COVID-19 Results Briefing

The European Union

September 1, 2021

This document contains summary information on the latest projections from the IHME model on COVID-19 in the European Union. The model was run on August 31, 2021, with data through August 30, 2021.

The Delta surges continue to dominate the EU, with reported cases level and deaths still increasing overall. Within the EU, Portugal, Spain, France, most of Italy, Malta, Cyprus, the Netherlands, and Finland have declining transmission. The remaining countries' transmission continues to increase. The second wave in Scotland may be a clear warning for countries in the EU where schools will open in the coming weeks. Given the large proportion of cases that are in individuals under age 18 and the timing of the second Delta wave, the most likely contributing factor is school openings, despite mask use requirements in schools. Likewise, the continued surge in Israel highlights the risks of the Delta variant even in a highly vaccinated population. Given the east-west gradient in the EU in terms of vaccine hesitancy, we expect that only 63% of the EU population will be fully vaccinated by December 1. Even taking into account immunity from past infection and vaccination and the efficacy of each against the Delta variant infection, we forecast that only 58% will be immune to the Delta variant by December 1. In our reference scenario, we expect daily reported deaths to rise steadily through the fall and early winter, reaching 2,000 a day by December 1. School openings may accelerate transmission and make the trajectory closer to our worse scenario with much larger increases in cases, hospitalizations, and deaths, with peaks in November. These forecasts do not take into account the growing evidence from Israel, the United Kingdom, the United States, and Qatar on rapid waning of vaccine-derived protection against infection and thus may be optimistic about the late fall/early winter. If controlling transmission is the policy goal, then the use of boosters will be required as well as very careful implementation of mitigation measures as schools open, including mask use, physical distancing, precautions for mealtimes when children are unmasked, and vaccination mandates for teachers. As more countries shift strategies toward harm reduction rather than controlling transmission, the focus will have to be on getting vaccination rates to very high levels in the populations over 60 and those with comorbidities at younger ages, along with promotion of seasonal mask use in the vulnerable. Given the ongoing potential for new variants to emerge with more than 5 million infections a day in the world, genetic surveillance and disaggregation of cases, hospitalizations, and deaths by vaccine status and variant type will be a very helpful resource.

Current situation

- Estimated daily infections in the last week increased to 154,000 per day on average compared to 135,000 the week before (Figure 1). Daily hospital census in the last week (through August 30) increased to 57,000 per day on average compared to 52,000 the week before.

- Daily reported cases in the last week remained constant at 65,700 per day on average (Figure 2).

- Reported deaths due to COVID-19 in the last week increased to 400 per day on average compared to 360 the week before (Figure 3).

- Excess deaths due to COVID-19 in the last week increased to 700 per day on average compared to 610 the week before (Figure 3). This makes COVID-19 the number 5 cause of death in the European Union this week (Table 1).

- The daily reported COVID-19 death rate is greater than 4 per million in Bulgaria and several regions in Spain (Figure 4).

- The daily rate of excess deaths due to COVID-19 is greater than 4 per million in Bulgaria and Lithuania, along with many regions in Spain and in Sicily (Figure 4).

- We estimate that 25% of people in the European Union have been infected as of August 30 (Figure 6).

- Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 18 countries (Figure 7). There is a division in the EU between Portugal, Spain, France and much of Italy, Malta, and Cyprus where transmission is declining, and the rest of the EU where transmission is increasing.

- The infection-detection rate in the European Union was close to 51% on August 30 (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 remains the dominant variant in all countries of the EU.

Trends in drivers of transmission

- Most but not all countries are still using a combination of border restrictions, business curfews, gathering restrictions, and mask mandates to reduce transmission (Table 2). The most limited set of mandates are deployed in Austria, Denmark, Estonia, Finland, Hungary, the Netherlands, and Sweden.

- Mobility last week was 1% lower than the pre-COVID-19 baseline (Figure 11). Mobility was near baseline (within 10%) in 23 countries. Mobility was lower than 30% of baseline in Madrid and two regions of Northern Italy.

- As of August 30, in the COVID-19 Trends and Impact Survey, 43% of people self-report that they always wore a mask when leaving their home (Figure 13).

- There were 359 diagnostic tests per 100,000 people on August 30 (Figure 15).

- As of August 30, nine countries have reached 70% or more of the population who have received at least one vaccine dose and five countries have reached 70% or more of the population who are fully vaccinated (Figure 17). Nine countries in the eastern part of the EU have vaccination rates below 50%.

- In the European Union, 72% of people 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 34% in Bulgaria to 85% in Portugal (Figure 19).

- In our current reference scenario, we expect that 298 million people will be vaccinated with at least one dose by December 1 (Figure 20). We expect 63% of the population will be fully vaccinated by December 1.

- Based on rates of past infection and vaccination and the protection each of these give against infection, we estimate that currently 50% of the population is immune to the Delta variant. This will grow to 58% by December 1 (Figure 21).

Projections

- In our **reference scenario**, which represents what we think is most likely to happen, our model projects 869,000 cumulative reported deaths due to COVID-19 on December 1. This represents 108,000 additional deaths from August 30 to December 1. Daily reported deaths will rise steadily to nearly 2,000 on December 1, 2021 (Figure 22).

- Under our **reference scenario**, our model projects 1,537,000 cumulative excess deaths due to COVID-19 on December 1. This represents 214,000 additional deaths from August 30 to December 1 (Figure 22).

- If **universal mask coverage (95%)** were attained in the next week, our model projects 62,000 fewer cumulative reported deaths compared to the reference scenario on December 1.

- Under our **worse scenario**, our model projects 1,022,000 cumulative reported deaths on December 1, an additional 153,000 deaths compared to our reference scenario. Daily reported deaths in the **worse scenario** rise to 5,500 by mid-November (Figure 22).

- Daily infections in the **reference scenario** will rise to 465,000 on December 1, 2021 (Figure 23). Daily infections in the **worse scenario** will rise to 1.2 million by the end of October and then decline (Figure 23).

- Daily cases in the **reference scenario** will rise to 225,000 on December 1, 2021 (Figure 24). Daily cases in the **worse scenario** will rise to 670,000 by the second week of November 8 (Figure 24).

- Daily hospital census in the **reference scenario** will rise to 214,730 on December 1, 2021 (Figure 25). Daily hospital census in the **worse scenario** will rise to 616,110 by November 13, 2021 (Figure 25).

- Figure 26 compares our reference scenario forecasts to other publicly archived models. Models including the ECDC ensemble agree that daily deaths will slowly rise in September. Models are widely divergent in October and even more so in November.

- At some point from August through December 1, 13 countries will have high or extreme stress on hospital beds (Figure 27). At some point from August through December 1, 20 countries will have high or extreme stress on intensive care unit (ICU) capacity (Figure 28).

Model updates

For 22 US states, we have observed poor temporal concordance over recent weeks when comparing (a) deaths, hospitalizations, and cases to (b) seroprevalence surveys after performing assay-specific corrections for sero-reversion. To improve this, we changed the assumptions in the model as to which assay was used in those particular states – from one with substantial declines in sensitivity over time to one with more robust long-term sensitivity – which resulted in a smaller adjustment for these data, and thus lower estimates of seroprevalence. The below are examples from Florida. The top figure shows the previous approach; the lower figure shows the new approach. Squares are reported, circles are post-correction.
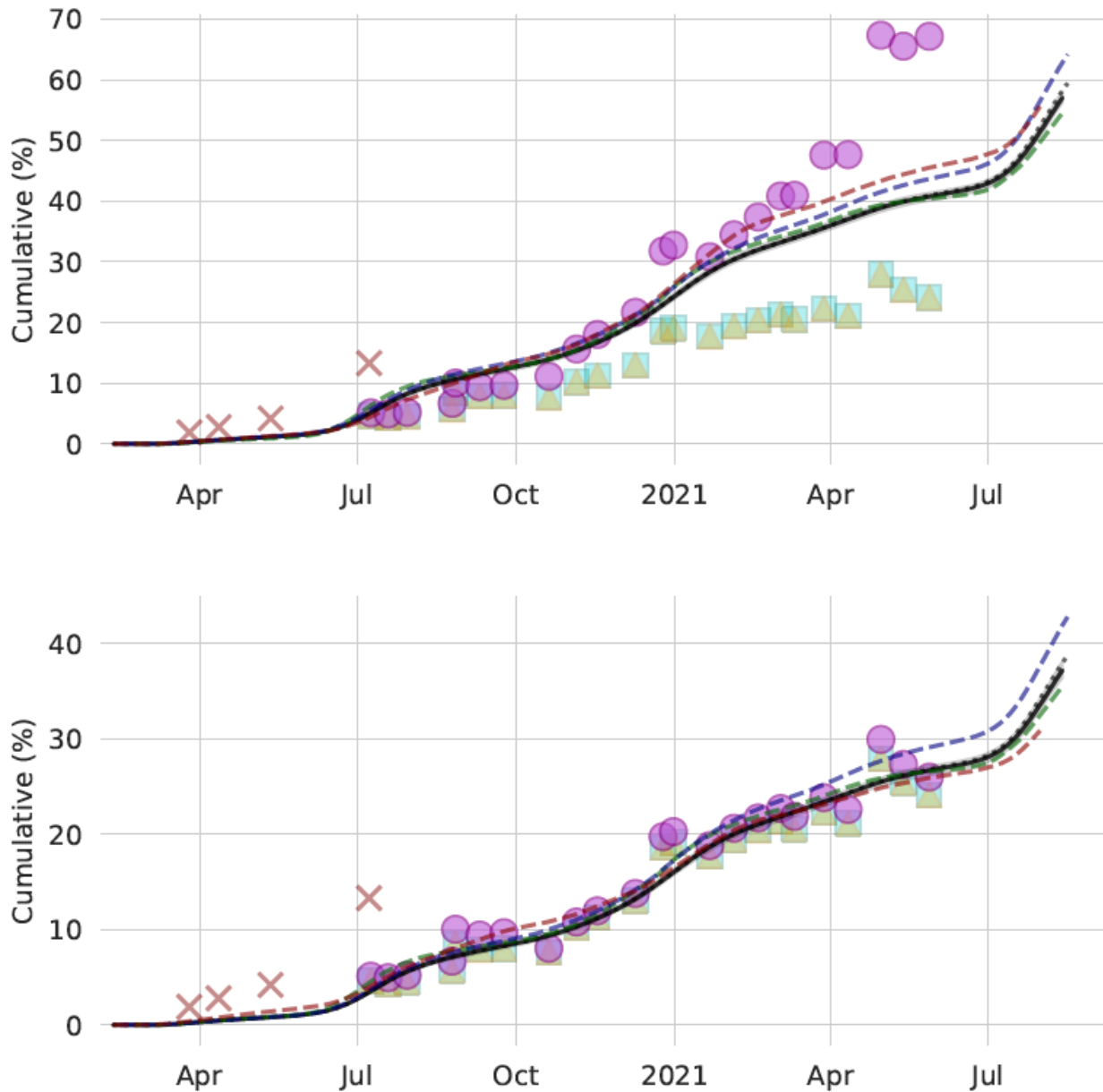
Figure 1. Daily COVID-19 hospital census and infections

Daily hospital census   Daily infections
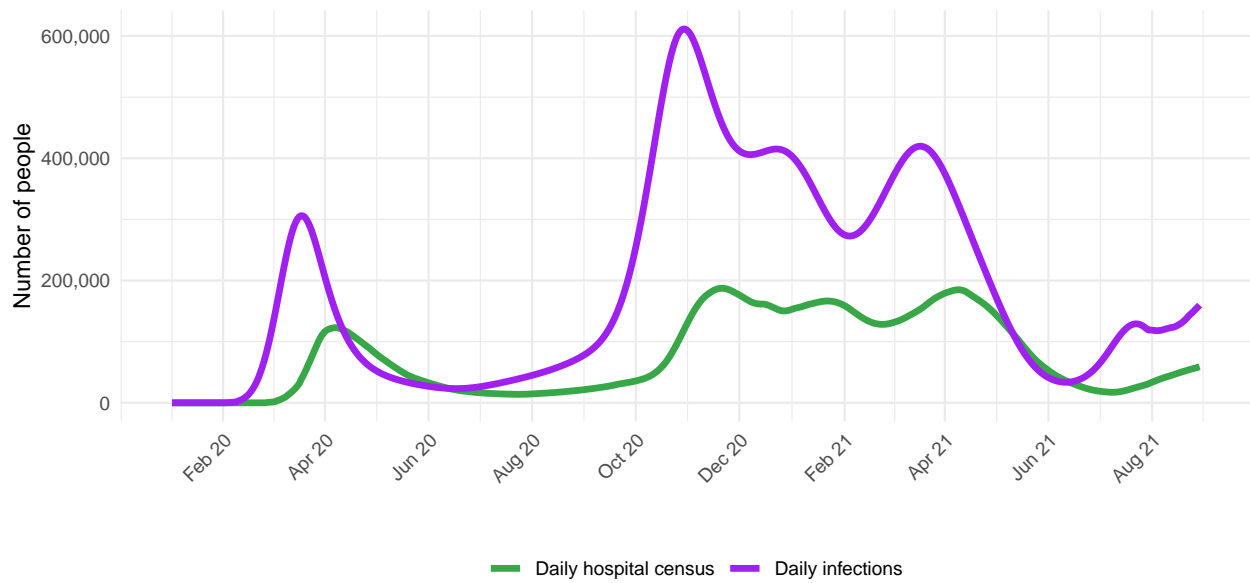
Figure 2. Reported daily COVID-19 cases, moving average

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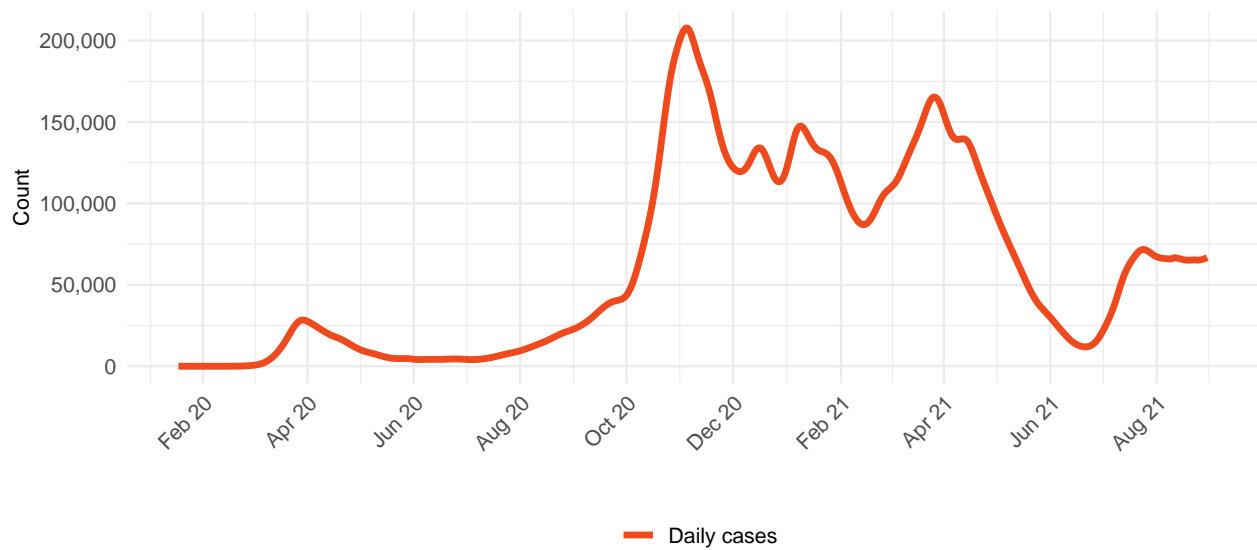
Table 1. Ranking of excess deaths due to COVID-19 among the leading causes of mortality this week, assuming uniform deaths of non-COVID causes throughout the year

Cause name	Weekly deaths	Ranking
Ischemic heart disease	18,714	1
Stroke	10,303	2
Tracheal, bronchus, and lung cancer	6,216	3
Alzheimer's disease and other dementias	5,827	4
COVID-19	4,885	5
Chronic obstructive pulmonary disease	4,608	6
Colon and rectum cancer	4,100	7
Lower respiratory infections	3,503	8
Hypertensive heart disease	2,797	9
Chronic kidney disease	2,430	10

Figure 3. Smoothed trend estimate of reported daily COVID-19 deaths (blue) and excess daily deaths due to COVID-19 (orange)
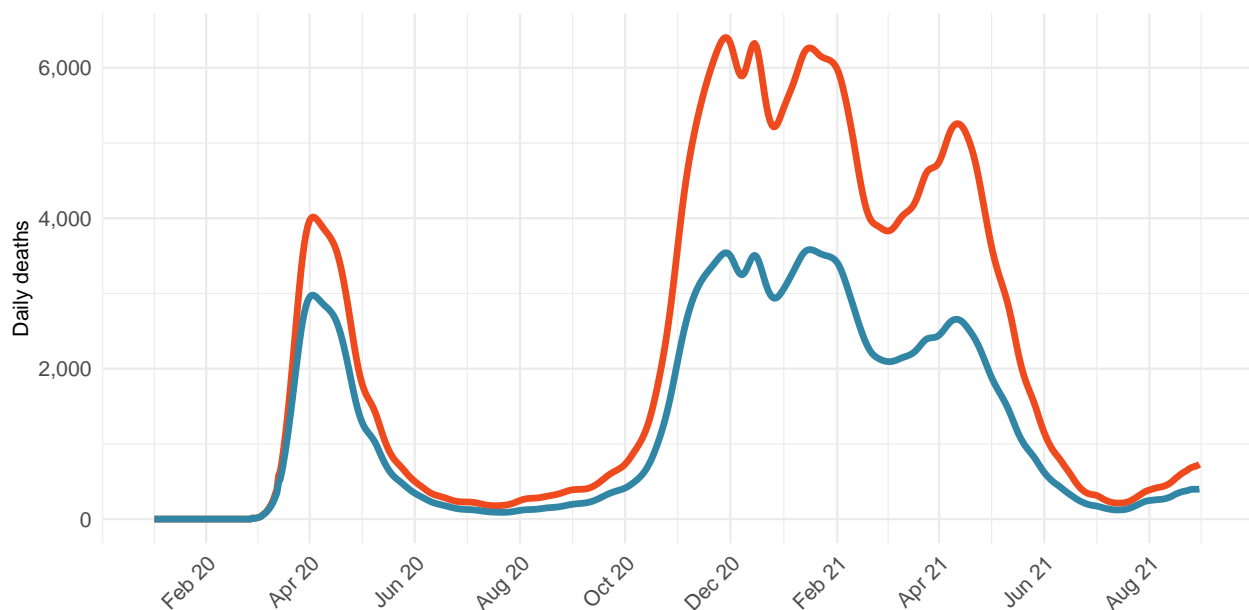
Figure 4. Daily COVID-19 death rate per 1 million on August 30, 2021

A. Daily reported COVID-19 death rate per 1 million
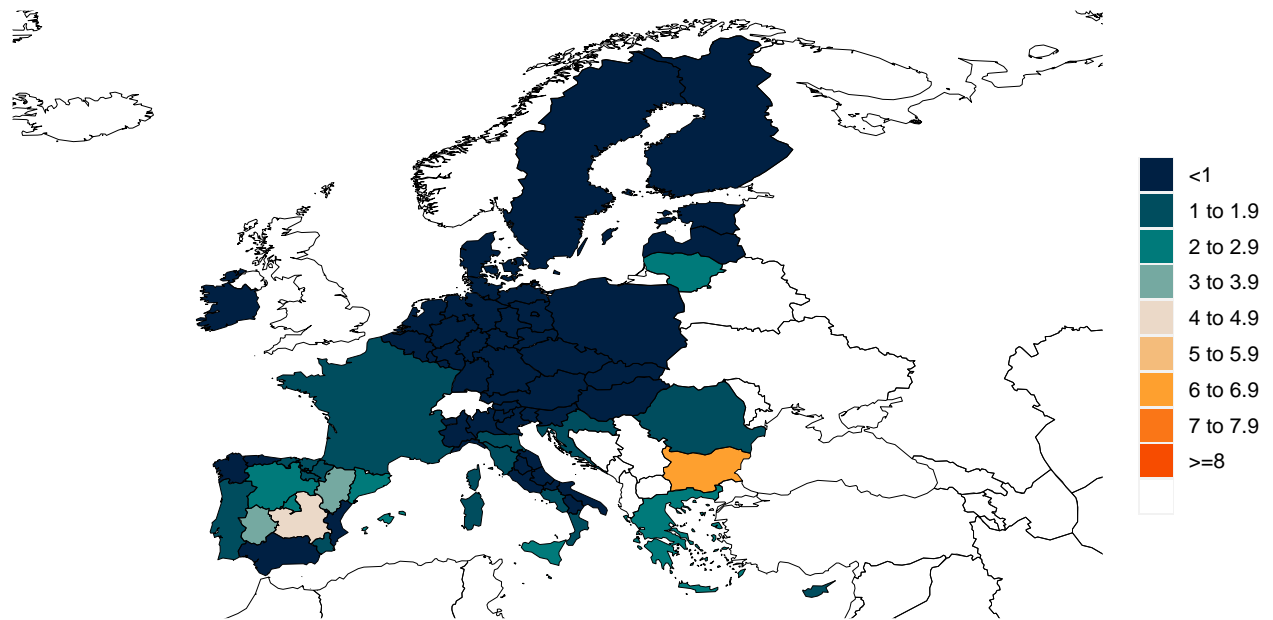
B. Daily excess COVID-19 death rate per 1 million
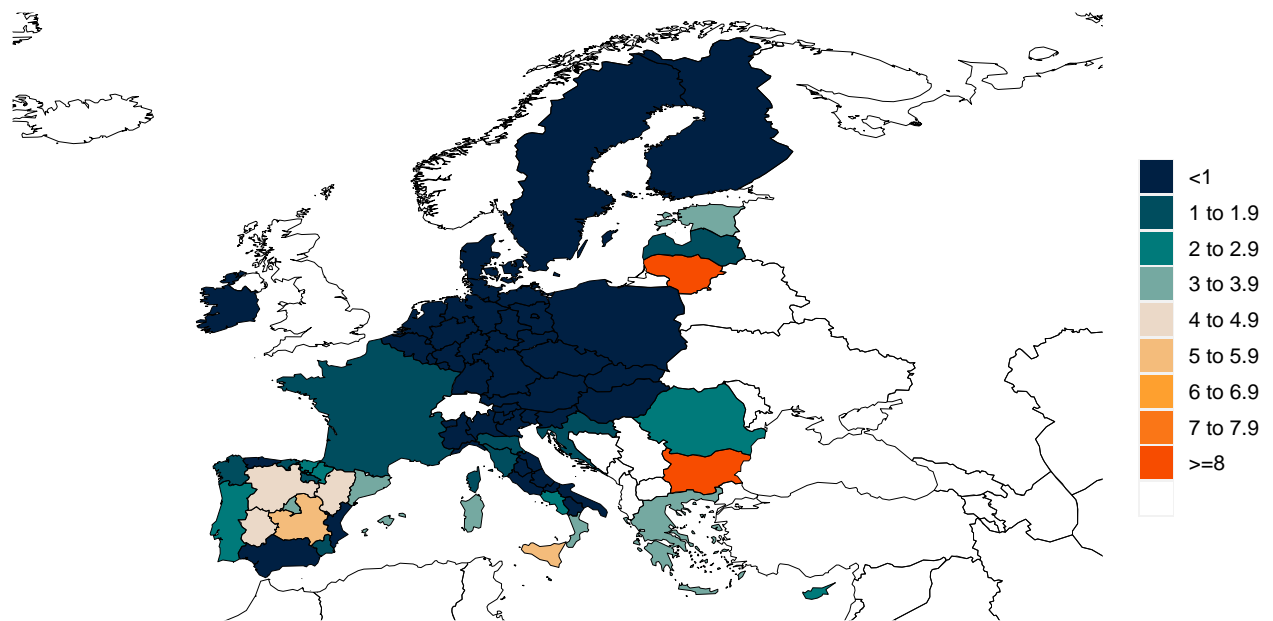
Figure 5. Cumulative COVID-19 deaths per 100,000 on August 30, 2021

A. Reported cumulative COVID-19 deaths per 100,000
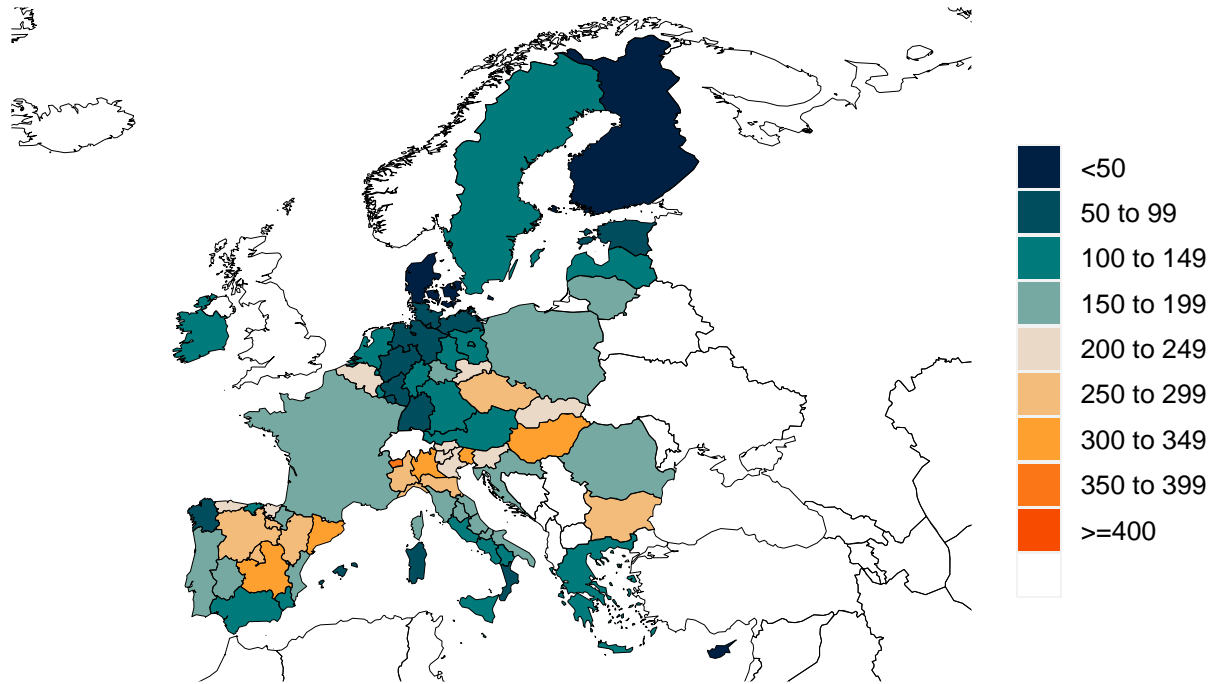
B. Excess cumulative COVID-19 deaths per 100,000
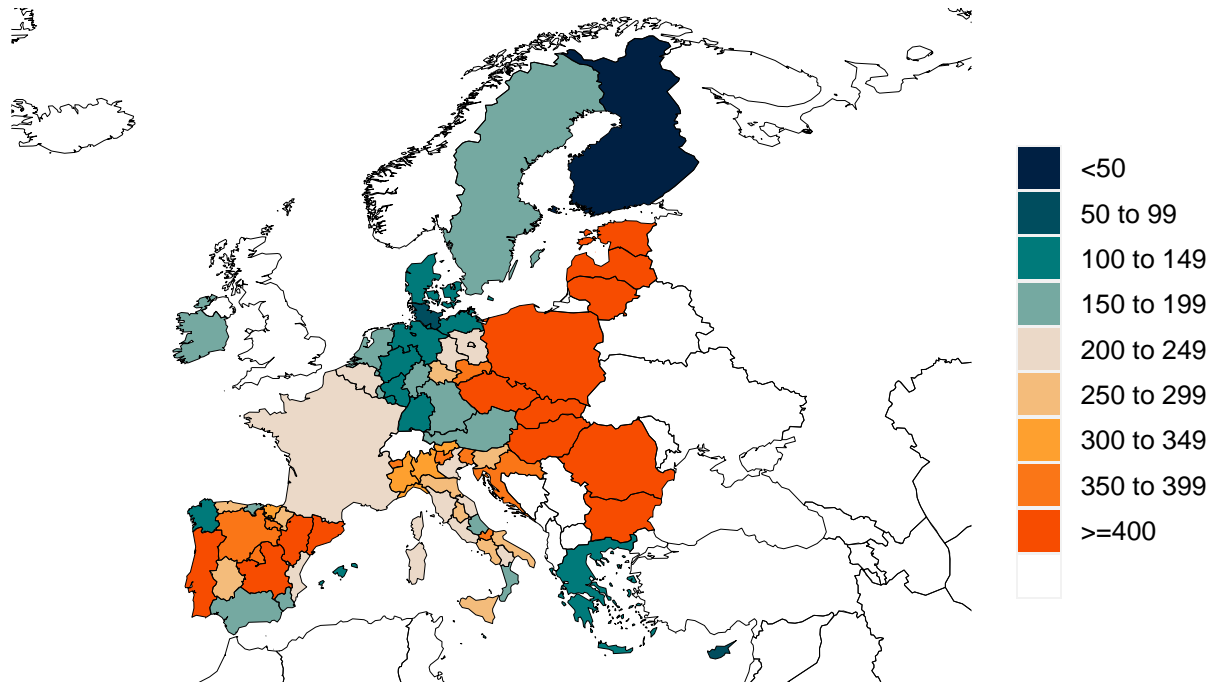
Figure 6. Estimated percent of the population infected with COVID-19 on August 30, 2021
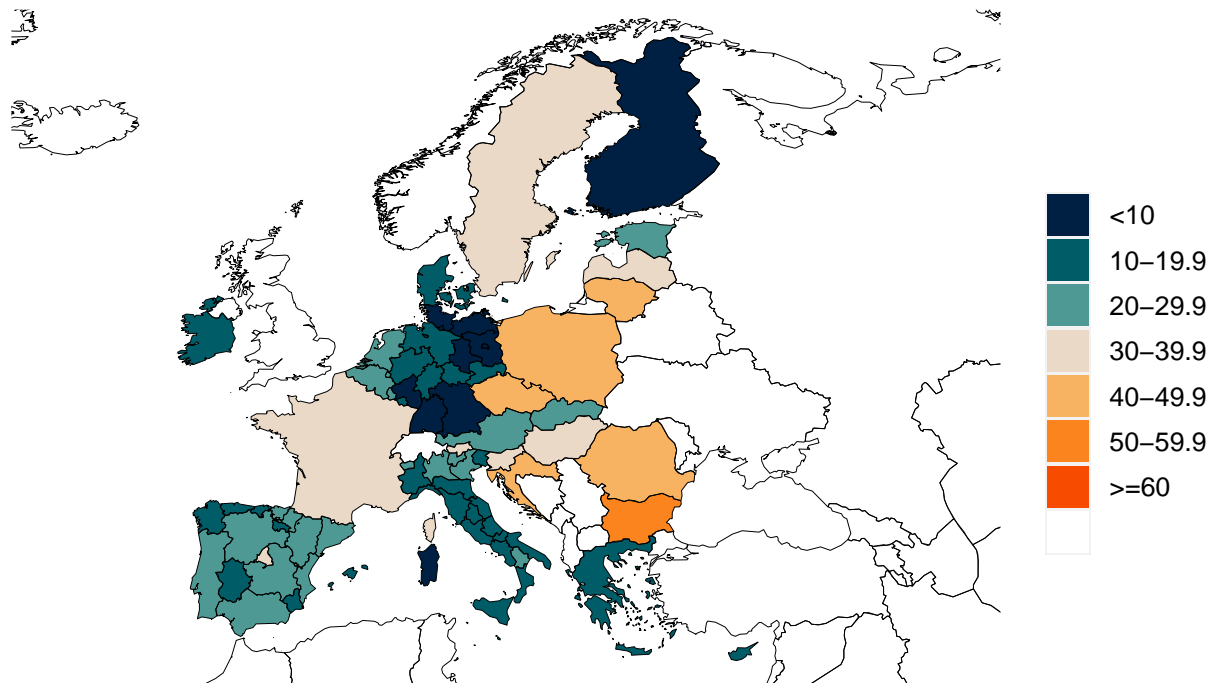
Figure 7. Mean effective R on August 19, 2021. Effective R less than 1 means that transmission should decline, all other things being held the same. The estimate of effective R is based on the combined analysis of deaths, case reporting, and hospitalizations where available. Current reported cases reflect infections 11-13 days prior, so estimates of effective R can only be made for the recent past.
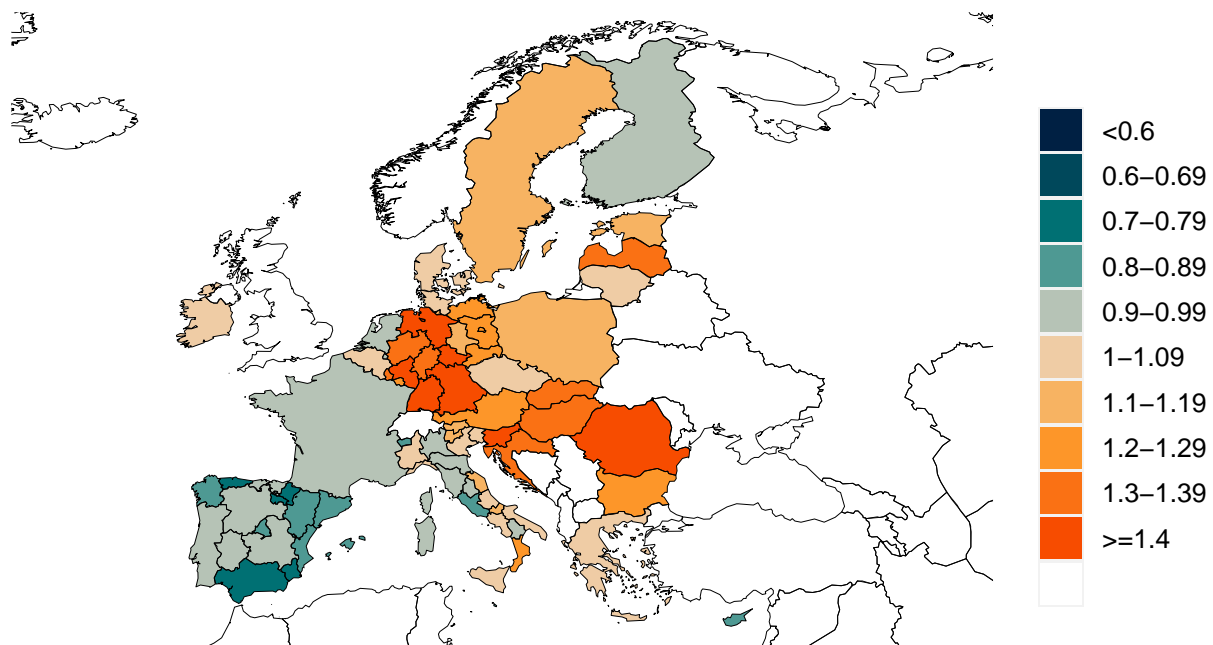
Figure 8. Percent of COVID-19 infections detected. This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model. Due to measurement errors in cases and testing rates, the infection-detection rate can exceed 100% at particular points in time.
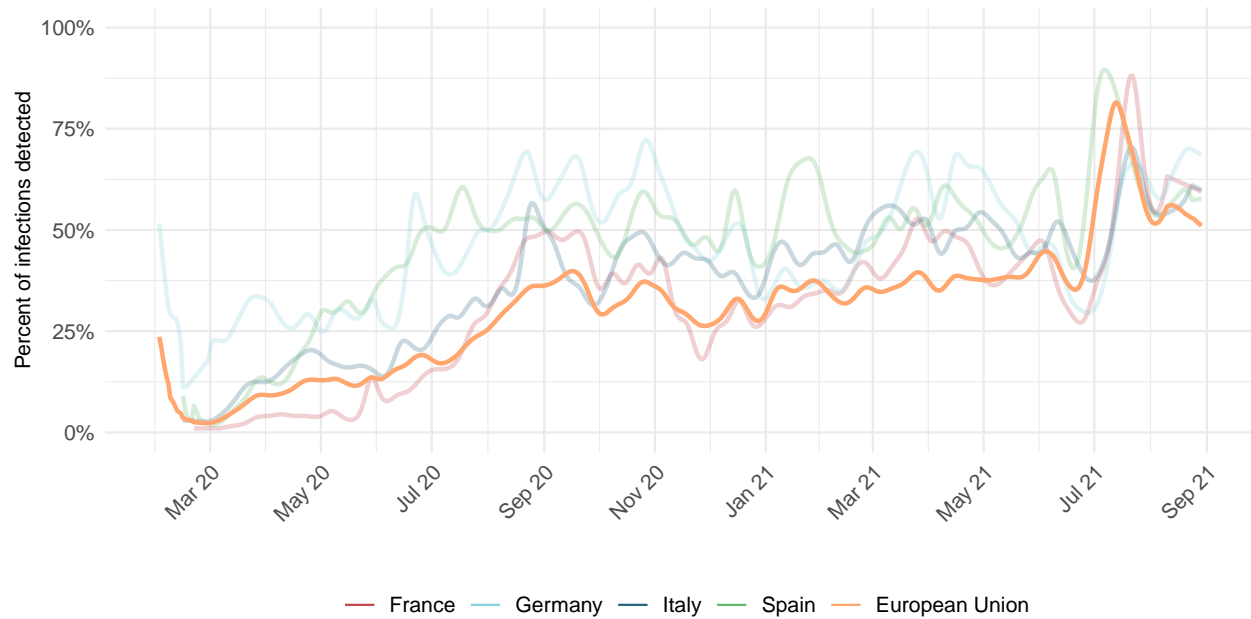
Figure 9. Estimated percent of circulating SARS-CoV-2 for primary variant families on August 30, 2021

A. Estimated percent Alpha variant
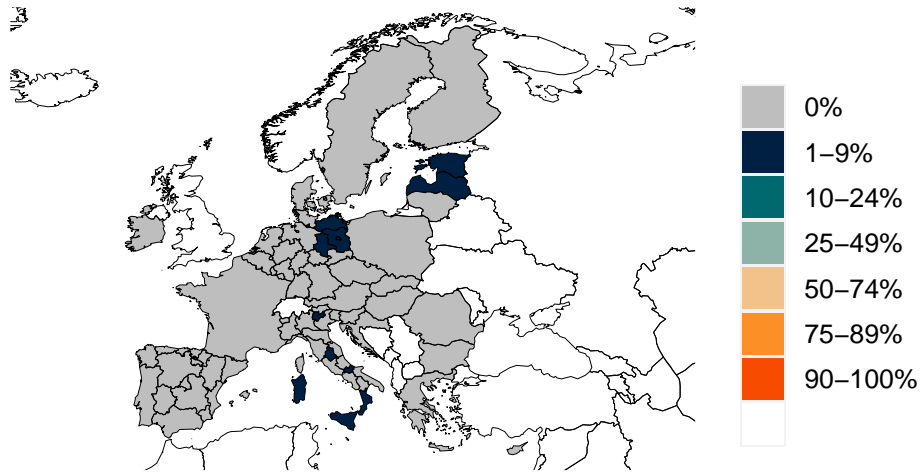
B. Estimated percent Beta variant
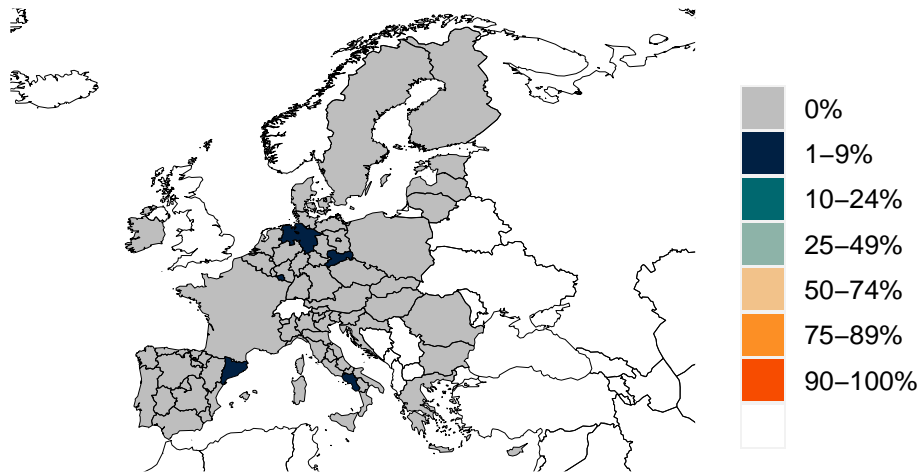
C. Estimated percent Delta variant

⬜	0%
⬛	1–9%
🟦	10–24%
🟩	25–49%
🟧	50–74%
🟧	75–89%
🟧	90–100%
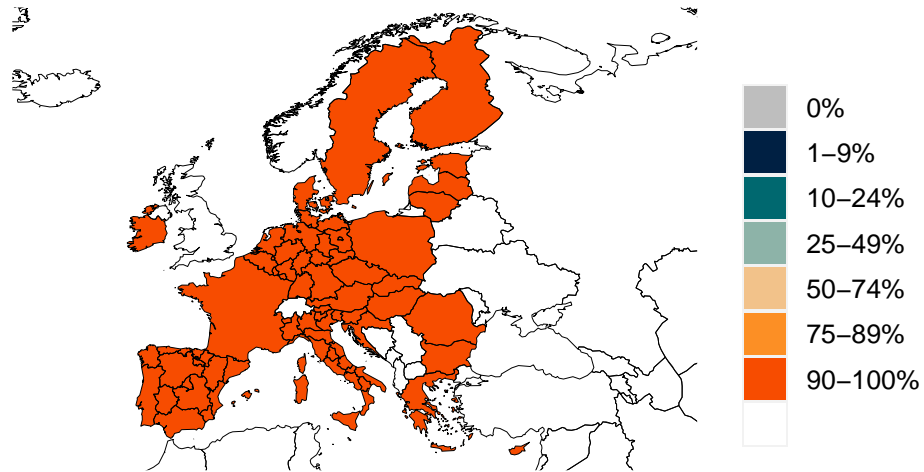
D. Estimated percent Gamma variant

⬜	0%
⬛	1–9%
🟦	10–24%
🟩	25–49%
🟧	50–74%
🟧	75–89%
🟧	90–100%
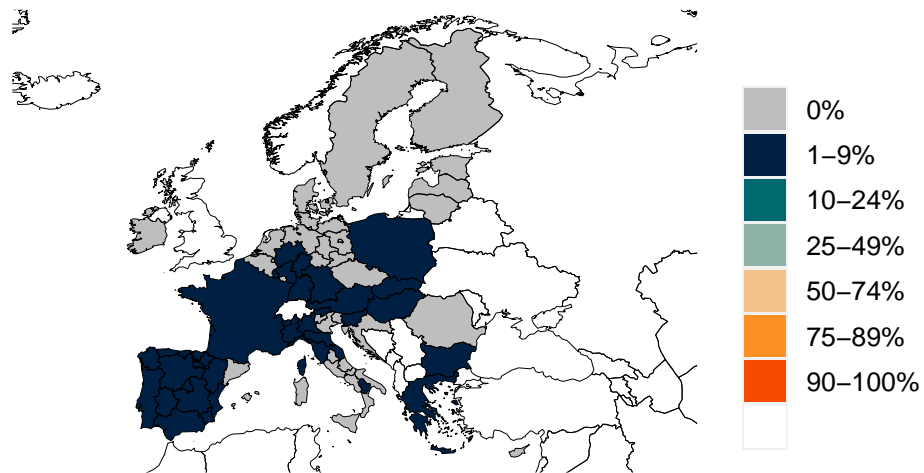
Figure 10. Infection-fatality rate on August 30, 2021. This is estimated as the ratio of COVID-19 deaths to estimated daily COVID-19 infections.
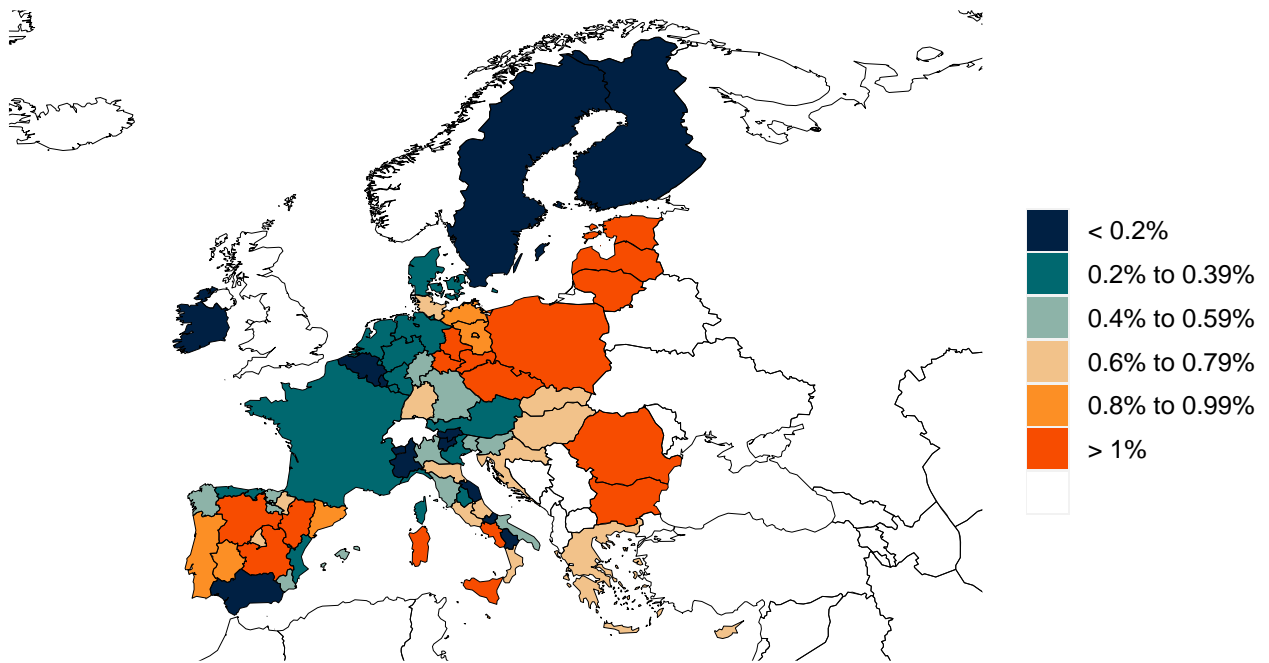
Critical drivers

Table 2. Current mandate implementation
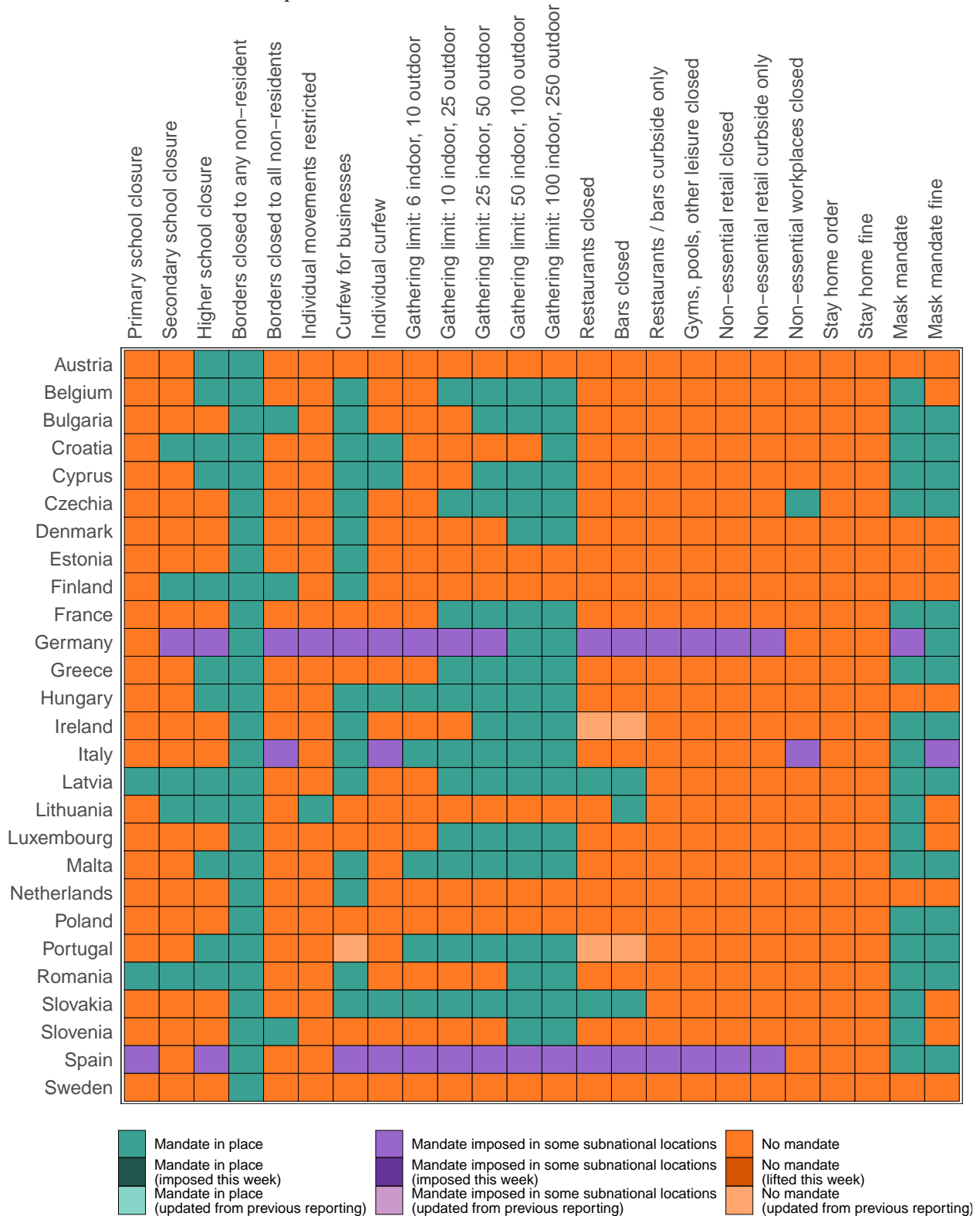
Figure 11. Trend in mobility as measured through smartphone app use, compared to January 2020 baseline

France — Germany — Italy — Spain — European Union
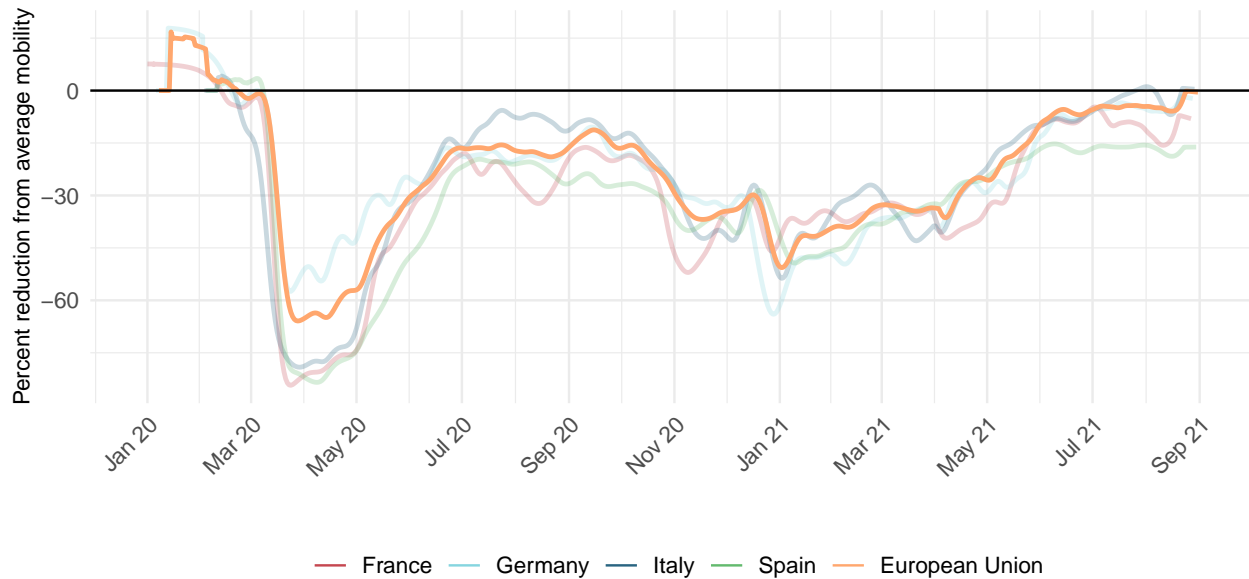
Figure 12. Mobility level as measured through smartphone app use, compared to January 2020 baseline (percent) on August 30, 2021

	=<−50
	−49 to −45
	−44 to −40
	−39 to −35
	−34 to −30
	−29 to −25
	−24 to −20
	−19 to −15
	−14 to −10
	>−10
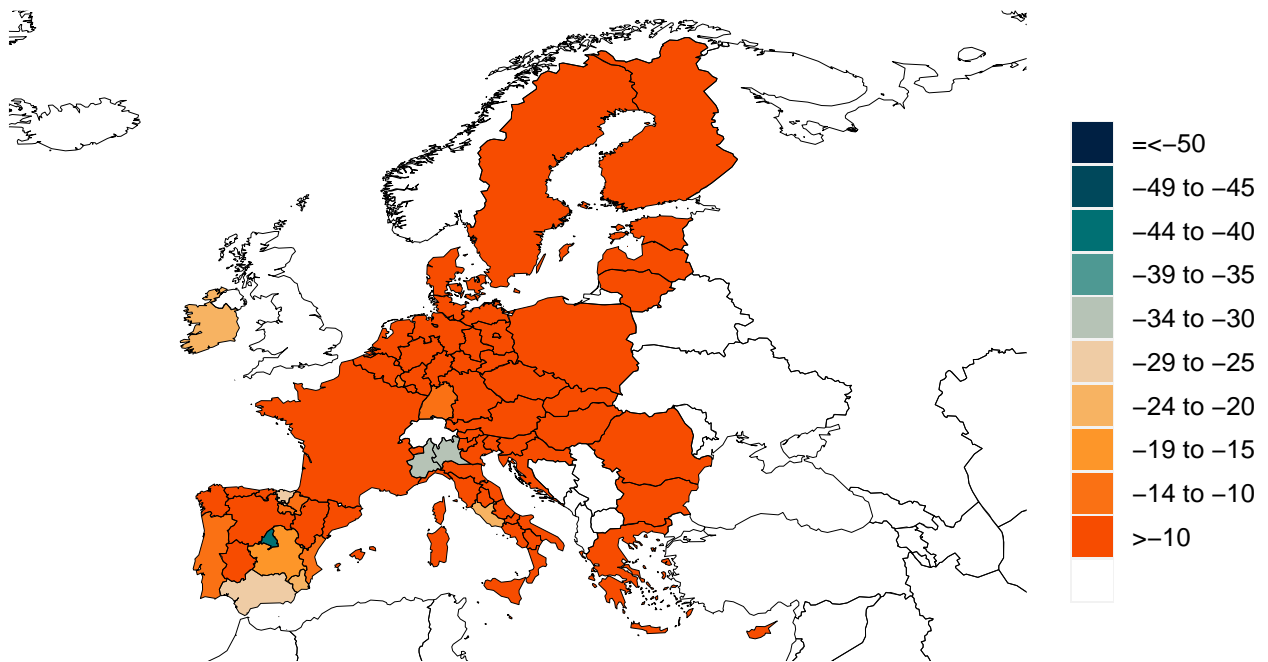
Figure 13. Trend in the proportion of the population reporting always wearing a mask when leaving home
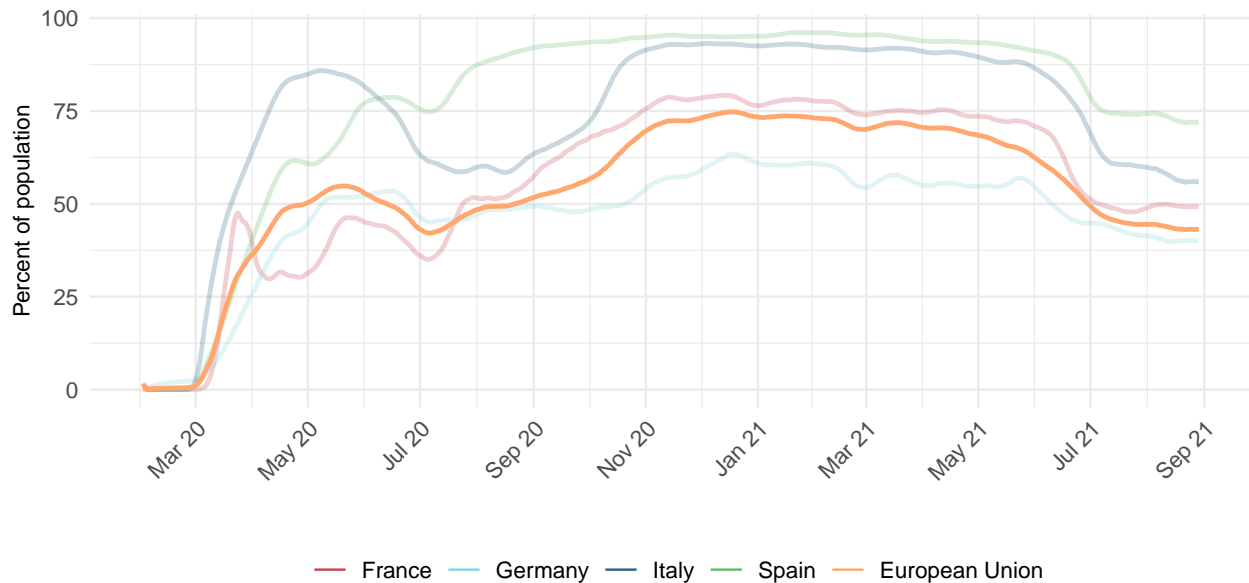
Figure 14. Proportion of the population reporting always wearing a mask when leaving home on August 30, 2021
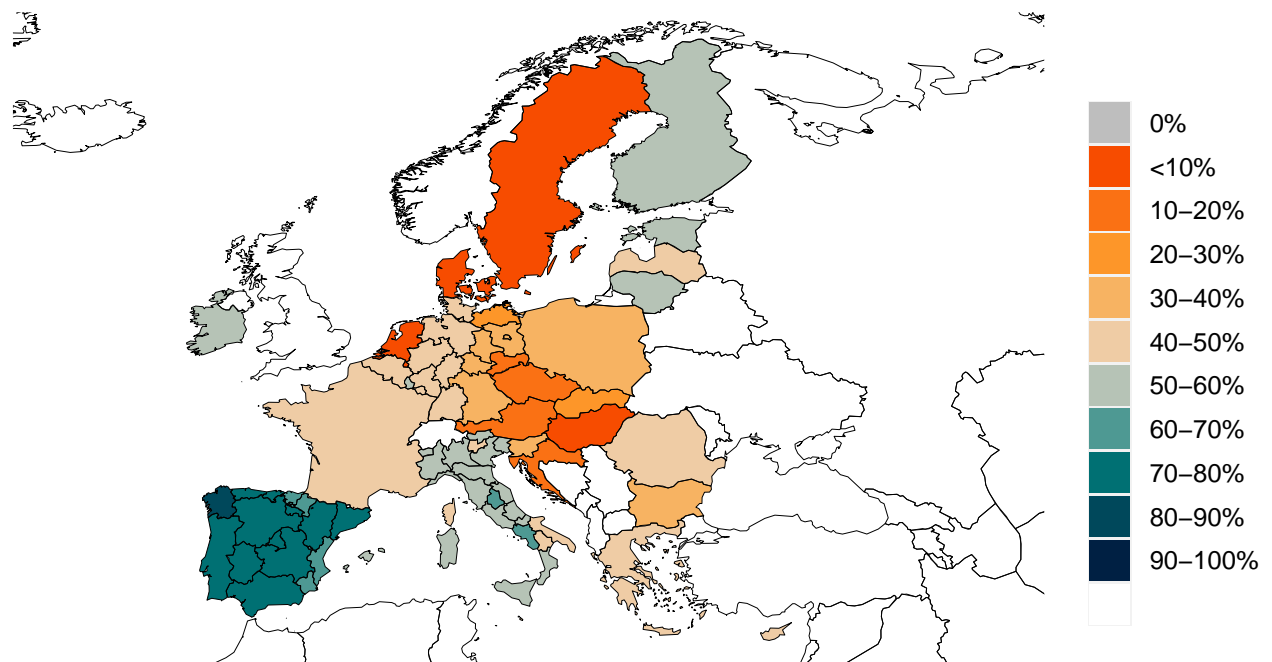
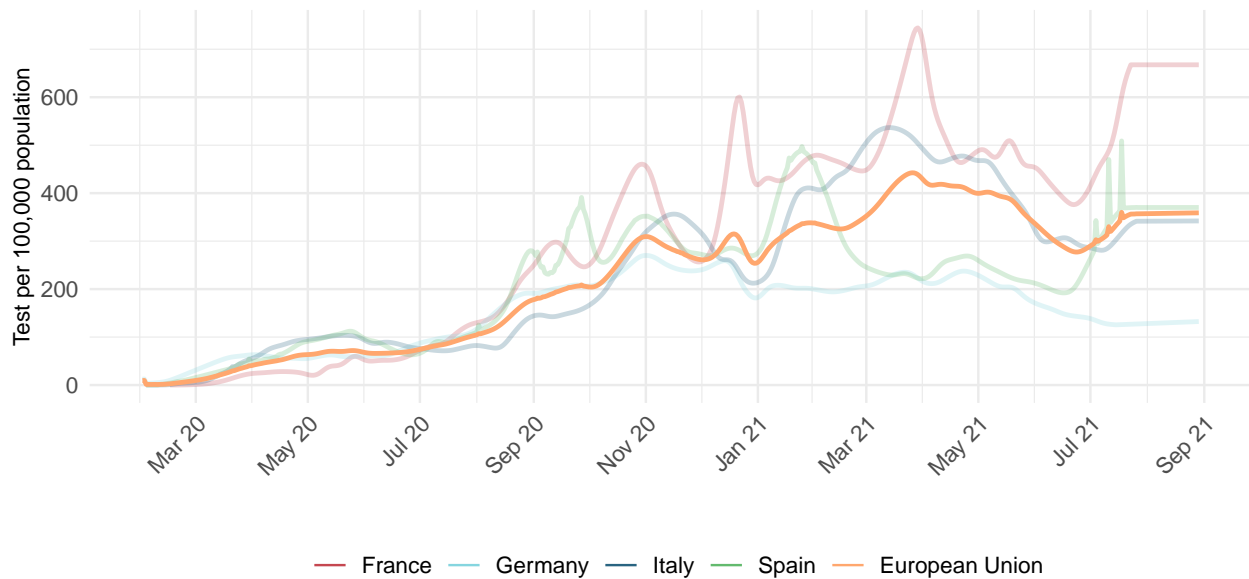**Figure 15.** Trend in COVID-19 diagnostic tests per 100,000 people

France — Germany — Italy — Spain — European Union

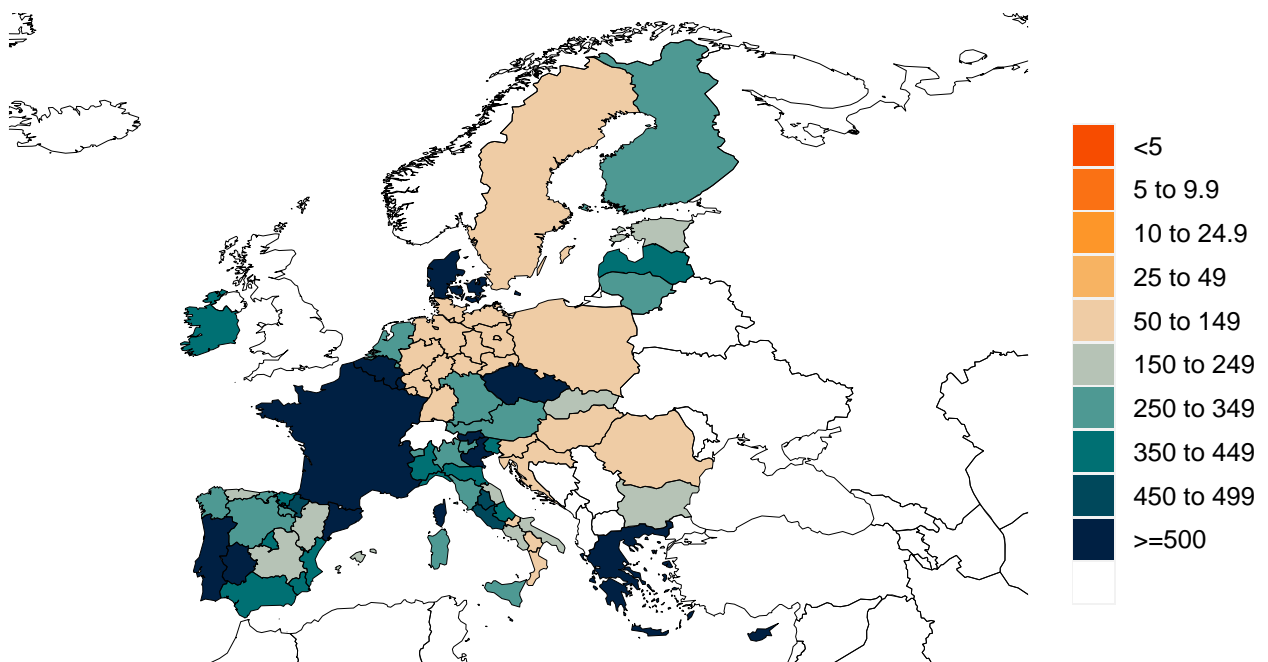**Figure 16.** COVID-19 diagnostic tests per 100,000 people on August 30, 2021

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	85%	52%	83%	57%
CoronaVac	50%	44%	43%	38%
Covaxin	78%	69%	68%	60%
Johnson & Johnson	86%	72%	85%	56%
Moderna	94%	89%	93%	80%
Novavax	89%	79%	79%	69%
Pfizer/BioNTech	92%	86%	90%	78%
Sinopharm	73%	65%	63%	56%
Sputnik-V	92%	81%	80%	70%
Tianjin CanSino	66%	58%	57%	50%
Other vaccines	75%	66%	65%	57%
Other vaccines (mRNA)	91%	86%	89%	78%

Figure 17. Percent of the population (A) having received at least one dose and (B) fully vaccinated against SARS-CoV-2 by August 30, 2021

A. Percent of the population having received one dose of a COVID-19 vaccine
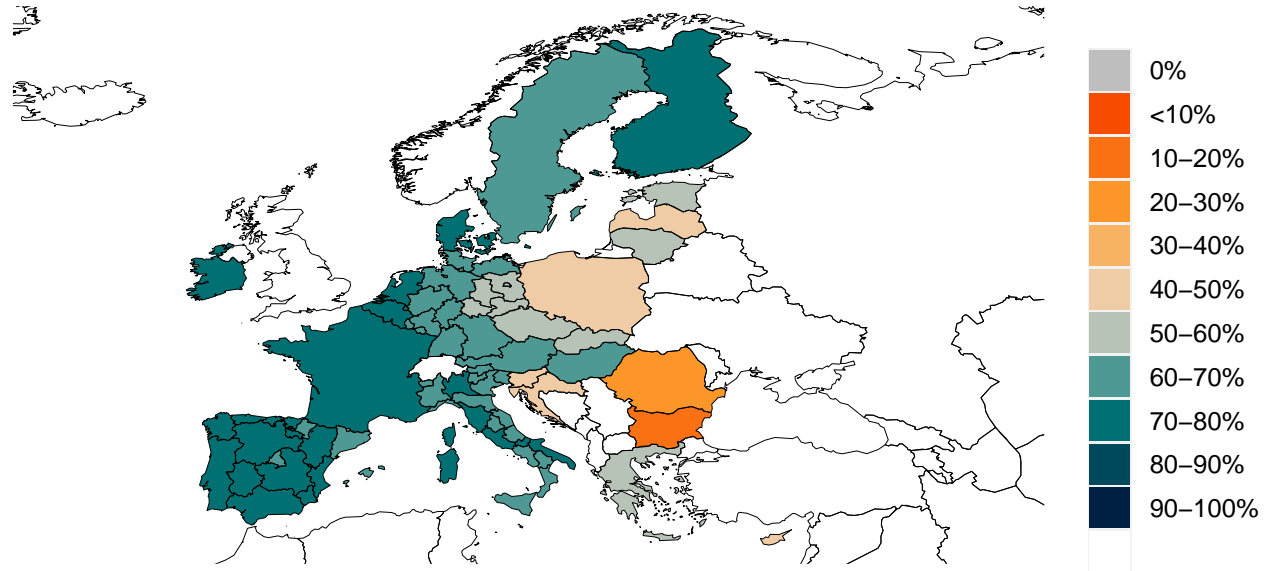
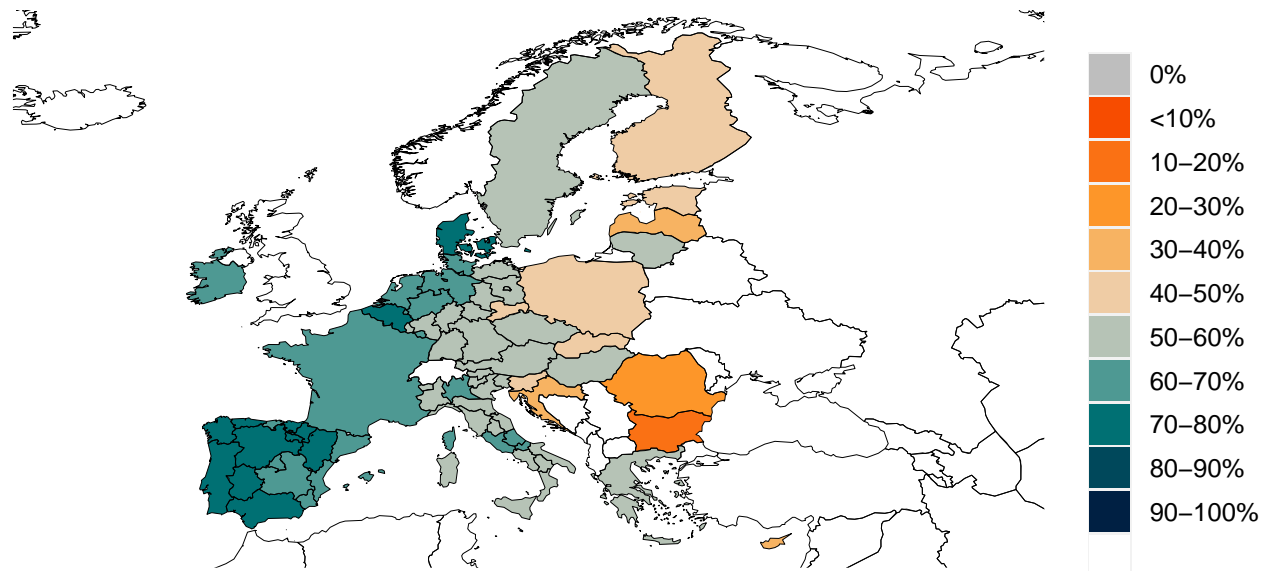**B. Percent of the population fully vaccinated against SARS-CoV-2**

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
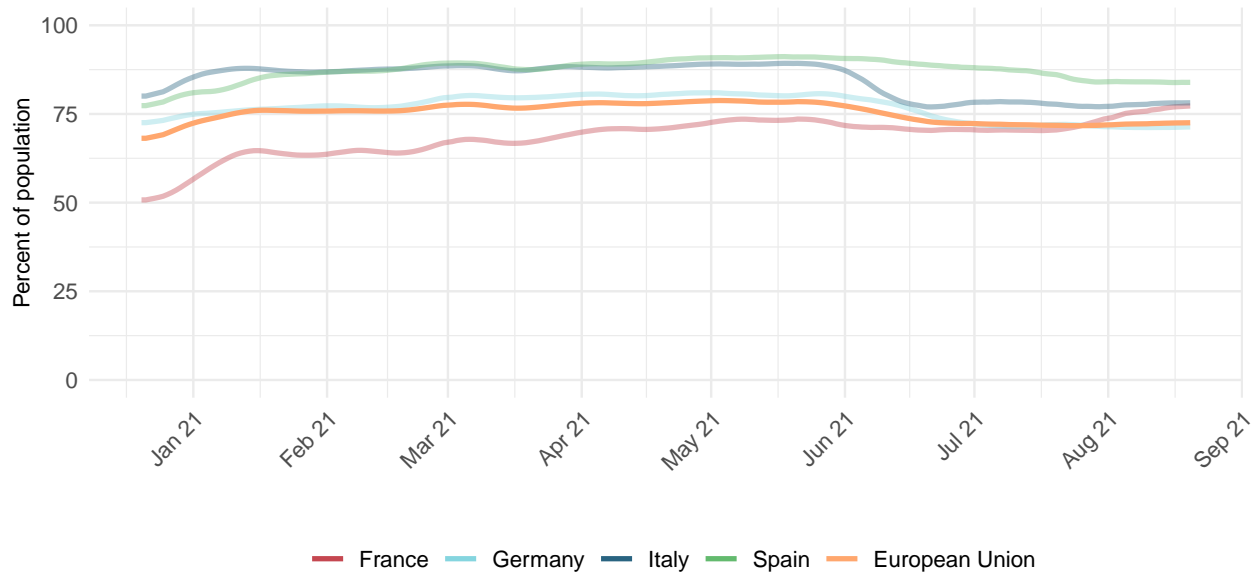

Figure 19. This figure shows the estimated proportion of the adult (18+) population that has been vaccinated or would probably or definitely receive the COVID-19 vaccine if available
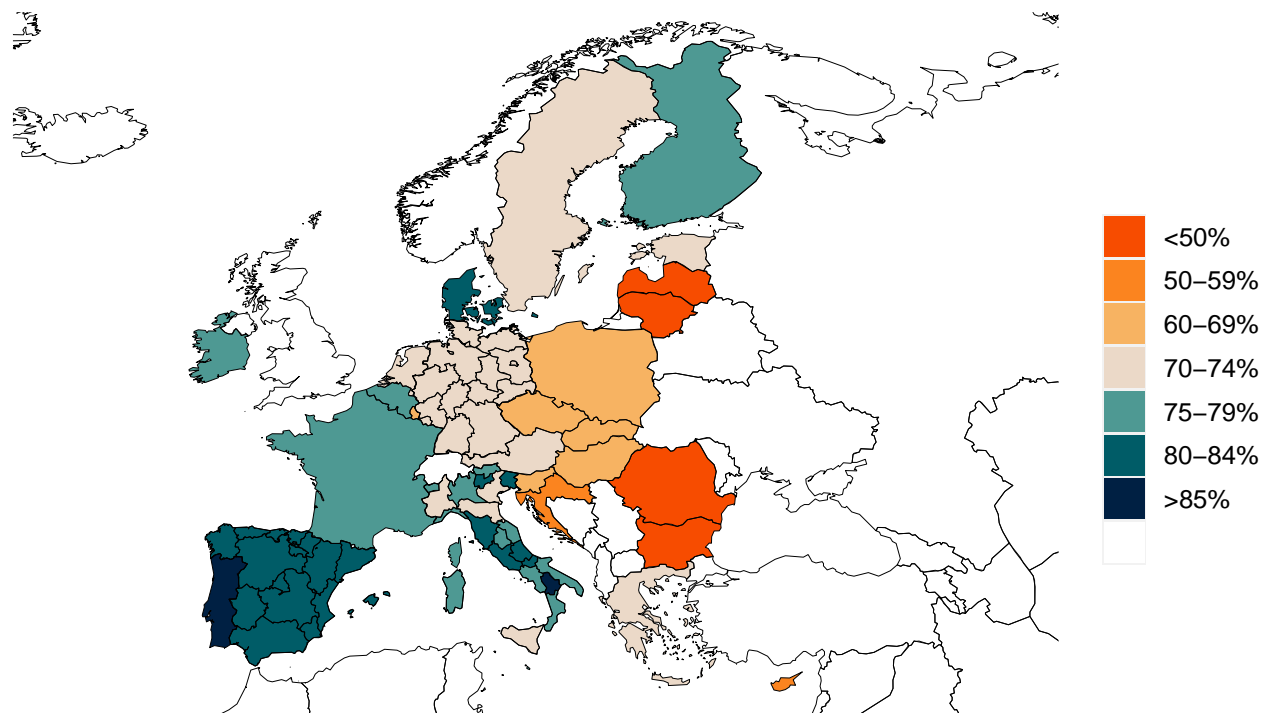
Figure 20. Percent of people who receive at least one dose of a COVID-19 vaccine and those who are fully vaccinated
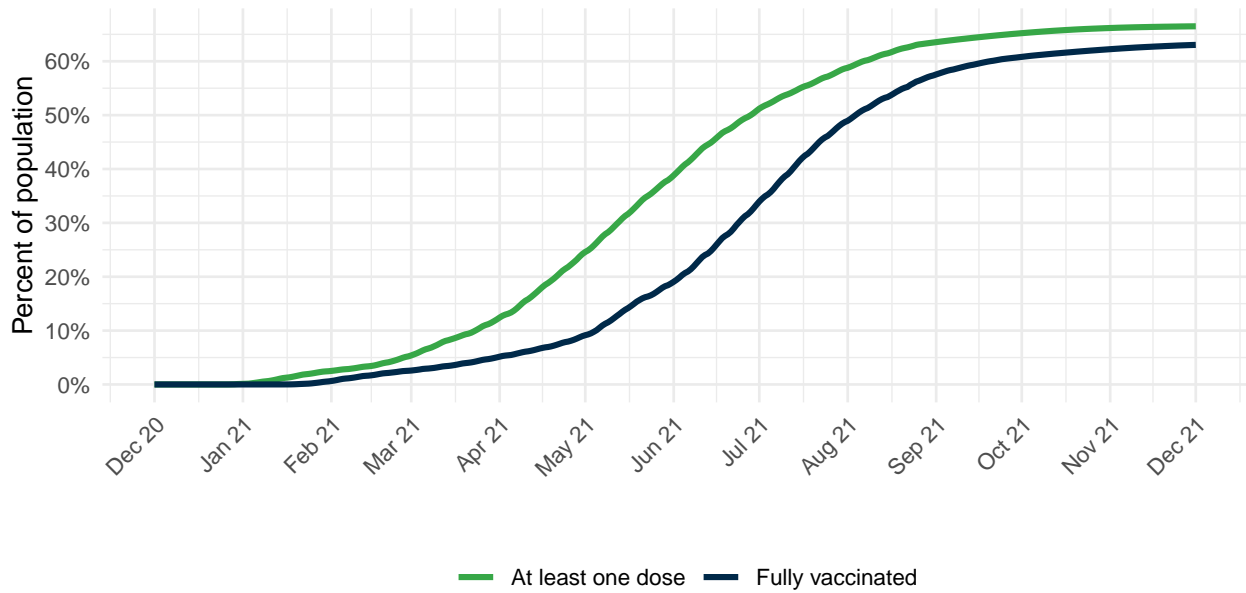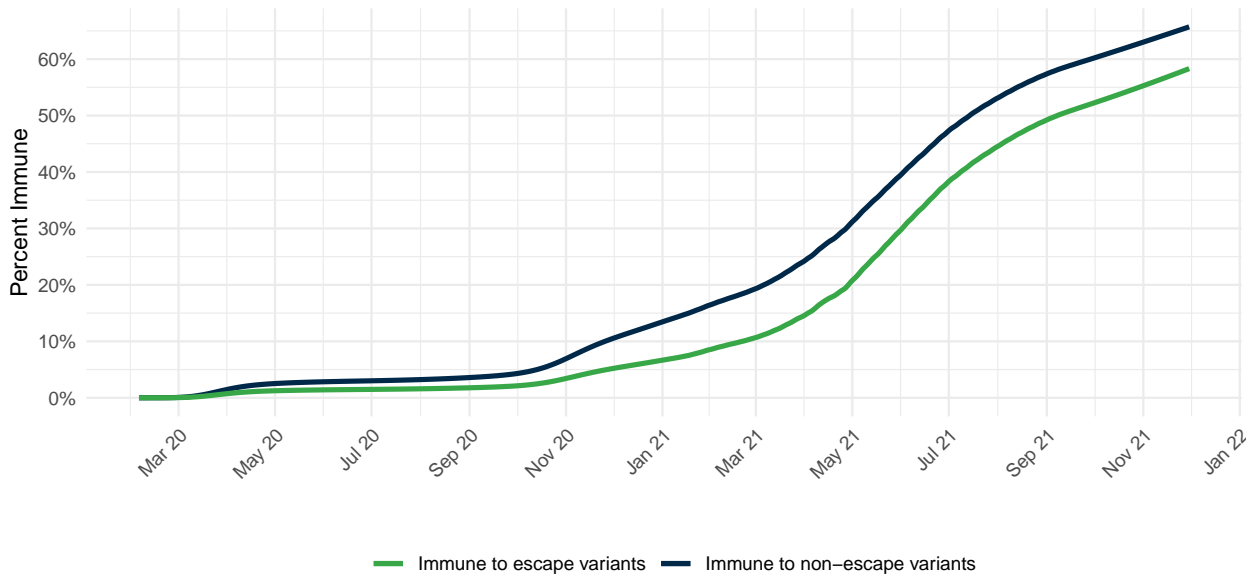

— At least one dose — Fully vaccinated

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

— Immune to escape variants — Immune to non−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 December 01, 2021 for three scenarios

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

Reference scenario ▬ Worse ▬
Universal mask use ▬
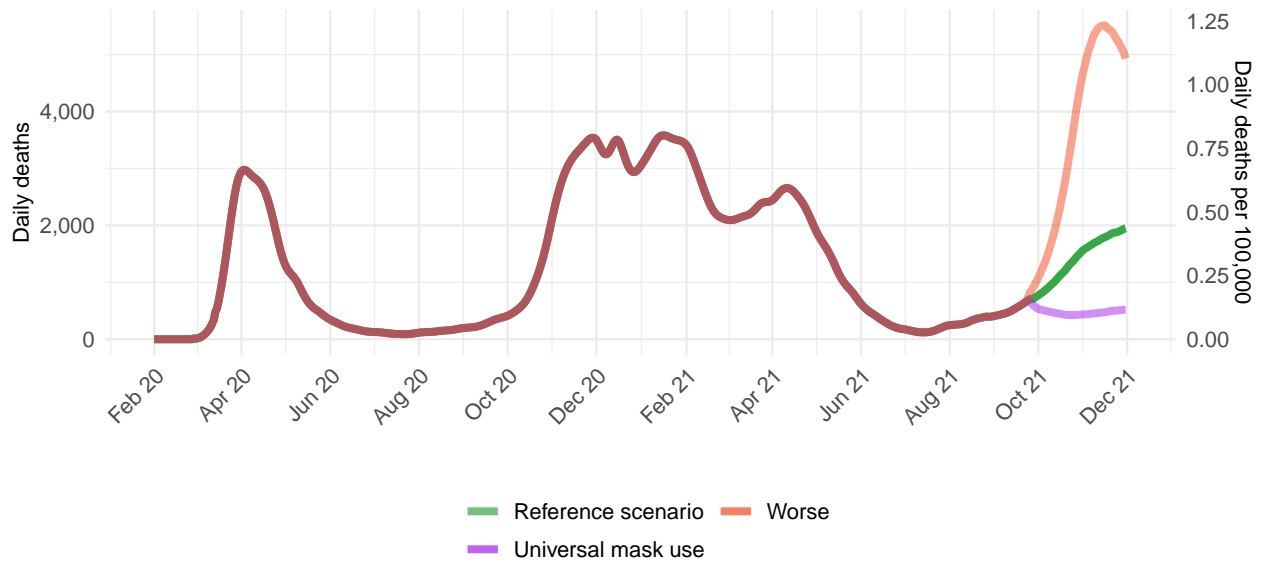
B. Excess daily COVID-19 deaths per 100,000
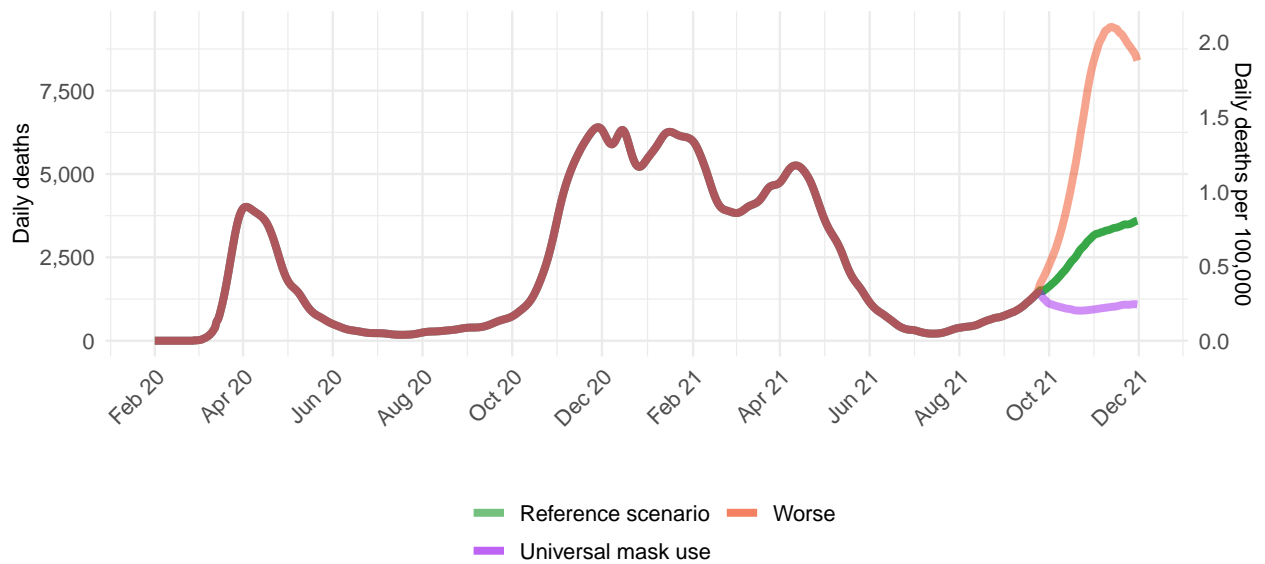

Reference scenario ▬ Worse ▬
Universal mask use ▬

Figure 23. Daily COVID-19 infections until December 01, 2021 for three scenarios
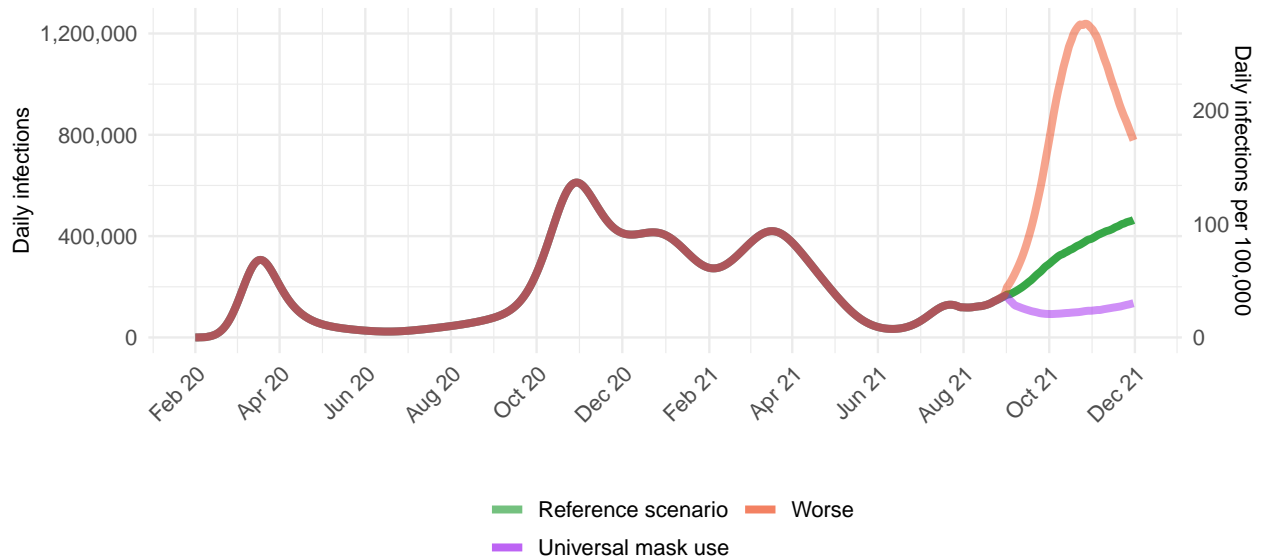

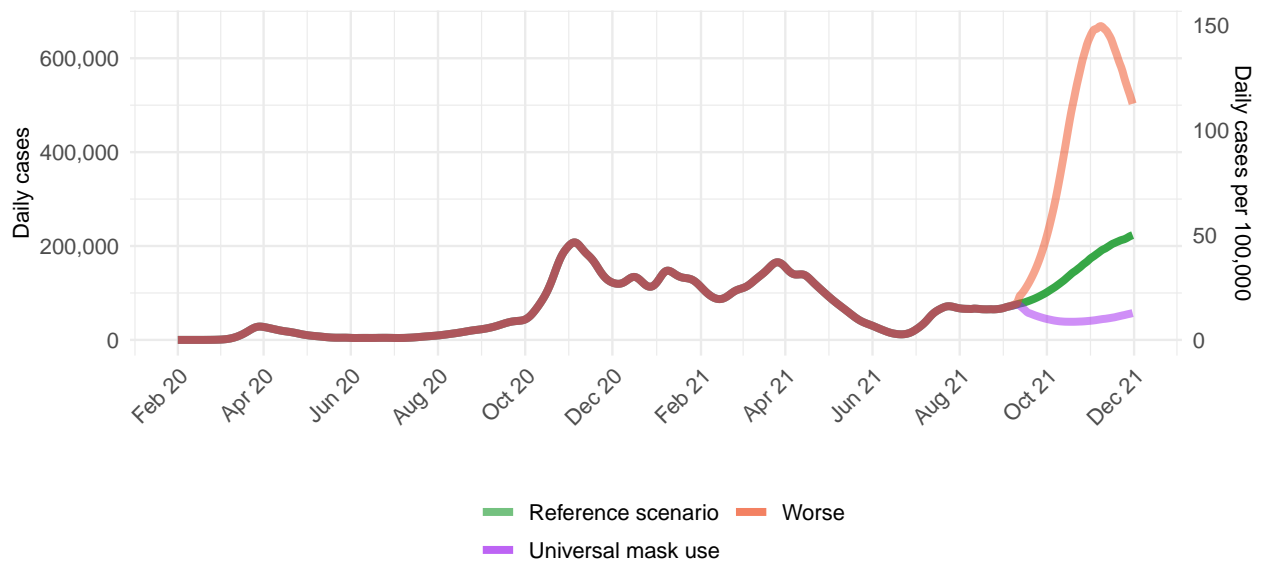**Figure 24.** Daily COVID-19 reported cases until December 01, 2021 for three scenarios

Figure 25. Daily COVID-19 hospital census until December 01, 2021 for three scenarios
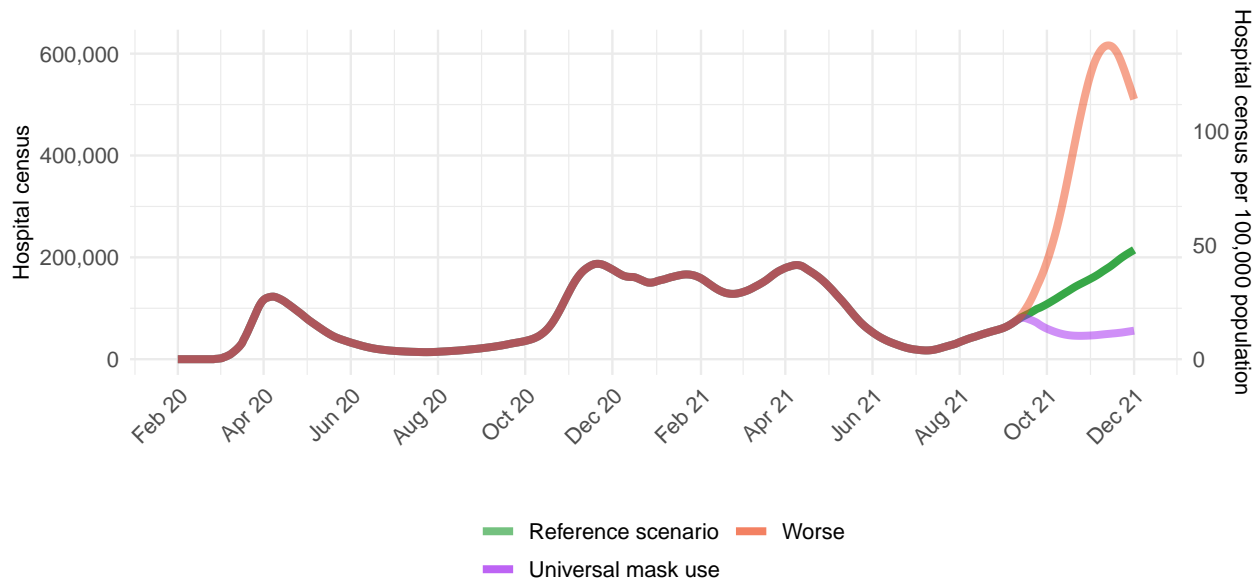

Figure 26. Comparison of reference model projections with other COVID modeling groups. For this comparison, we are including projections of daily COVID-19 deaths from other modeling groups when available: Delphi from the Massachusetts Institute of Technology (Delphi), Imperial College London (Imperial), The Los Alamos National Laboratory (LANL), the SI-KJalpha model from the University of Southern California (SIKJalpha), and the ECDC Ensemble Model (ECDC) Daily deaths from other modeling groups are smoothed to remove inconsistencies with rounding. Regional values are aggregates from available locations in that region.
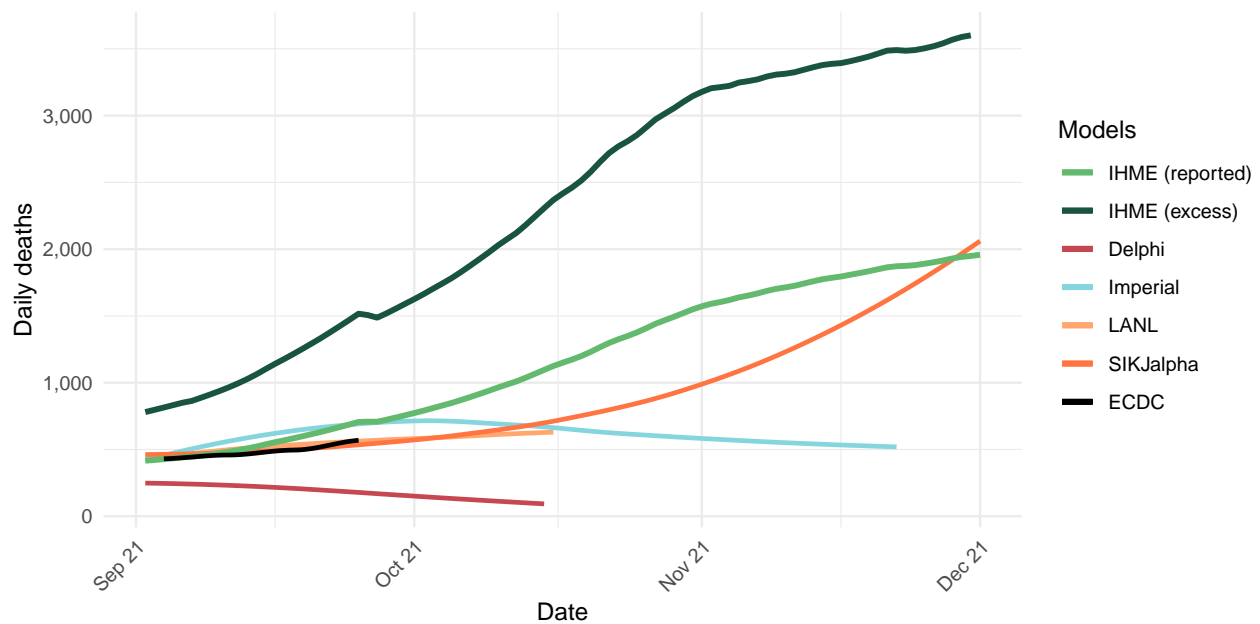
Figure 27. The estimated inpatient hospital usage is shown over time. The percent of hospital beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of beds occupied by COVID-19 patients. Less than 5% is considered *low stress*, 5-9% is considered *moderate stress*, 10-19% is considered *high stress*, and 20% or greater is considered *extreme stress*.
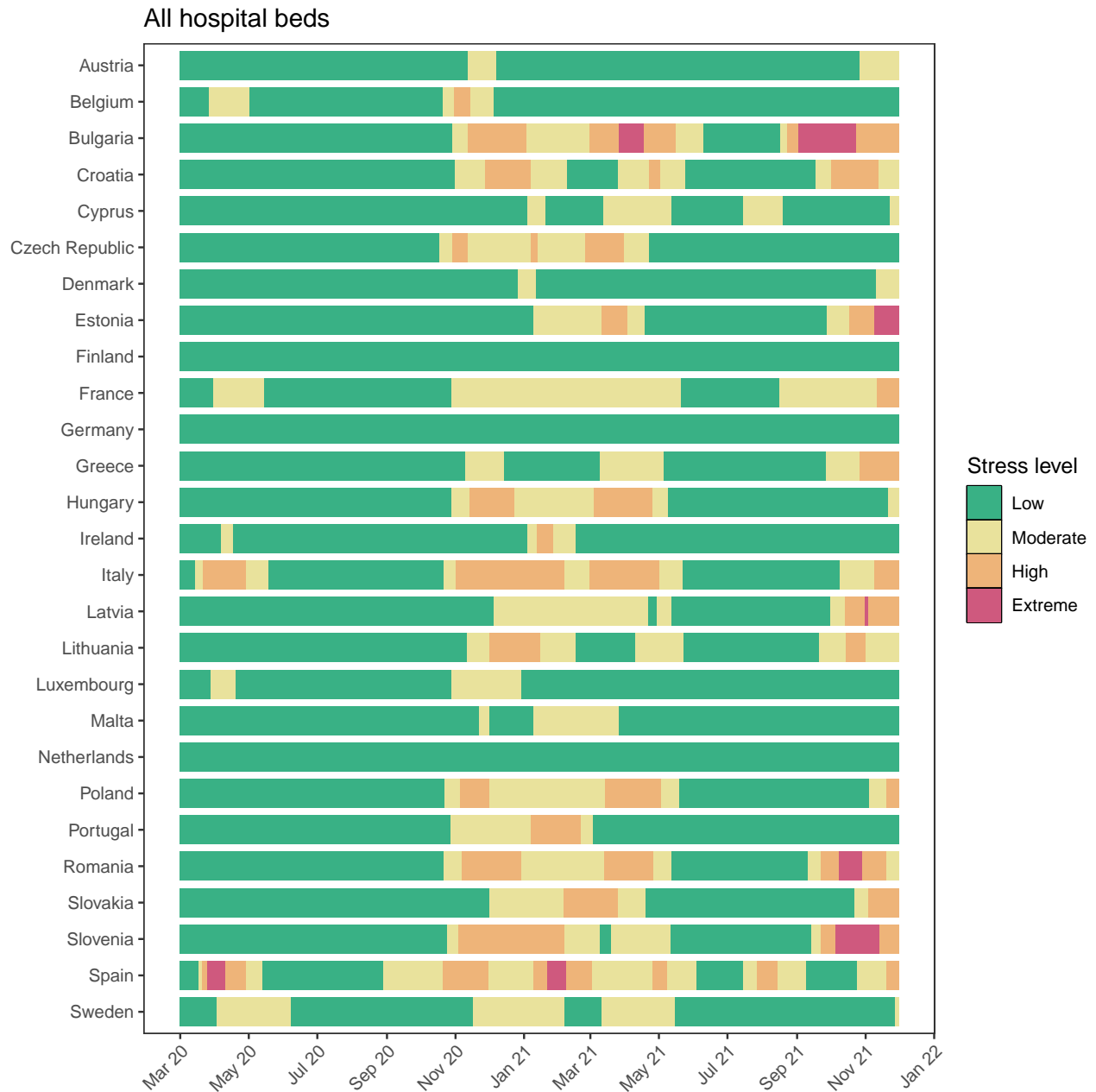
Figure 28. The estimated intensive care unit (ICU) usage is shown over time. The percent of ICU beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of ICU beds occupied by COVID-19 patients. Less than 10% is considered *low stress*, 10-29% is considered *moderate stress*, 30-59% is considered *high stress*, and 60% or greater is considered *extreme stress*.
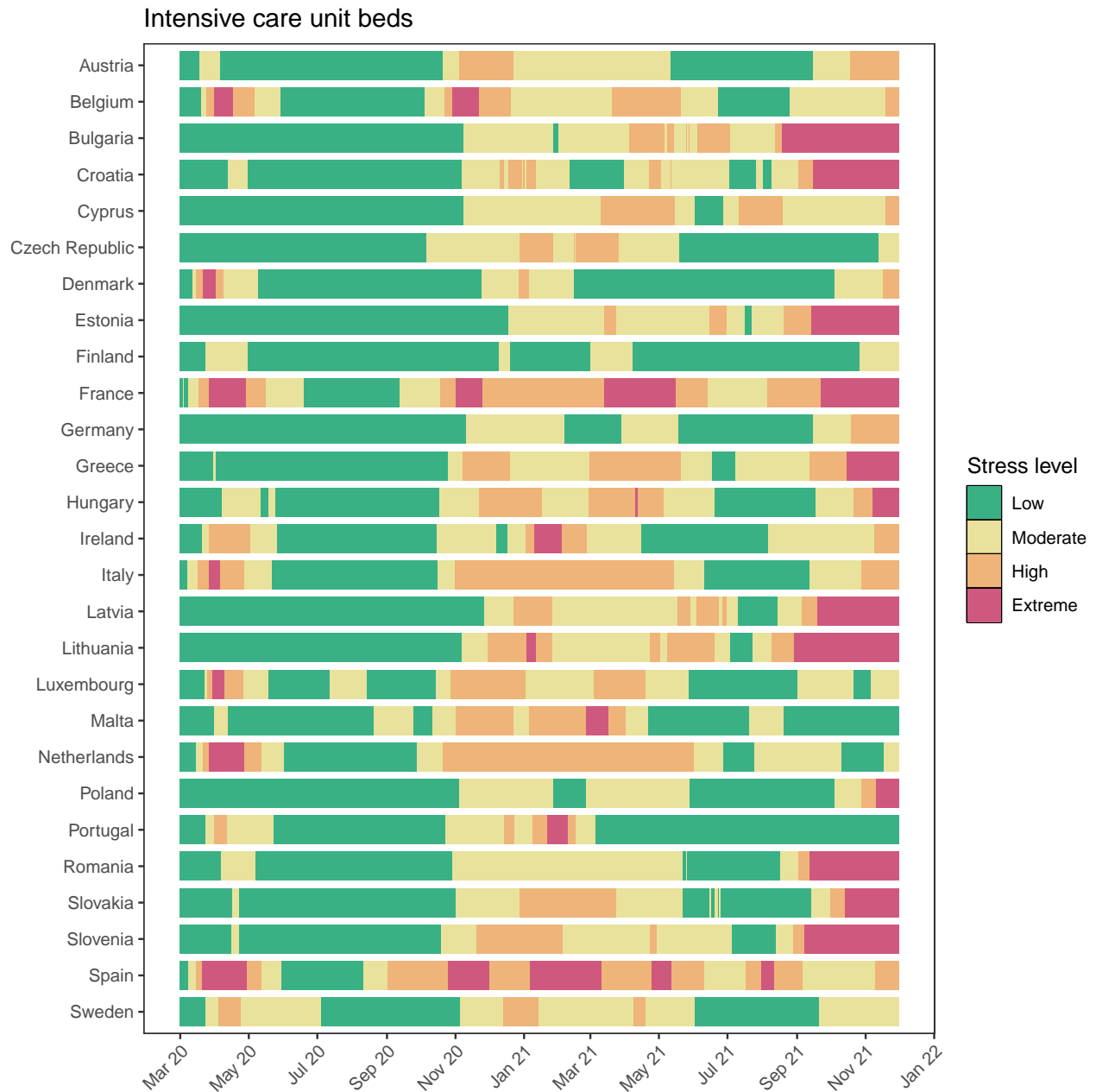
More information

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.