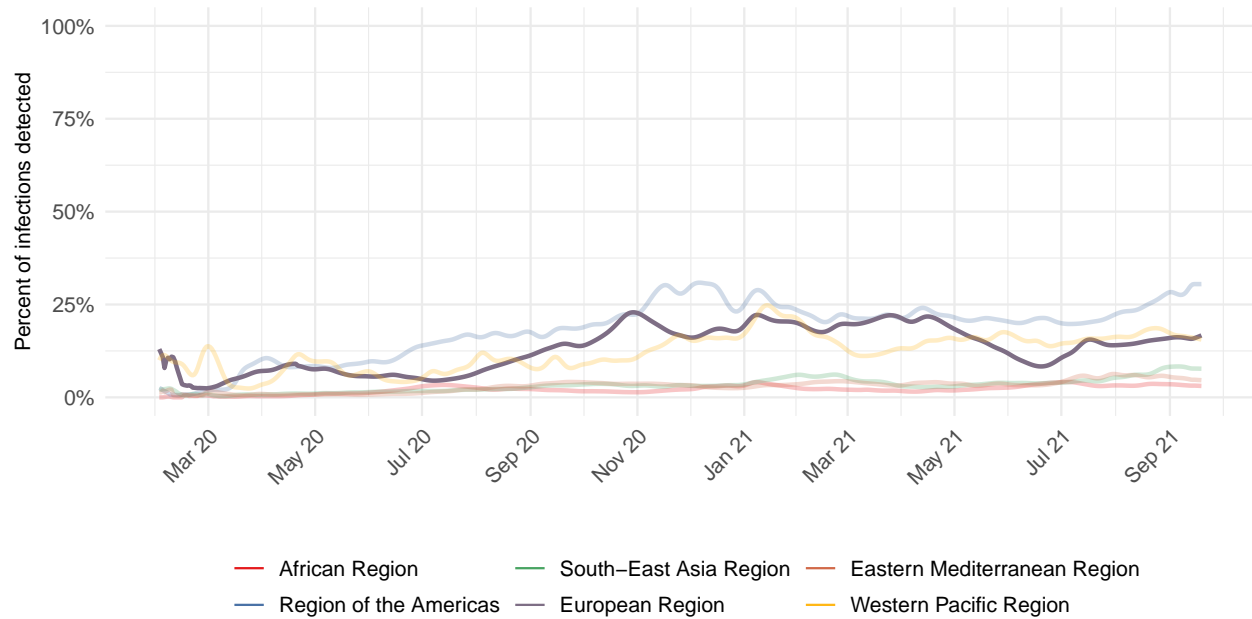


Figure 9. Estimated percent of circulating SARS-CoV-2 for primary variant families on September 20, 2021

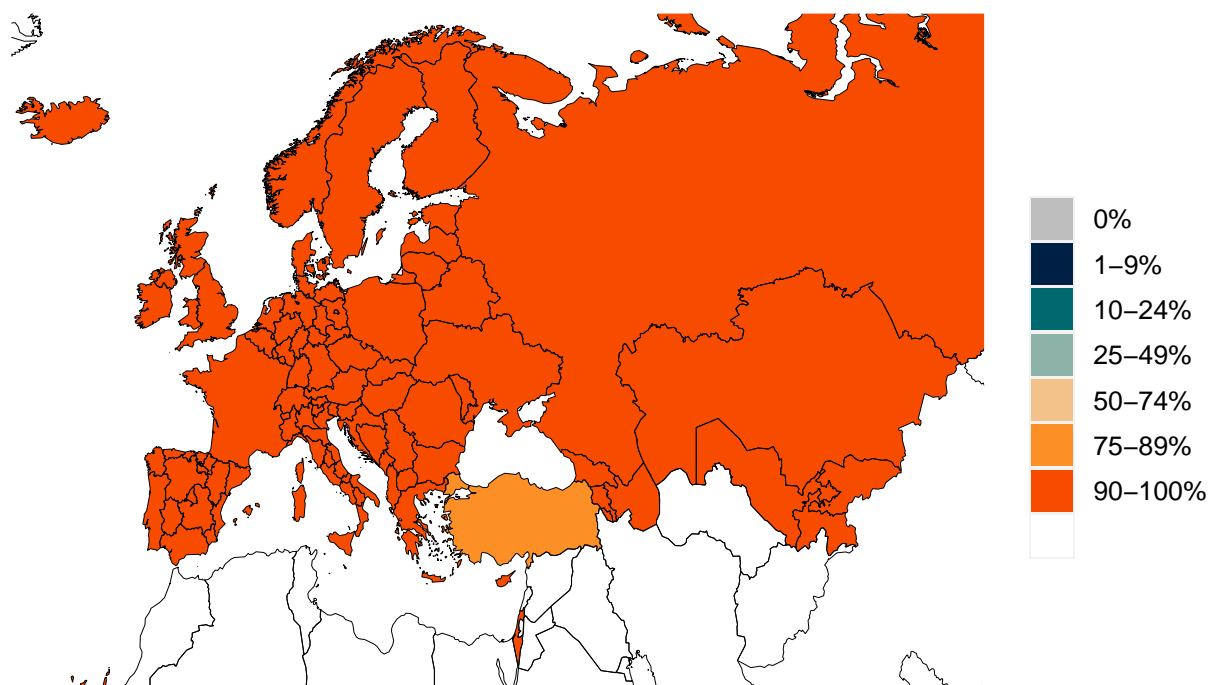
A. Estimated percent Alpha variant



B. Estimated percent Beta variant



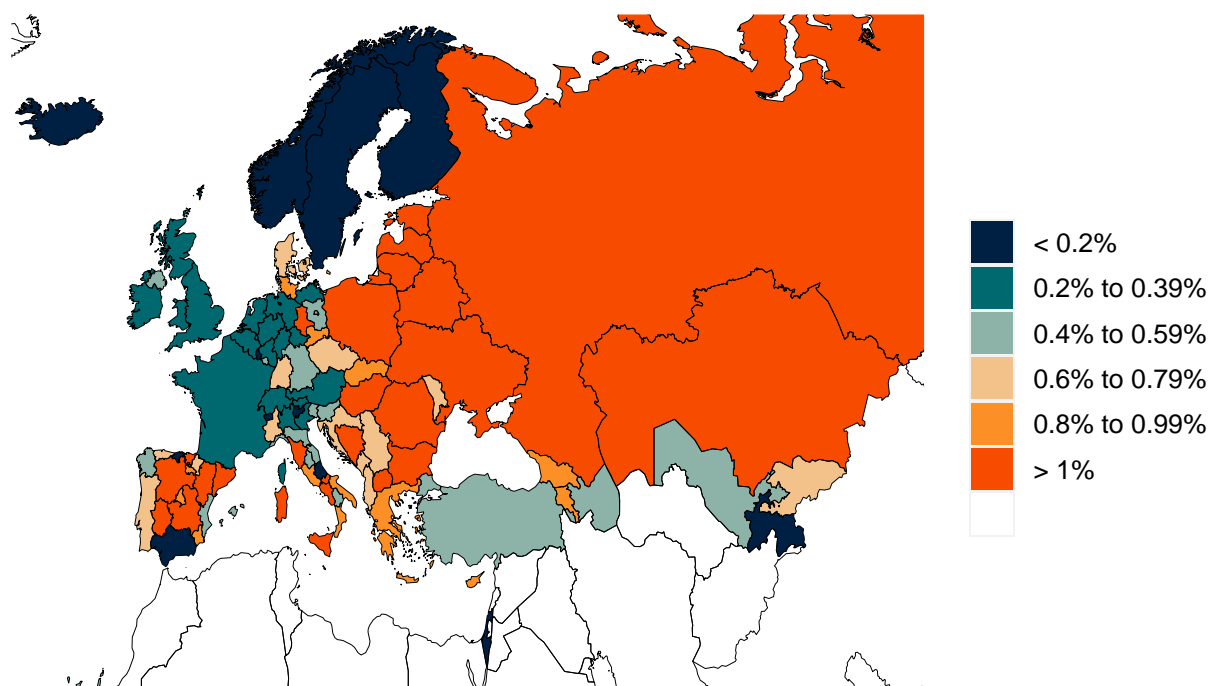
C. Estimated percent Delta variant



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

Table 2. Current mandate implementation

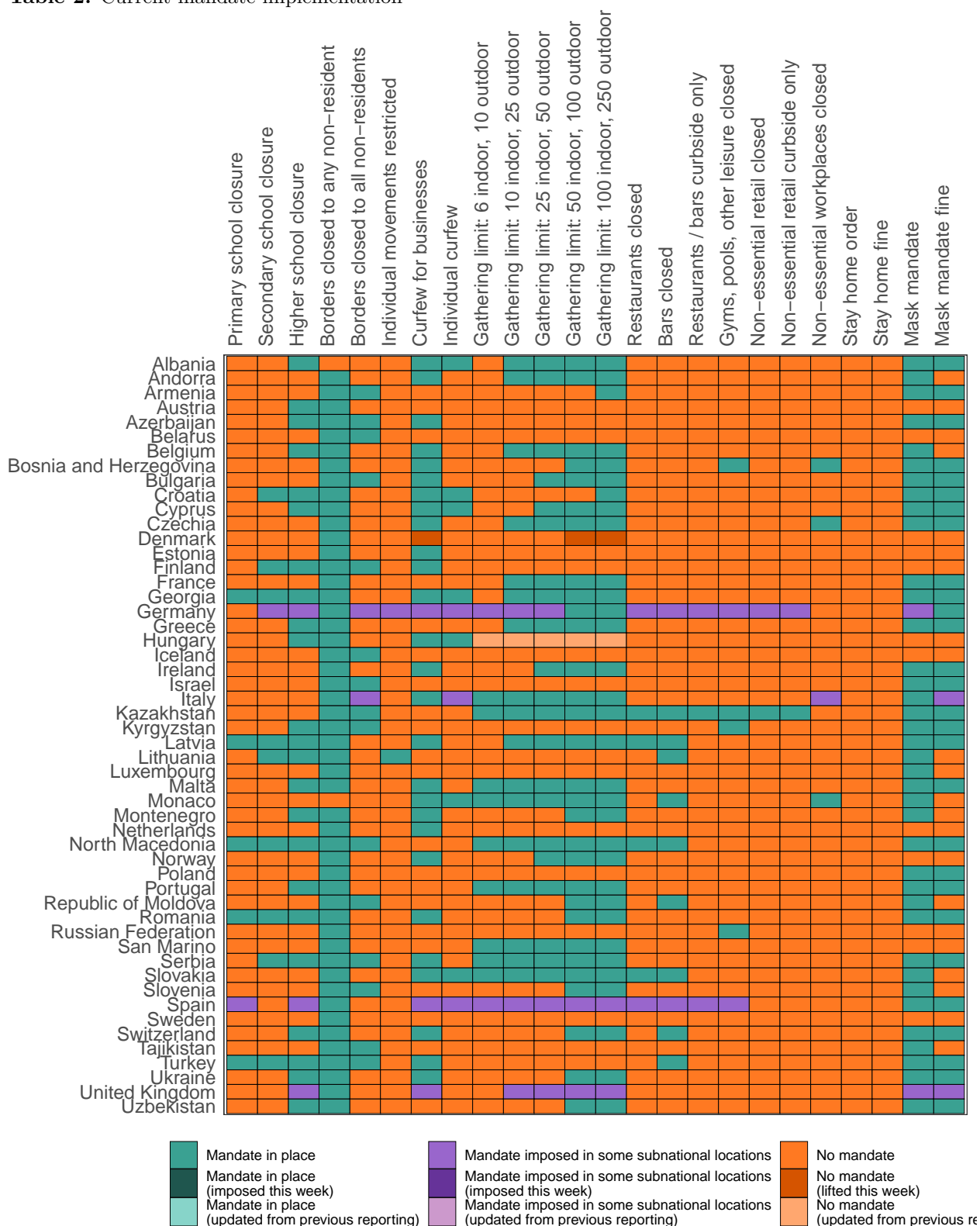


Figure 11. Trend in mobility as measured through smartphone app use, compared to January 2020 baseline

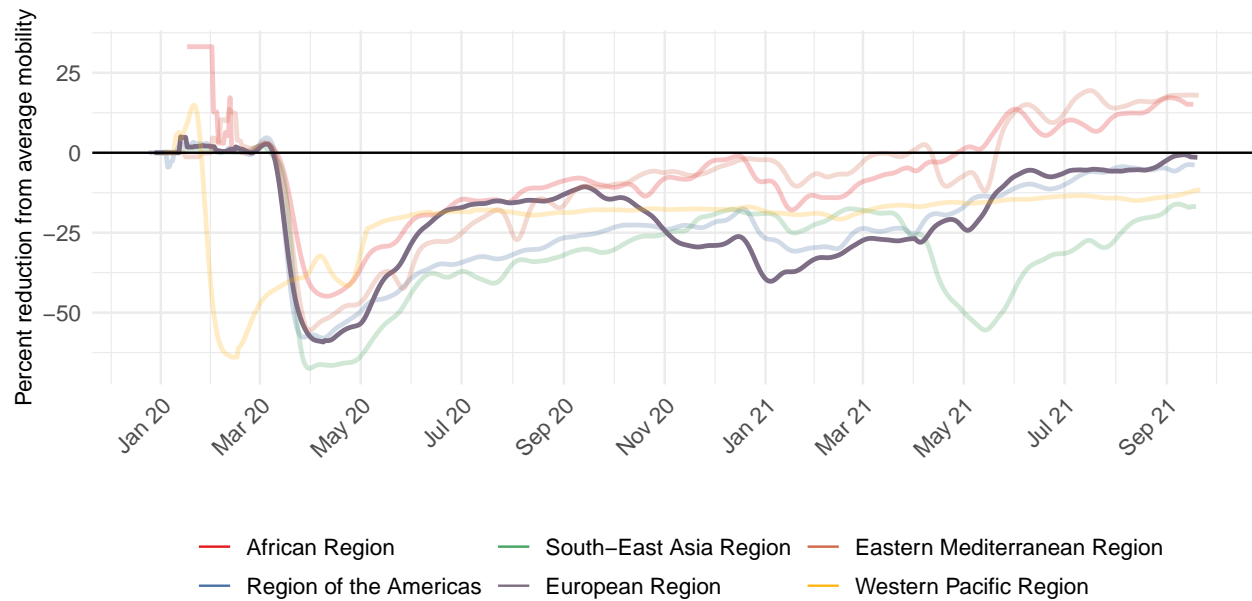


Figure 12. Mobility level as measured through smartphone app use, compared to January 2020 baseline (percent) on September 20, 2021

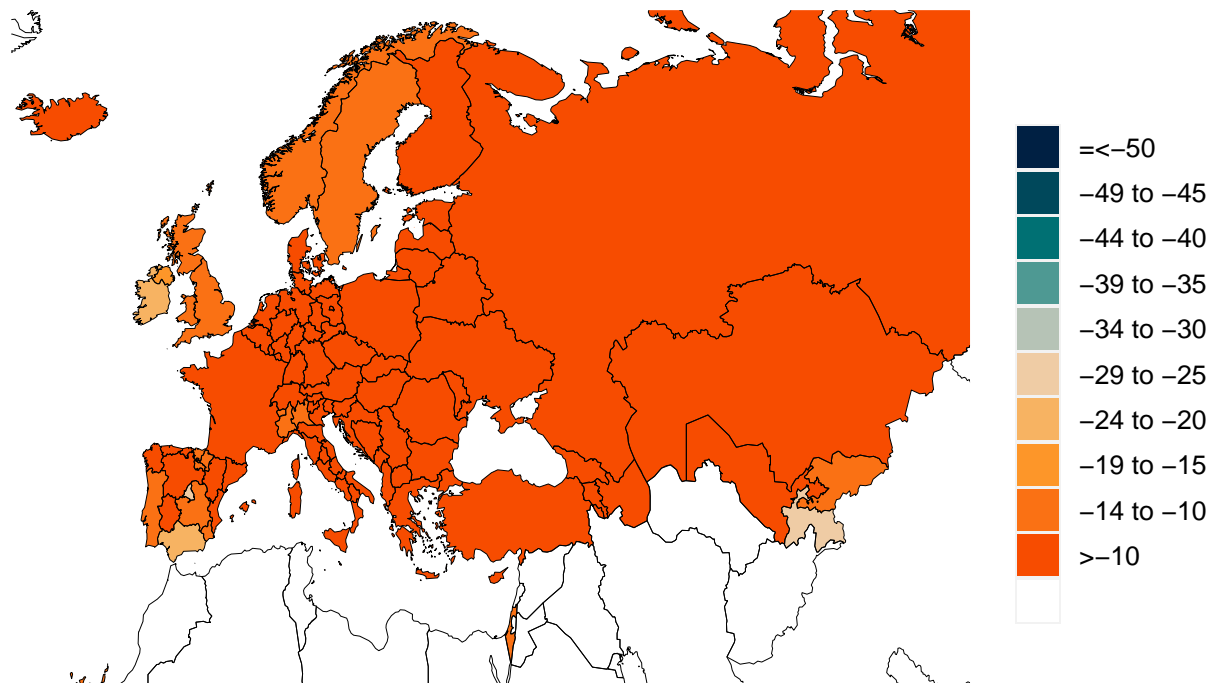


Figure 13. Trend in the proportion of the population reporting always wearing a mask when leaving home

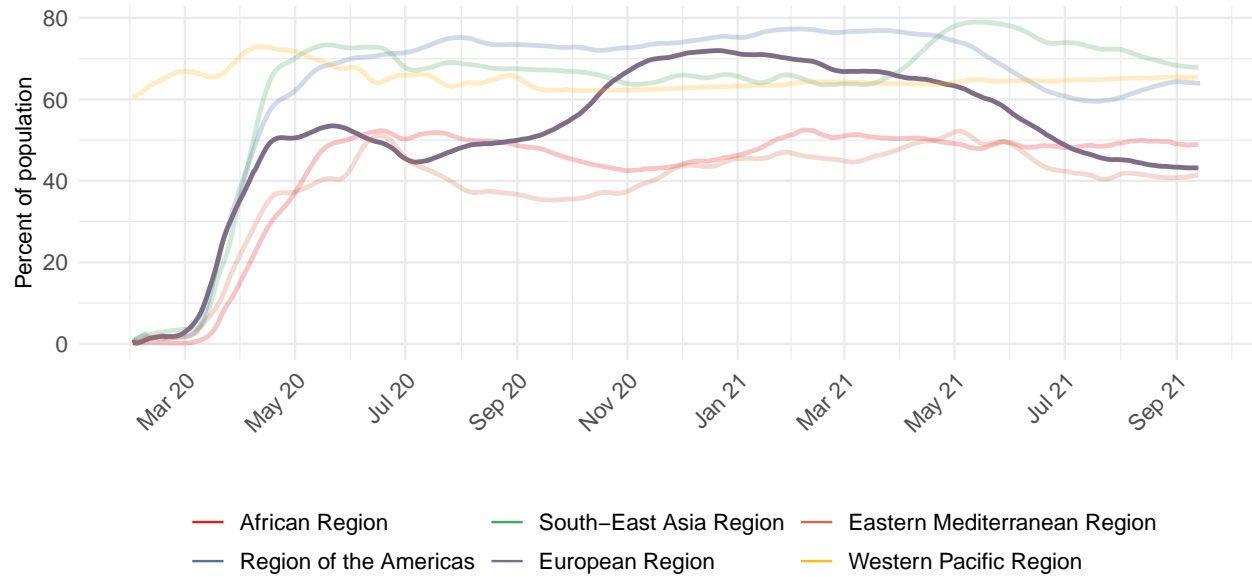


Figure 14. Proportion of the population reporting always wearing a mask when leaving home on September 20, 2021

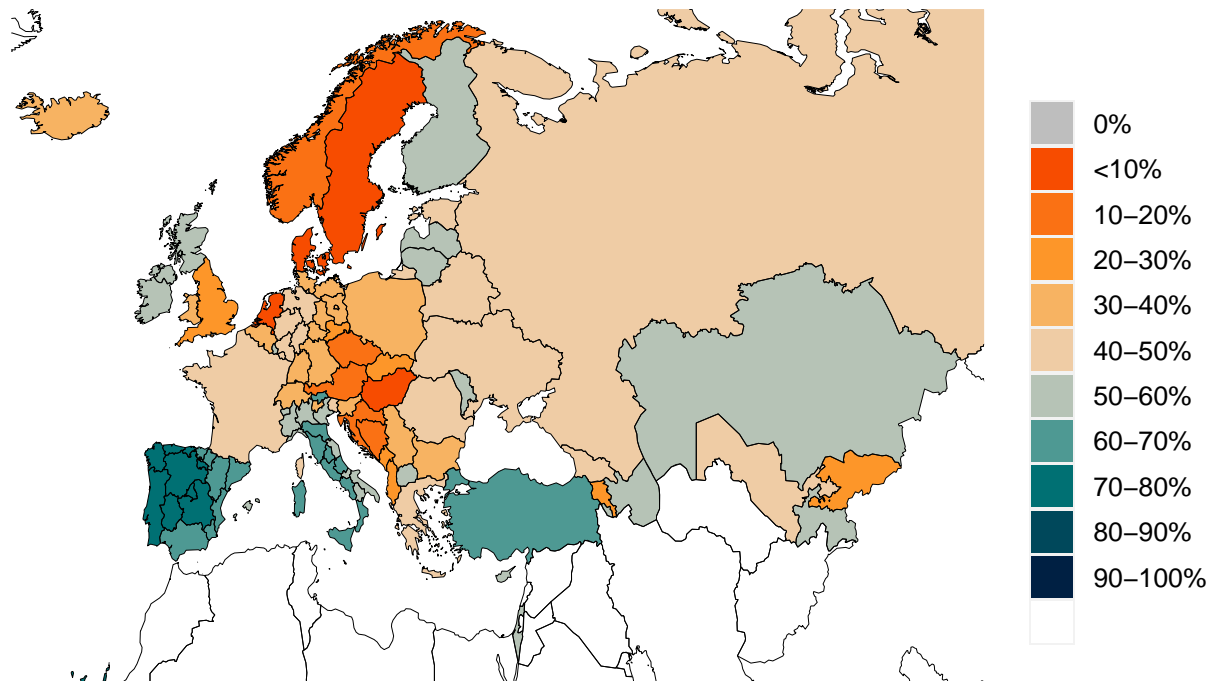


Figure 15. Trend in COVID-19 diagnostic tests per 100,000 people

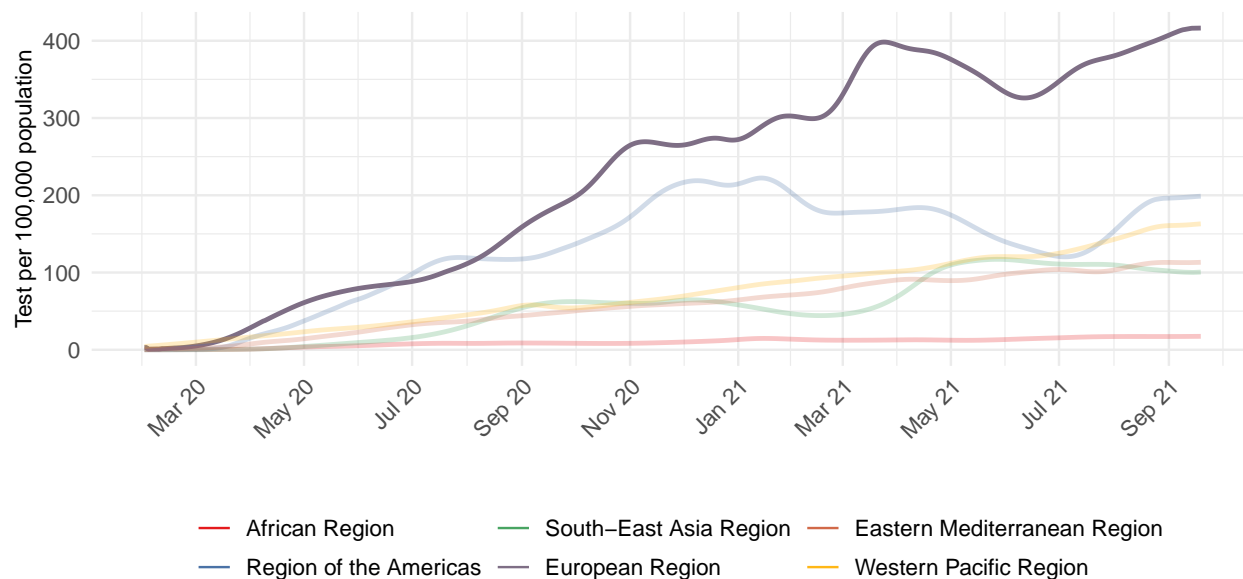


Figure 16. COVID-19 diagnostic tests per 100,000 people on September 20, 2021

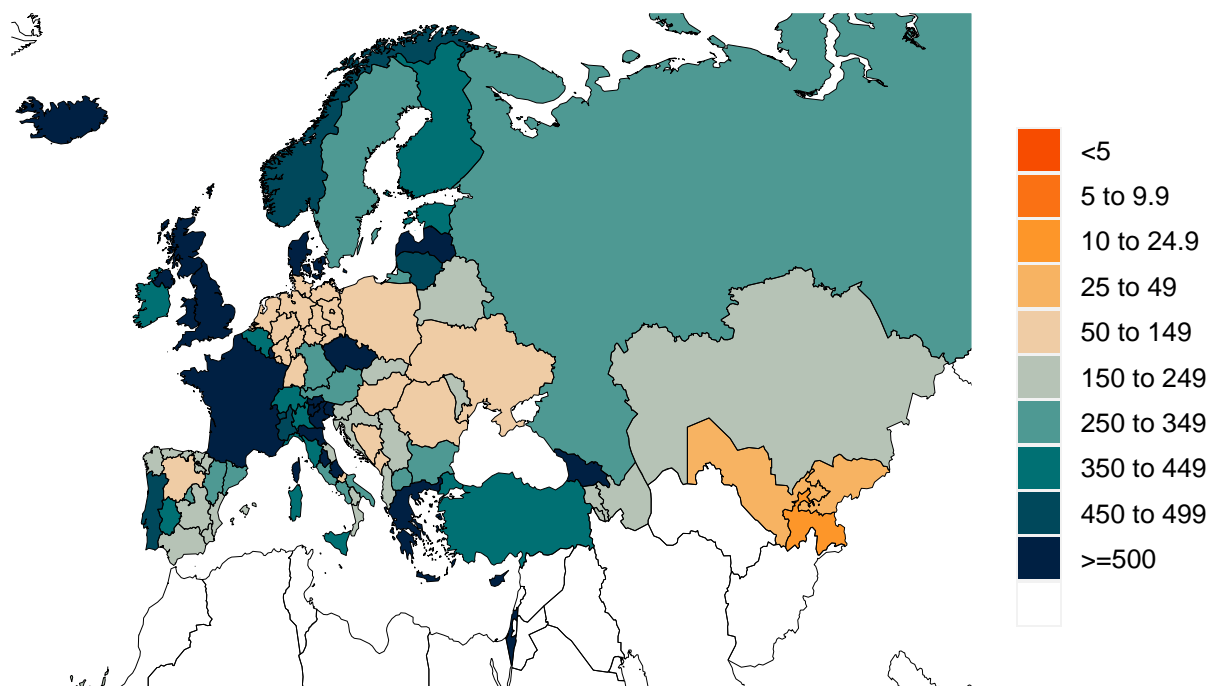
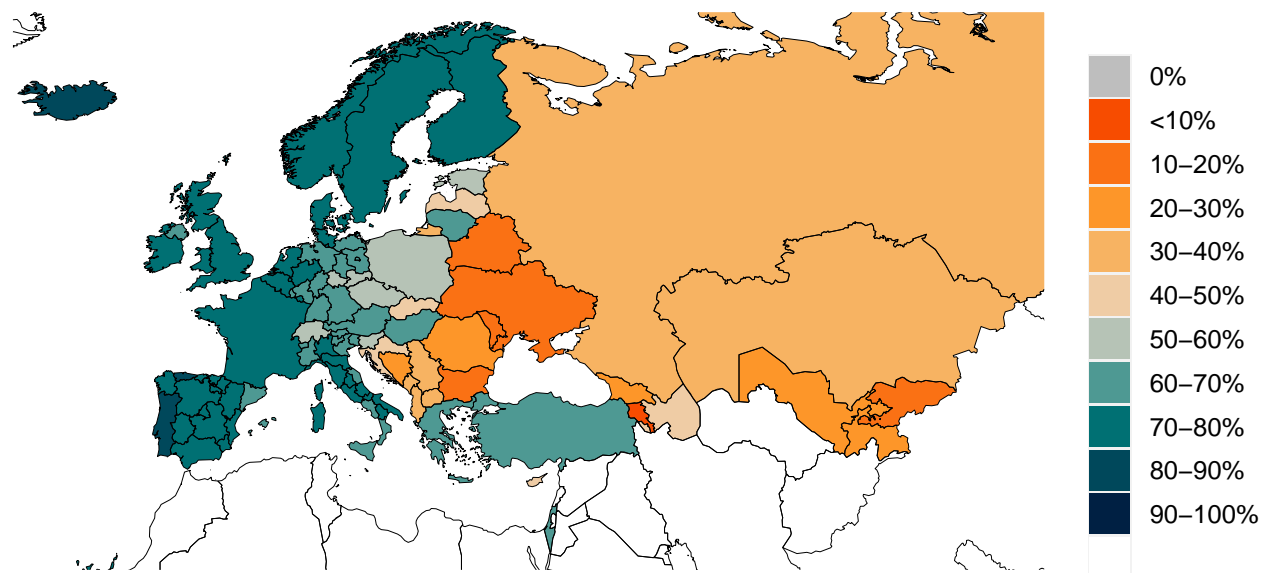


Table 3. Estimates of vaccine efficacy for specific vaccines used in the model at preventing disease and infection. The SEIR model uses variant-specific estimates of vaccine efficacy at preventing symptomatic disease and at preventing infection. We use data from clinical trials directly, where available,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

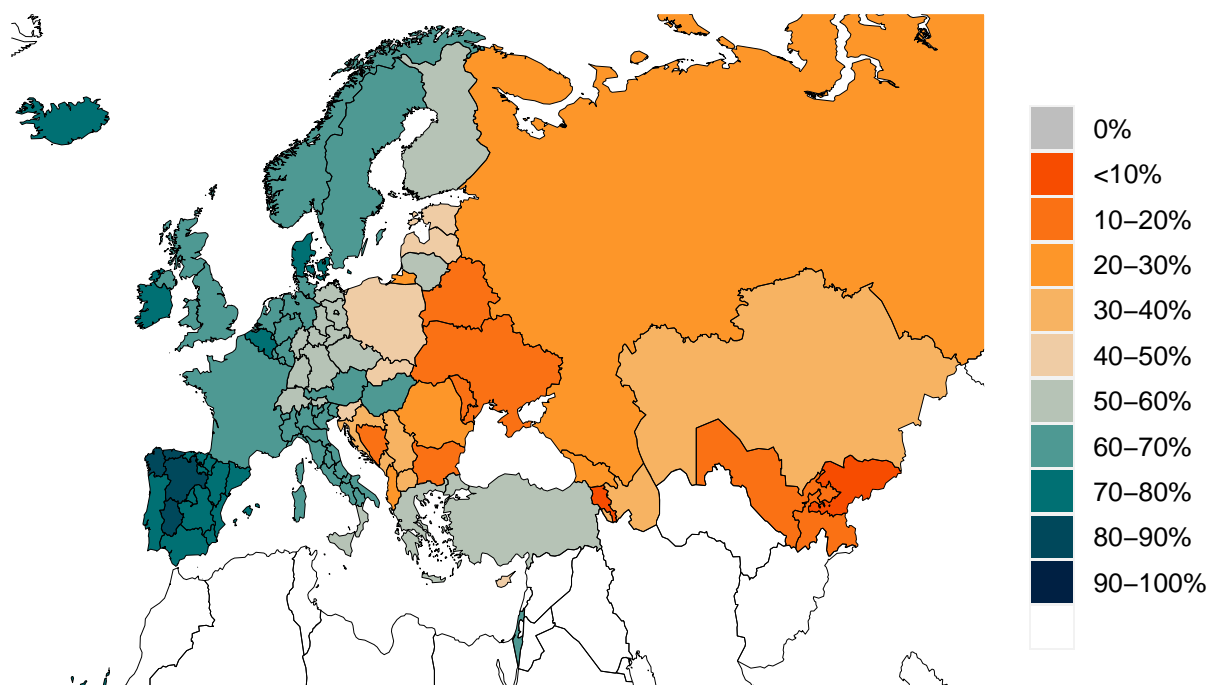


Figure 18. Trend in the estimated proportion of the adult (18+) population that have been vaccinated or would probably or definitely receive the COVID-19 vaccine if available

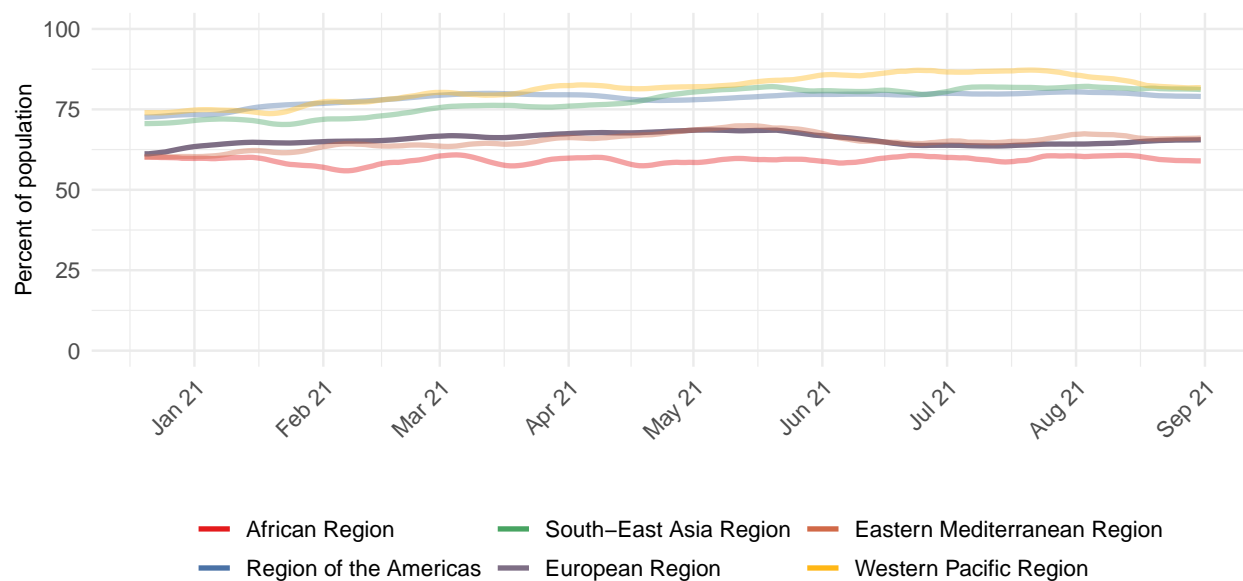


Figure 19. This figure shows the estimated proportion of the adult (18+) population that has been vaccinated or would probably or definitely receive the COVID-19 vaccine if available

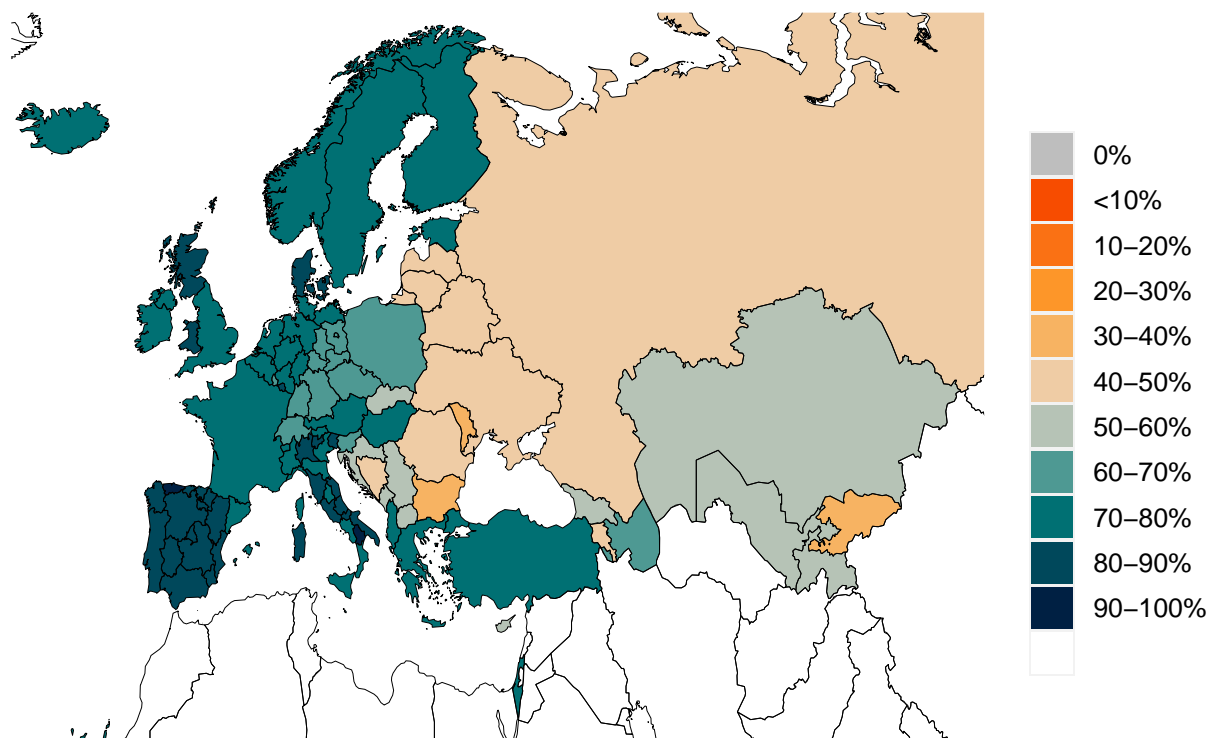


Figure 20. Percent of people who receive at least one dose of a COVID-19 vaccine and those who are fully vaccinated

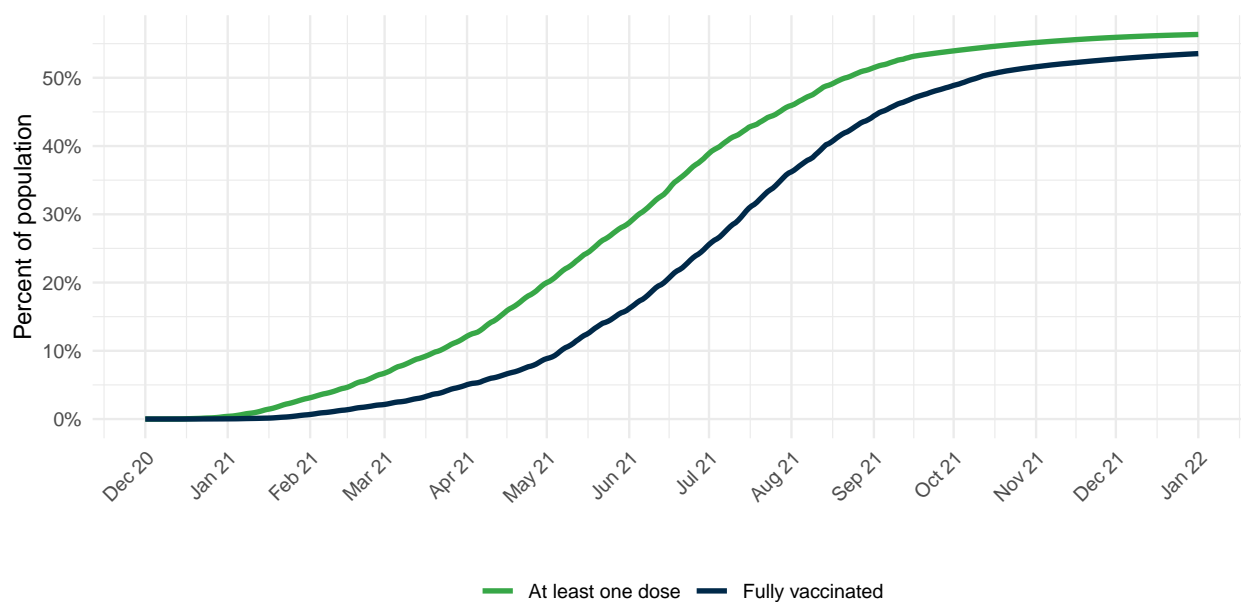
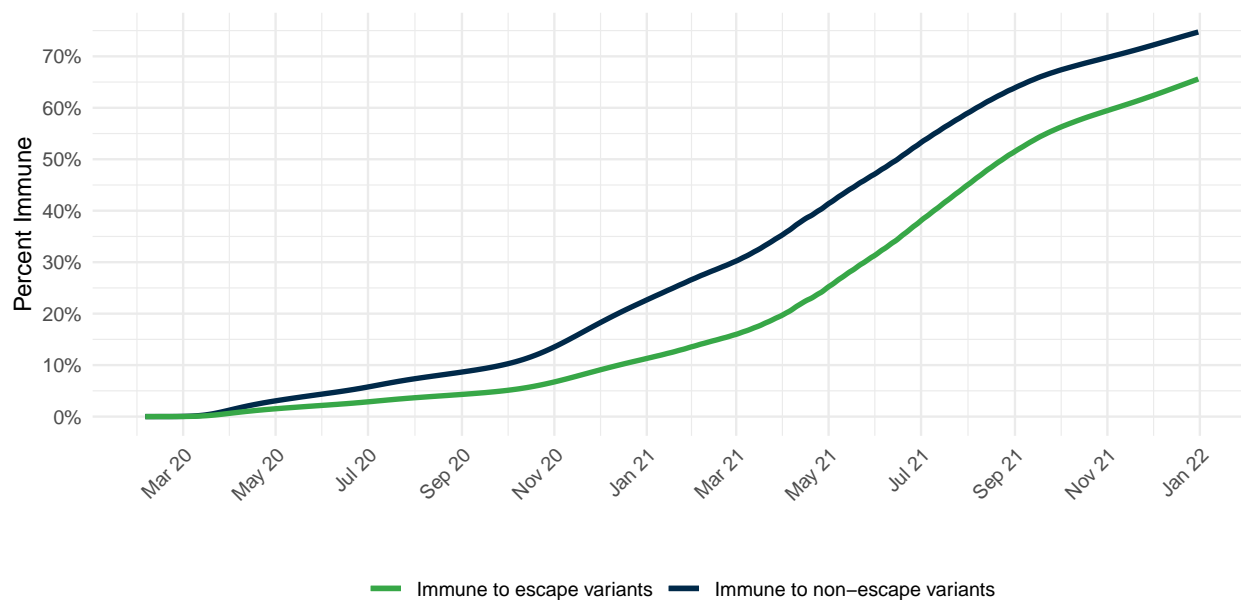


Figure 21. Percentage of people who are immune to non-escape variants and the percentage of people who are immune to escape variants



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.

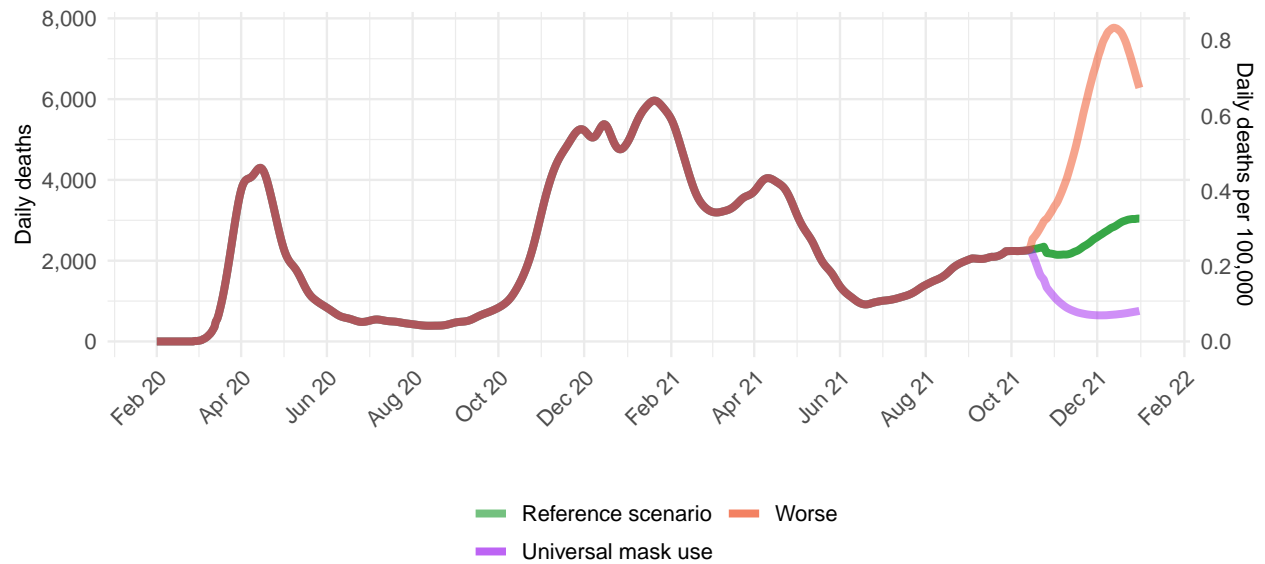
The **worse scenario** modifies the reference scenario assumption in four ways:

- 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

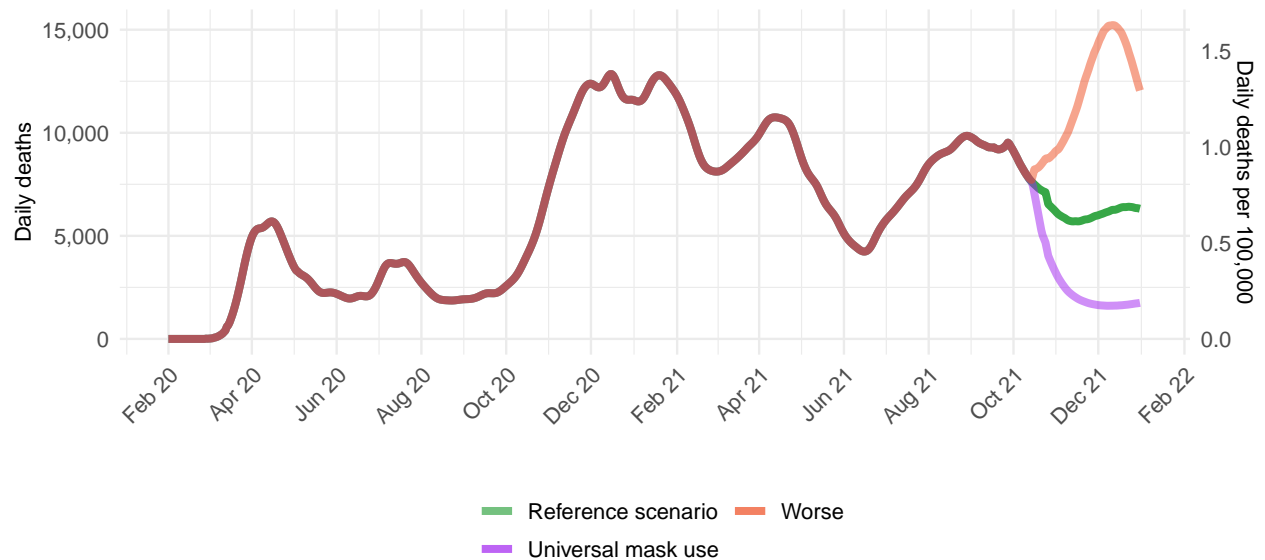


Figure 23. Daily COVID-19 infections until January 01, 2022 for three scenarios

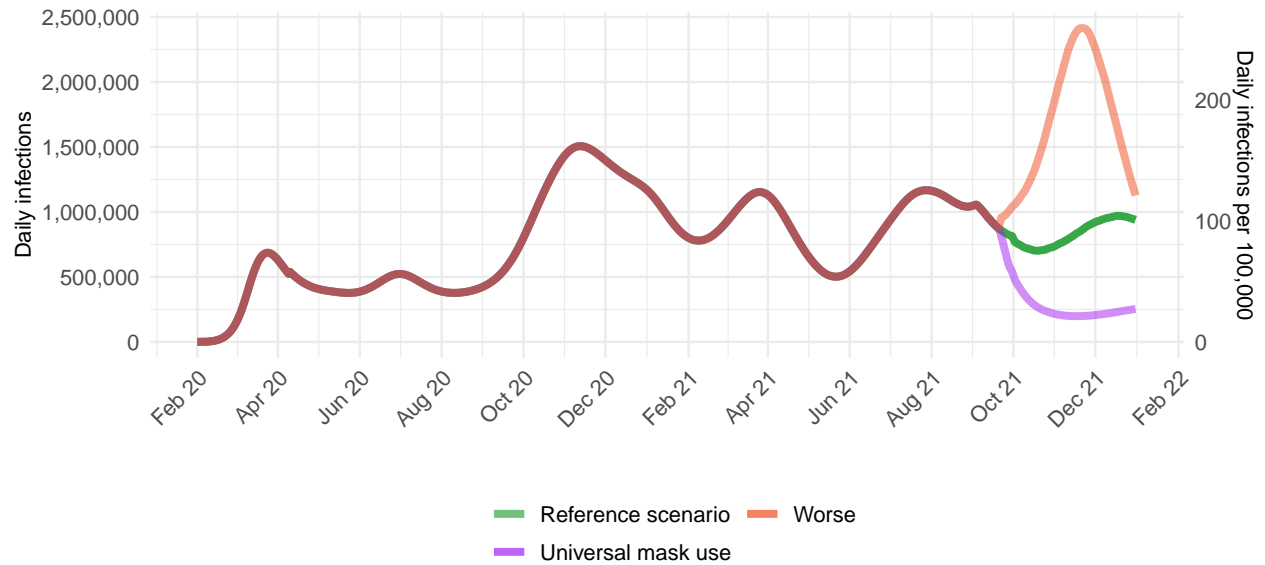


Figure 24. Daily COVID-19 reported cases until January 01, 2022 for three scenarios

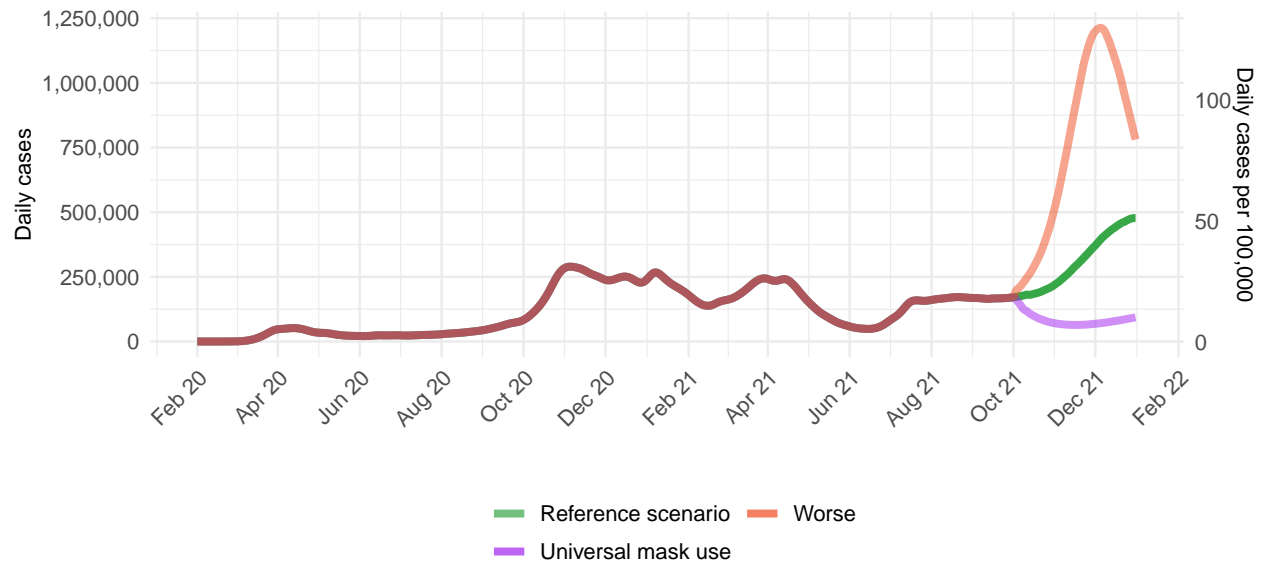


Figure 25. Daily COVID-19 hospital census until January 01, 2022 for three scenarios

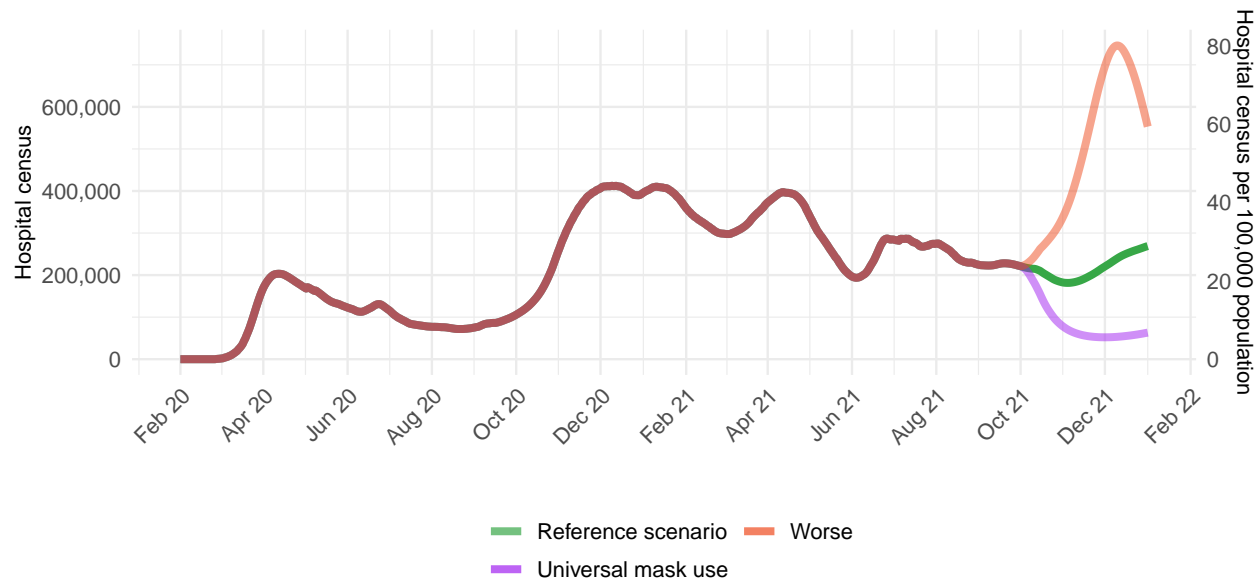


Figure 26. Comparison of reference model projections with other COVID modeling groups. For this comparison, we are including projections of daily COVID-19 deaths from other modeling groups when available: Delphi from the Massachusetts Institute of Technology ([Delphi](#)), Imperial College London ([Imperial](#)), The Los Alamos National Laboratory ([LANL](#)), and the SI-KJalpha model from the University of Southern California ([SIKJalpha](#)). Daily deaths from other modeling groups are smoothed to remove inconsistencies with rounding. Regional values are aggregates from available locations in that region.

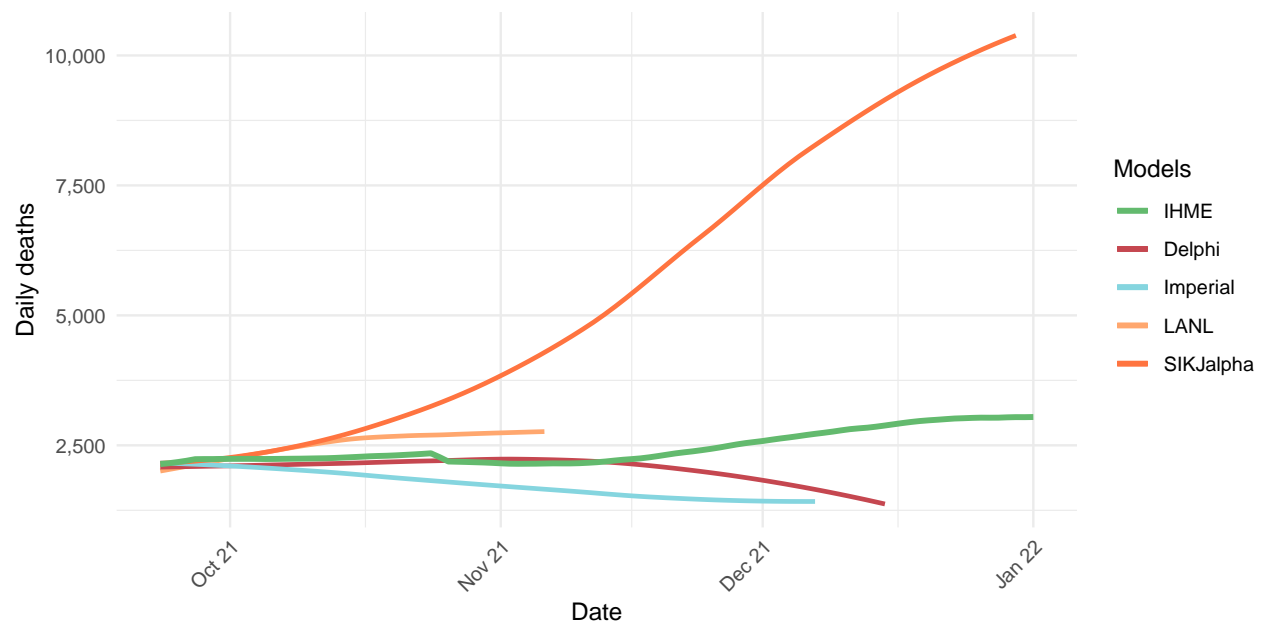
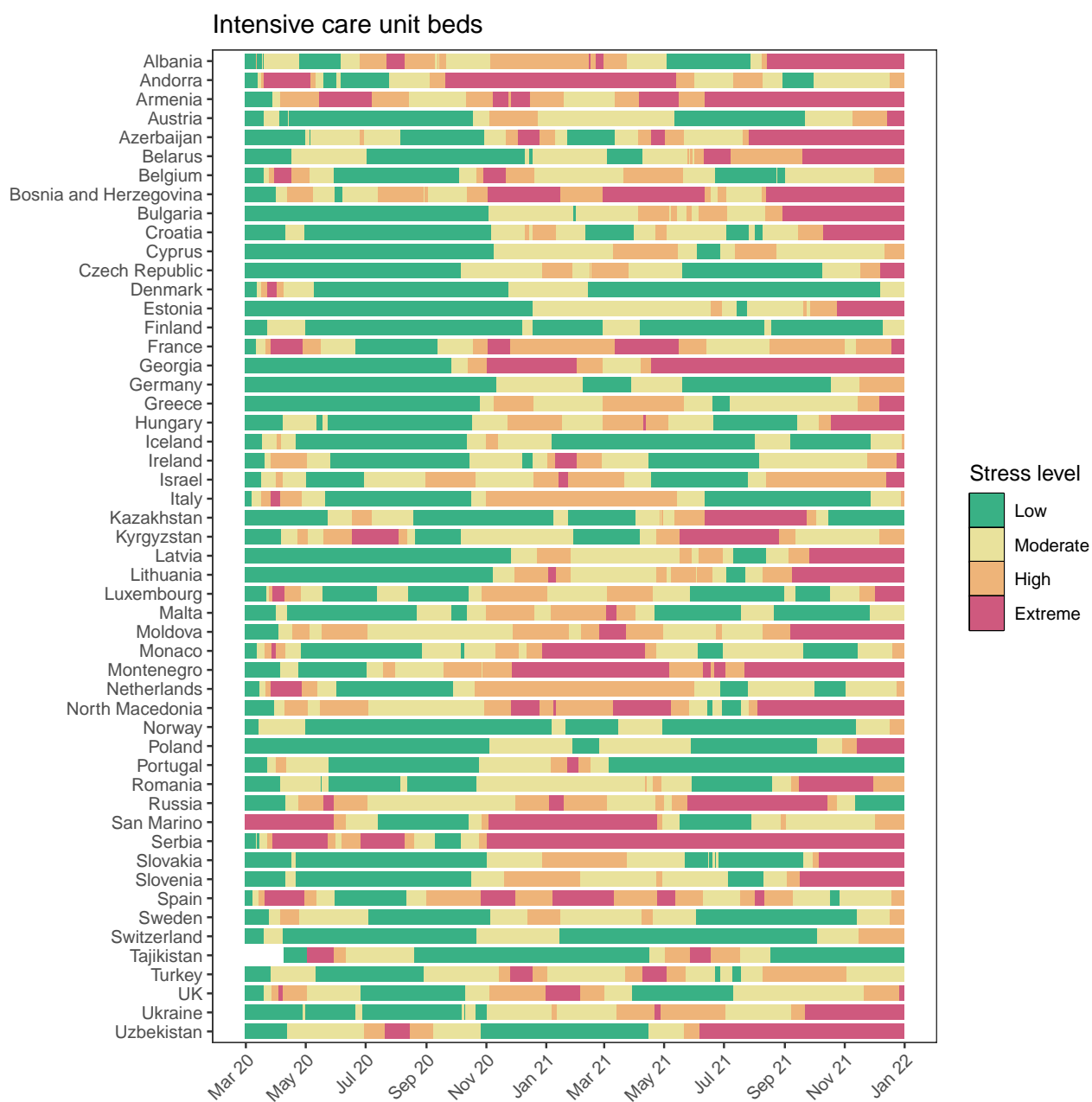


Figure 27. The estimated inpatient hospital usage is shown over time. The percent of hospital beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of beds occupied by COVID-19 patients. Less than 5% is considered *low stress*, 5-9% is considered *moderate stress*, 10-19% is considered *high stress*, and 20% or greater is considered *extreme stress*.



Figure 28. The estimated intensive care unit (ICU) usage is shown over time. The percent of ICU beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of ICU beds occupied by COVID-19 patients. Less than 10% is considered *low stress*, 10-29% is considered *moderate stress*, 30-59% is considered *high stress*, and 60% or greater is considered *extreme stress*.



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>.