COVID-19 Results Briefing

European Union

January 8, 2022

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 January 7, 2022, with data through January 3, 2022.

Two weeks' more data on Omicron since our last release confirm that Omicron has a much higher fraction of asymptomatic infections, a lower fraction of diagnosed cases requiring hospitalization, and a dramatically lower death rate among those who have been hospitalized compared to Delta. The extraordinarily rapid transmission and extremely high community prevalence of infection have also been well documented. Our models for the European Union suggest that infections will peak at just under 5 million in the middle of January, although national peaks will vary considerably, with later peaks in the eastern part of the EU. We expect more than 50% of the EU population will be infected with Omicron in the next 6-8 weeks. The infection-detection rate (IDR) is declining, although shortages of testing may lead to more rapid decreases in the IDR than we currently model. Nevertheless, we expect reported cases to reach 1.9 million by the third week of January then decline steadily. Hospitalizations will increase to a peak that may be one-third higher than last winter. These figures, however, include incidental admissions. Because the prevalence of Omicron infection is so high, many individuals hospitalized for other conditions will have asymptomatic infections. Incidental admissions may exceed 50% of total COVID-19 admissions in some countries. Daily deaths are expected to increase only slightly due to the less severe Omicron replacing the more severe Delta. This pattern depends on the extent to which countries were already experiencing a winter Delta wave in December.

Our alternative policy scenarios, including more rapid scale-up of boosters to all who have been previously vaccinated, increasing mask use to 80%, and vaccinating the partially hesitant have a small impact on the trajectory over the next 4 months. The intervention with the largest impact is increasing mask use to 80%. This impact is greatest in those countries that have not yet started their Omicron surges. In previous waves, the control strategy has been to control infection and thus reduce hospitalizations and deaths. Given that there is little prospect of controlling infection once the surge has begun, strategies in those countries need to focus on reducing harm in the vulnerable and minimizing health system, school, and economic disruption. The number of individuals who will be admitted with COVID-19 to hospital is expected to increase significantly, but a substantial fraction of this increase is due to incidental COVID-19. But hospitals are likely to be under stress due to health care workers who have tested positive and need to quarantine. Given the massive numbers of infections in the community, testing and quarantining asymptomatic individuals may not be helpful. There appears to be no prospect for controlling transmission and considerable prospect for disruption of schools and essential services due to screening. Countries may need to consider revisions to their testing and quarantine strategies.

Considerable uncertainty remains about the future course of the Omicron wave. First, the infection-detection rate may decline even more than we have estimated if testing capacity in countries is overwhelmed. This would reduce the reported case rates below the peak of 1.9 million that have been forecasted per day. Second, hospital admission screening will substantially impact the reported COVID-19 admissions. If some hospitals run out of testing capacity and do not screen all admissions, then the incidental COVID-19 admission rate may also decline. Third, a critical factor in understanding the trajectory of Omicron is the fraction of infections that are asymptomatic. Based on data from South Africa and the UK, we currently estimate this to be 80%–90%. Increases or decreases in this fraction asymptomatic have an important impact on the trajectory and severity of the Omicron wave.

For individuals at risk of bad outcomes, particularly the unvaccinated and never infected, the strategies to reduce risk remain: vaccination including a third dose where appropriate, high-quality mask use, and avoiding crowded indoor settings.

Current situation

- Daily infections in the last week increased to 3.7 million per day on average compared to 2.5 million the week before (Figure 1.1).
- Daily hospital census in the last week (through January 3) increased to 276,000 per day on average compared to 240,200 the week before.
- Daily reported cases in the last week increased to 607,300 per day on average compared to 330,900 the week before (Figure 2.1).
- Reported deaths due to COVID-19 in the last week decreased to 1,700 per day on average compared to 1,800 the week before (Figure 3.1).
- Total deaths due to COVID-19 in the last week decreased to 2,500 per day on average compared to 2,700 the week before (Figure 3.1). This makes COVID-19 the number 2 cause of death in the European Union this week (Table 1). Estimated total daily deaths due to COVID-19 in the past week were 1.5 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 11 member states and 8 subnational locations (Figure 4.1).
- The daily rate of reported deaths due to COVID-19 is greater than 4 per million in 15 member states and 22 subnational locations (Figure 4.2).
- We estimate that 42% of people in the European Union have been infected at least once as of January 3 (Figure 6.1).
- Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in the majority of the EU (Figure 7.1).
- The infection-detection rate in the European Union was close to 38% on January 3 (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). We estimate that by now, Omicron is the dominant variant in all EU countries.

Trends in drivers of transmission

- Only three member states do not have some form of mask mandate. Gathering restrictions or some form of business curfews are in place in the majority of member states. A smaller set of countries have school closures.
- Mobility last week was 6% lower than the pre-COVID-19 baseline (Figure 11.1). Mobility was lower than 30% of baseline in no locations.
- As of January 3, in the COVID-19 Trends and Impact Survey, 57% of people in the EU self-report that they always wore a mask when leaving their home (Figure 13.1).

- There were 815 diagnostic tests per 100,000 people on January 3 (Figure 15.1).
- As of January 3, 13 member states and 52 subnational locations have reached 70% or more of the population who have received at least one vaccine dose, and 10 member states and 40 subnational locations have reached 70% or more of the population who are fully vaccinated (Figure 17.1). 73% of people in the European Union have received at least one vaccine dose, and 68% are fully vaccinated.
- In the European Union, 85% of the population 12 years and older say they would accept or would probably accept a vaccine for COVID-19. Note that vaccine acceptance is calculated using survey data from the 18+ population. This is up by 0.1 percentage points from last week (Figure 19.1).
- In our current reference scenario, we expect that 325.6 million people in the EU will be vaccinated with at least one dose by May 1 (Figure 20.1). We expect that 68% of the population will be fully vaccinated by May 1.

Projections

Infections

- Daily estimated infections in the **reference scenario**, which represents what we think is most likely to happen, will rise to 4.9 million by January 12, 2022, and then steadily decline (Figure 21.1).
- Daily estimated infections in the **high severity of Omicron scenario** will rise to 4.9 million by January 13, 2022, and then decline (Figure 21.1).
- Daily estimated infections in the **80% mask coverage scenario** will rise to 4.4 million by January 7, 2022, and then decline (Figure 21.1).
- Daily estimated infections in the **third dose scenario** will rise to 4.8 million by January 11, 2022, and then decline (Figure 21.1).
- Daily estimated infections in the **reduced vaccine hesitancy scenario** will rise to 4.8 million by January 11, 2022, and then decline (Figure 21.1).

Cases

- Daily cases in the **reference scenario** will rise to 1.9 million by January 24, 2022 (Figure 21.2).
- Daily cases in the **high severity of Omicron scenario** will rise to 1.8 million by January 24, 2022 (Figure 21.2).
- Daily cases in the **80% mask coverage scenario** will rise to 1.7 million by January 20, 2022, and then decline (Figure 21.2).
- Daily cases in the **third dose scenario** will rise to 1.9 million by January 24, 2022, and then decline (Figure 21.2).
- Daily cases in the **reduced vaccine hesitancy scenario** will rise to 1.8 million by January 24, 2022, and then decline (Figure 21.2).

Hospitalizations

- Daily hospital census in the **reference scenario** will rise to 505,000 by January 26, 2022 (Figure 21.3).
- Daily hospital census in the **high severity of Omicron scenario** will rise to 894,000 by February 1, 2022 (Figure 21.3).
- Daily hospital census in the **80% mask coverage scenario** will rise to 482,000 by January 22, 2022 (Figure 21.3).
- Daily hospital census in the **third dose scenario** will rise to 498,000 by January 26, 2022 (Figure 21.3).
- Daily hospital census in the **reduced vaccine hesitancy scenario** will rise to 497,000 by January 26, 2022 (Figure 21.3).

Deaths

- In our **reference scenario**, our model projects 1,014,000 cumulative reported deaths due to COVID-19 on May 1. This represents 96,000 additional deaths from January 3 to May 1. Daily reported COVID-19 deaths in the **reference scenario** will rise to 1,630 by January 23, 2022, and then steadily decline (Figure 21.4).
- Under our **reference scenario**, our model projects 1,445,000 cumulative total deaths due to COVID-19 on May 1. This represents 136,000 additional deaths from January 3 to May 1 (Figure 24.2).
- In our **high severity of Omicron scenario**, our model projects 1,038,000 cumulative reported deaths due to COVID-19 on May 1. This represents 120,000 additional deaths from January 3 to May 1. Daily reported COVID-19 deaths in the **high severity of Omicron scenario** will rise to 1,850 by January 26, 2022 (Figure 21.4).
- In our **80% mask coverage scenario**, our model projects 1,002,000 cumulative reported deaths due to COVID-19 on May 1. This represents 84,000 additional deaths from January 3 to May 1. Daily reported COVID-19 deaths in the **80% mask coverage scenario** will rise to 1,630 by January 23, 2022 (Figure 21.4).
- In our **third dose scenario**, our model projects 998,000 cumulative reported deaths due to COVID-19 on May 1. This represents 86,000 additional deaths from January 3 to May 1. Daily reported COVID-19 deaths in the **third dose scenario** will rise to 1,510 by January 23, 2022 (Figure 21.4).
- In our **reduced vaccine hesitancy scenario**, our model projects 997,000 cumulative reported deaths due to COVID-19 on May 1. This represents 85,000 additional deaths from January 3 to May 1. Daily reported COVID-19 deaths in the **reduced vaccine hesitancy scenario** will rise to 1,490 by January 23, 2022 (Figure 21.4).

- Figure 22.1 compares our reference scenario forecasts to other publicly archived models. The ECDC and Imperial forecasts suggest a slight increase in daily deaths over the next 4 weeks, with the Imperial model suggesting increases in February. The USC model forecasts huge increases in daily deaths, while the MIT model steadily declines from a peak next week.
- At some point from January through May 1, 18 member states will have high or extreme stress on hospital beds (Figure 23.1). At some point from January through May 1, 25 member states will have high or extreme stress on intensive care unit (ICU) capacity (Figure 24.1).

Model updates

In this week's update, we have made changes to key Omicron parameters based on data from South Africa, the United Kingdom, and the US. First, based on an analysis of the UK Office of National Statistics prevalence of infection surveys, we have revised the range of asymptomatic infection from 90% to 80%–90%. Second, the degree of transmissibility of Omicron compared to ancestral variants was increased from 1.5–2.5 to 2–3. This adjustment was based on matching the scale-up curves for Omicron from the analysis of the GISAID database. Third, the infection-hospitalization rate for Omicron relative to Delta has been increased from a mean of 0.07 to a mean of 0.125 (range 0.0625–0.1875) based on data from the UK, US, and South Africa. Fourth, the infection-hospitalization rate has been decreased from a mean of 0.02 to 0.01875 (range 0.009375–0.028125) based on published studies of the hospital-fatality rate, the case-hospitalization rate, and the fraction asymptomatic. Fifth, based on the timing of Omicron surges, we have adjusted the date of Omicron arrival for a number of countries to match the timing of increases in reported cases, taking into account the lag from introduction to the exponential rise in reported cases. Sixth, in the high-severity scenario, we have used IFR and IHR values that are double the ranges used in the reference scenario.

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

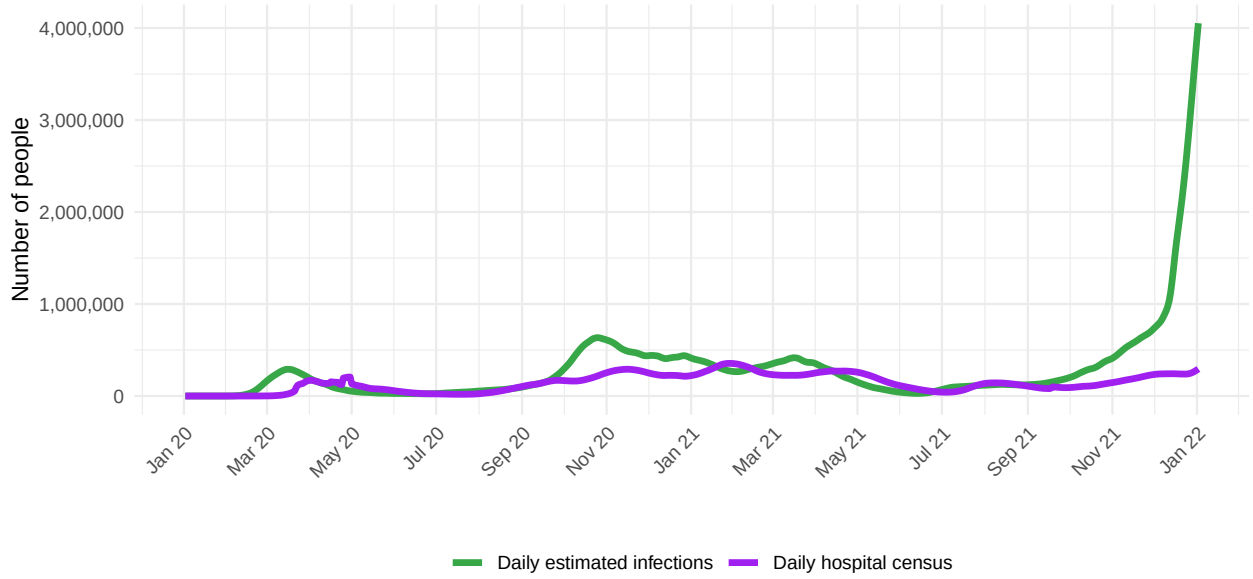


Figure 2.1. Reported daily COVID-19 cases, moving average

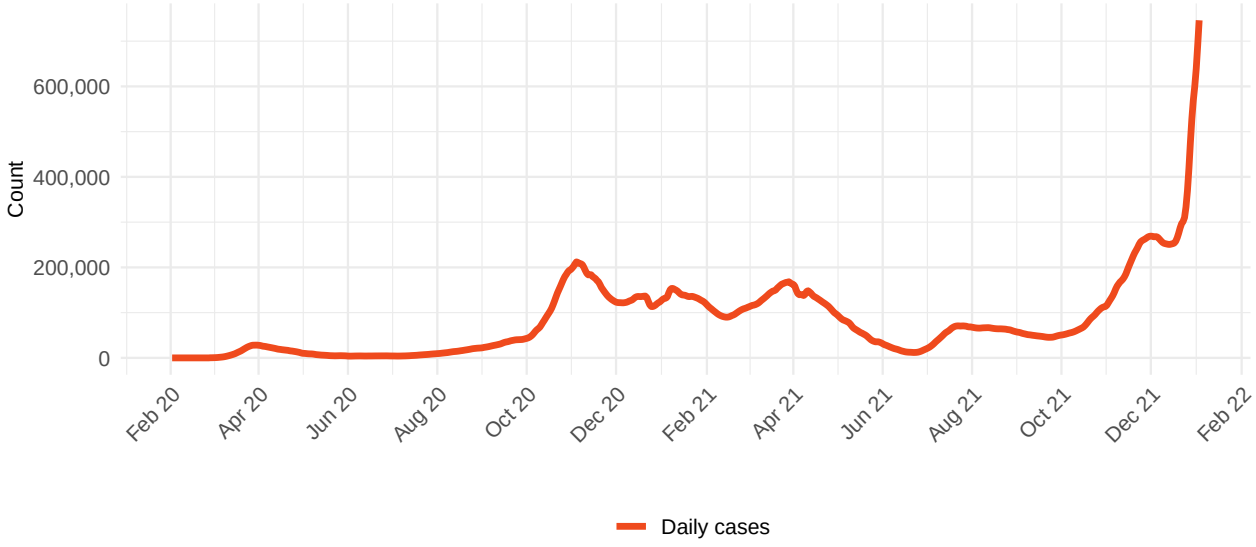
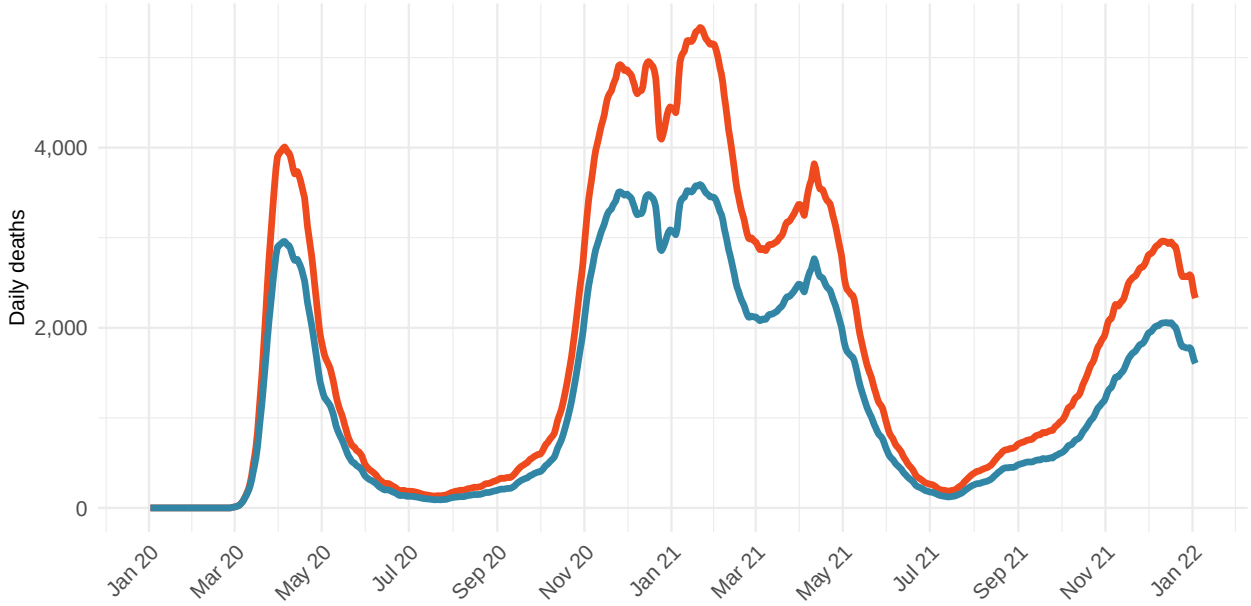


Table 1. Ranking of total deaths due to COVID-19 among the leading causes of mortality this week, assuming uniform deaths of non-COVID causes throughout the year

Cause name	Weekly deaths	Ranking
Ischemic heart disease	18,714	1
COVID-19	17,498	2
Stroke	10,303	3
Tracheal, bronchus, and lung cancer	6,216	4
Alzheimer's disease and other dementias	5,827	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 3.1. Smoothed trend estimate of reported daily COVID-19 deaths (blue) and total daily deaths due to COVID-19 (orange)



Daily COVID-19 death rate per 1 million on January 3, 2022

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

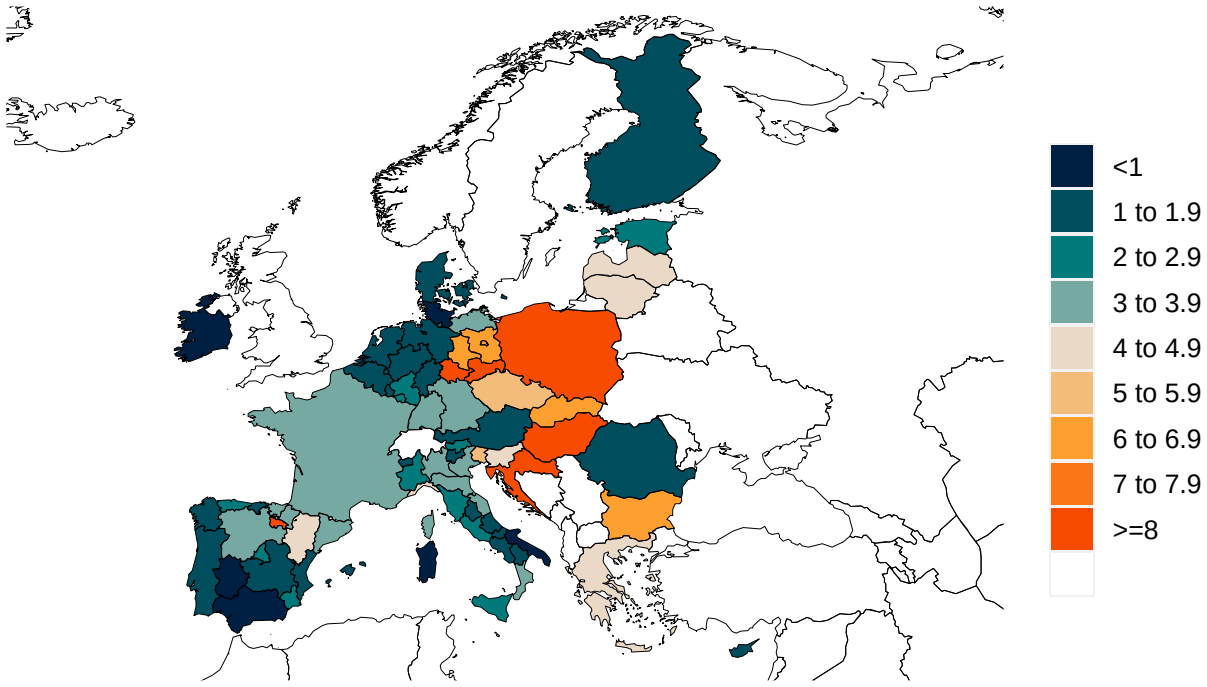
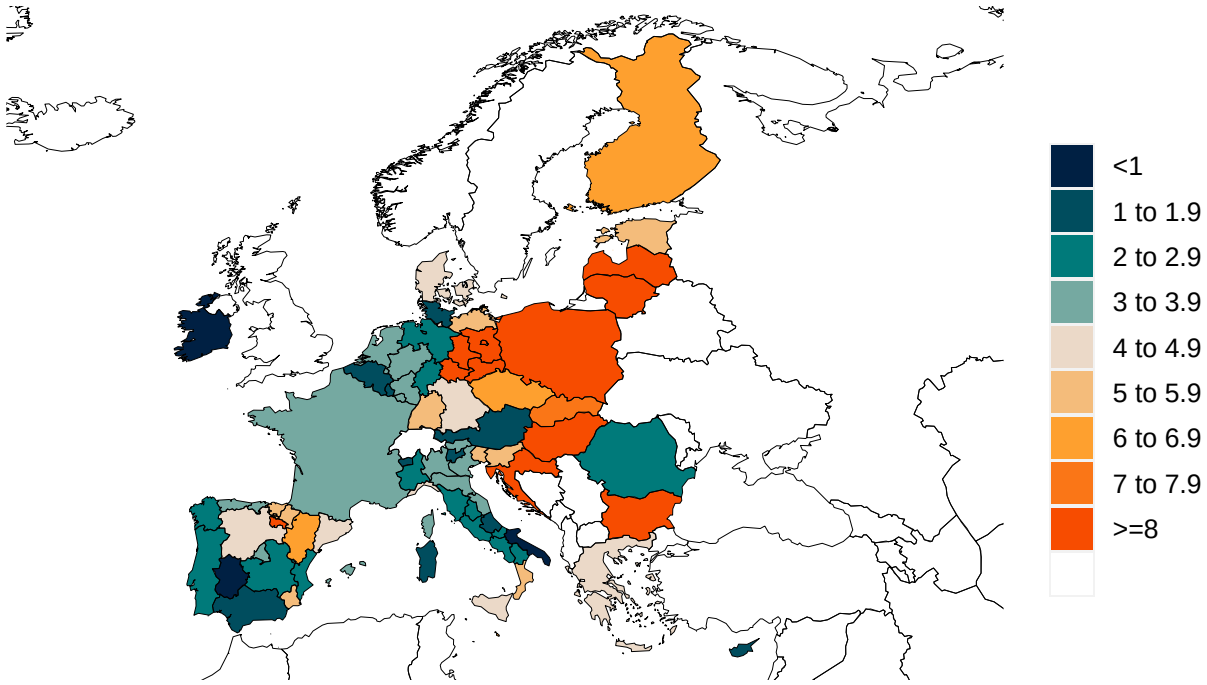


Figure 4.2 Daily total COVID-19 death rate per 1 million



Cumulative COVID-19 deaths per 100,000 on January 3, 2022

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

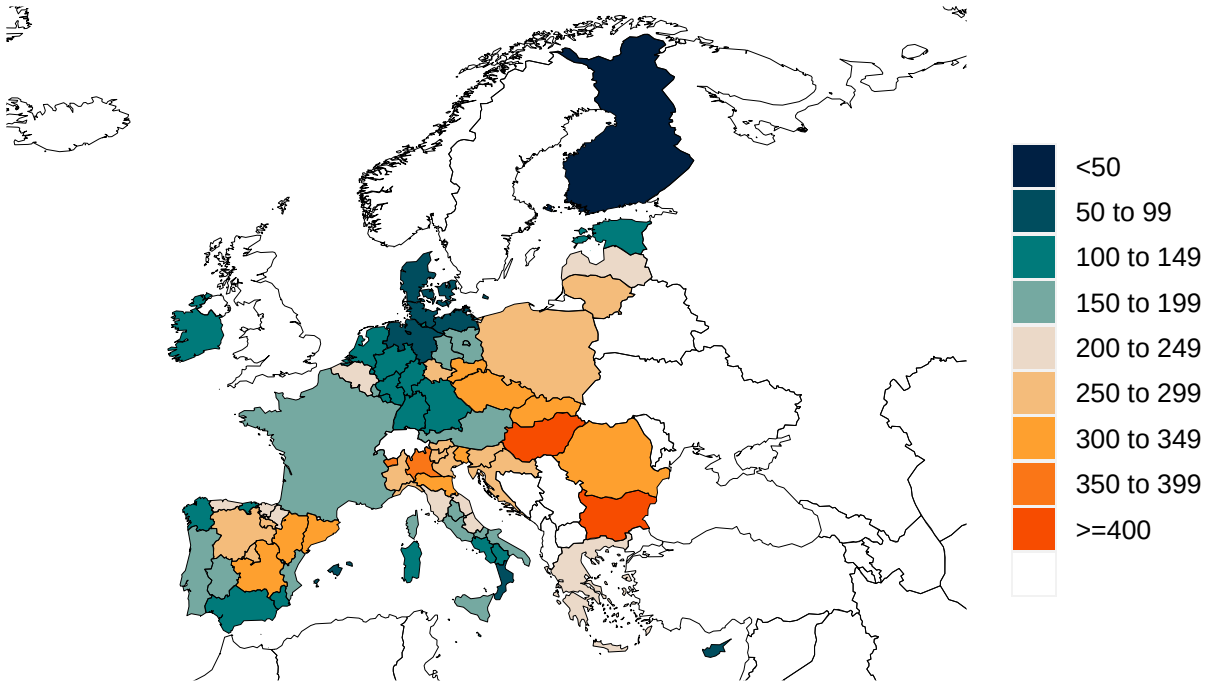


Figure 5.2 Total cumulative COVID-19 deaths per 100,000

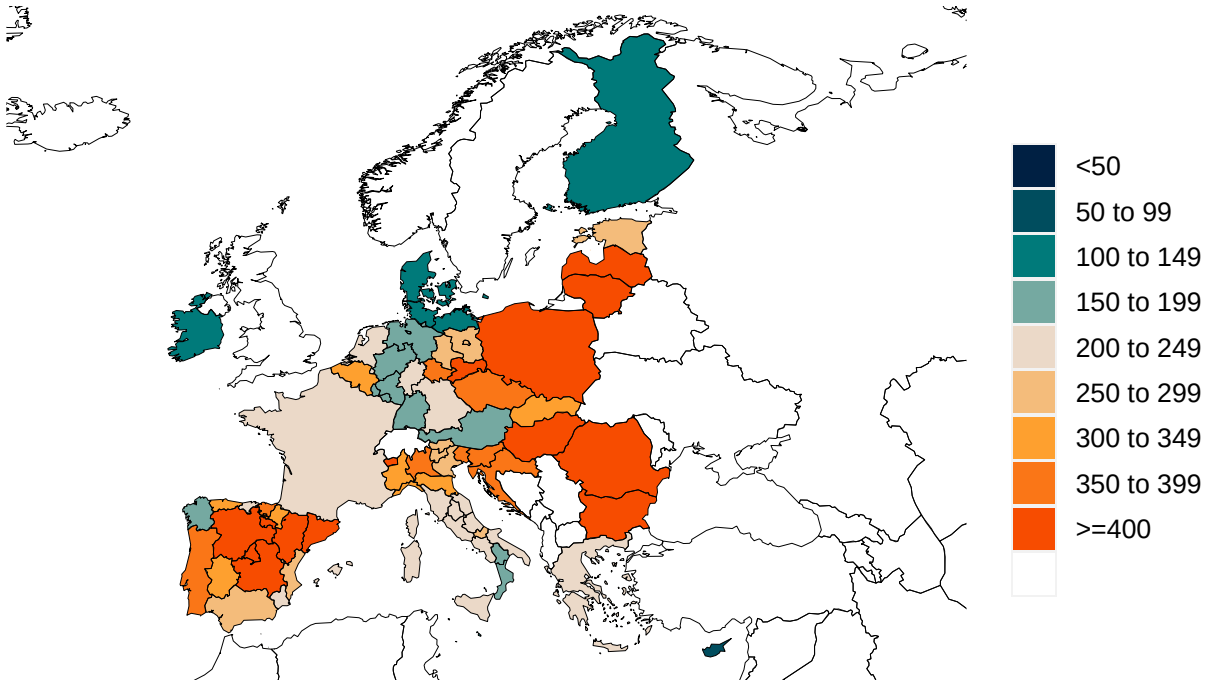


Figure 6.1. Estimated percent of the population infected with COVID-19 on January 3, 2022

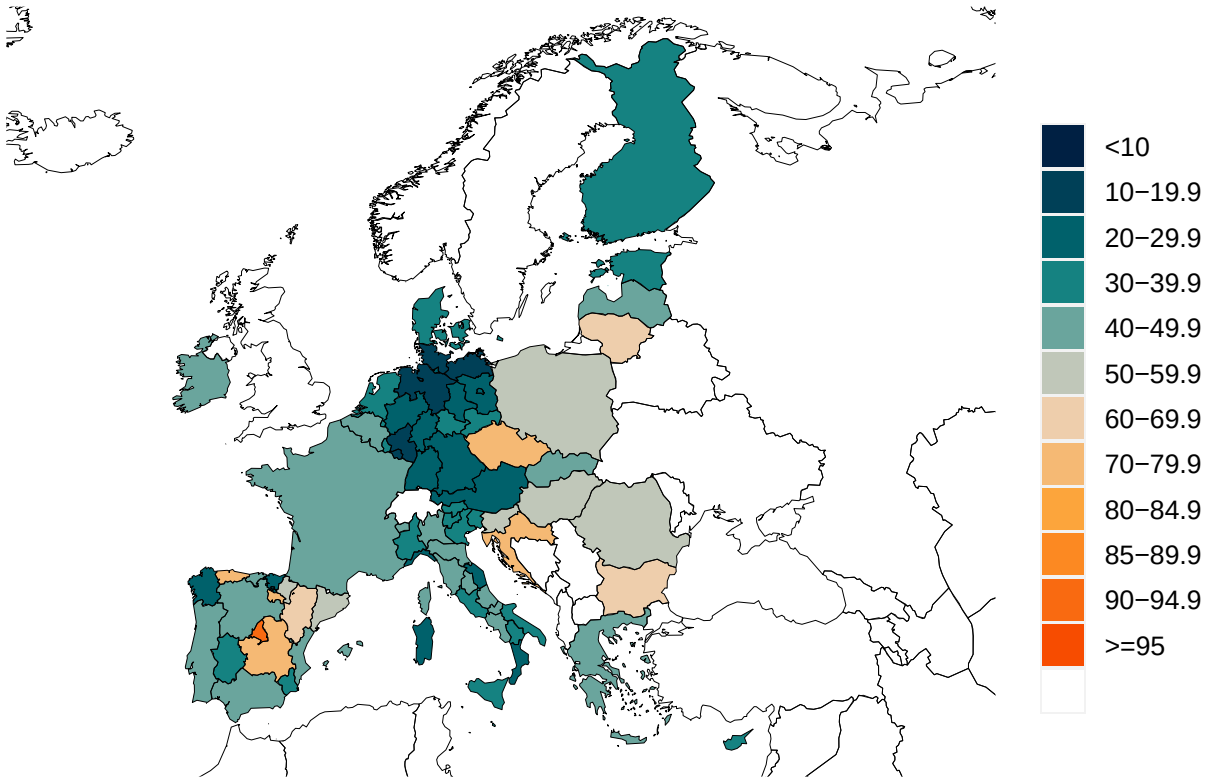


Figure 7.1. Mean effective R on December 23, 2021. Effective R less than 1 means that transmission should decline, all other things being held the same. The estimate of effective R is based on the combined analysis of deaths, case reporting, and hospitalizations where available. Current reported cases reflect infections 11-13 days prior, so estimates of effective R can only be made for the recent past.

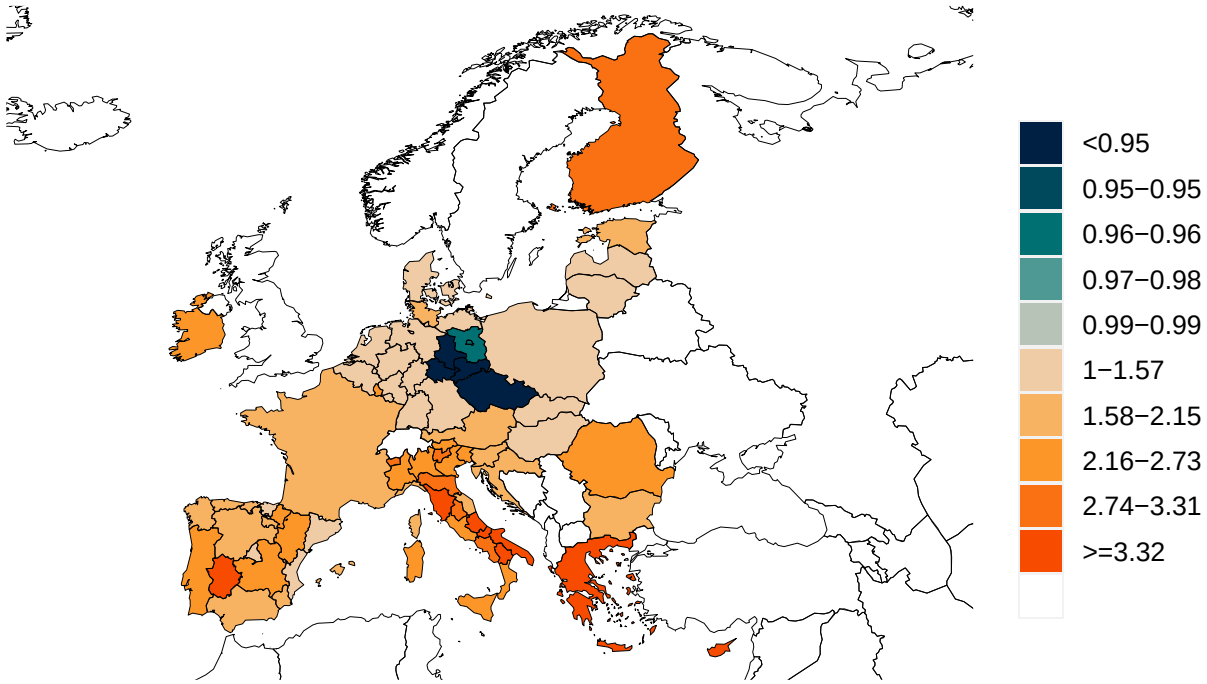
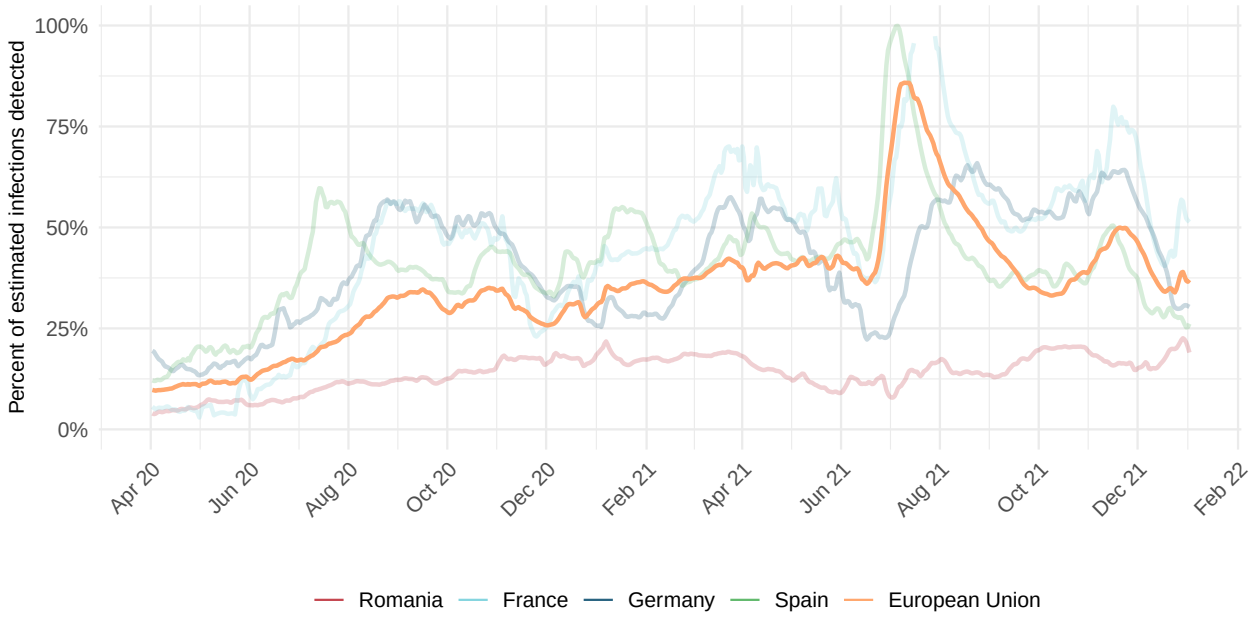


Figure 8.1. Percent of estimated COVID-19 infections detected. This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model. Due to measurement errors in cases and testing rates, the infection-detection rate can exceed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



Estimated percent of circulating SARS-CoV-2 for primary variant families on January 3, 2022

Figure 9.1 Estimated percent of new infections that are Alpha variant

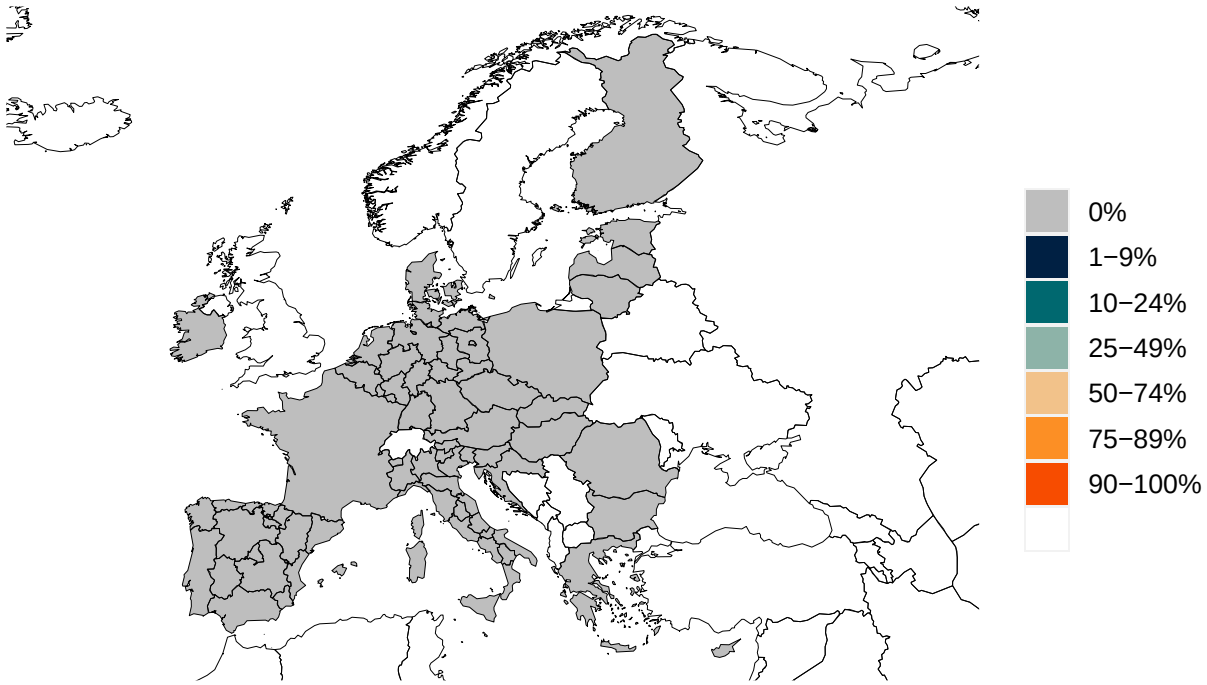


Figure 9.2 Estimated percent of new infections that are Beta variant

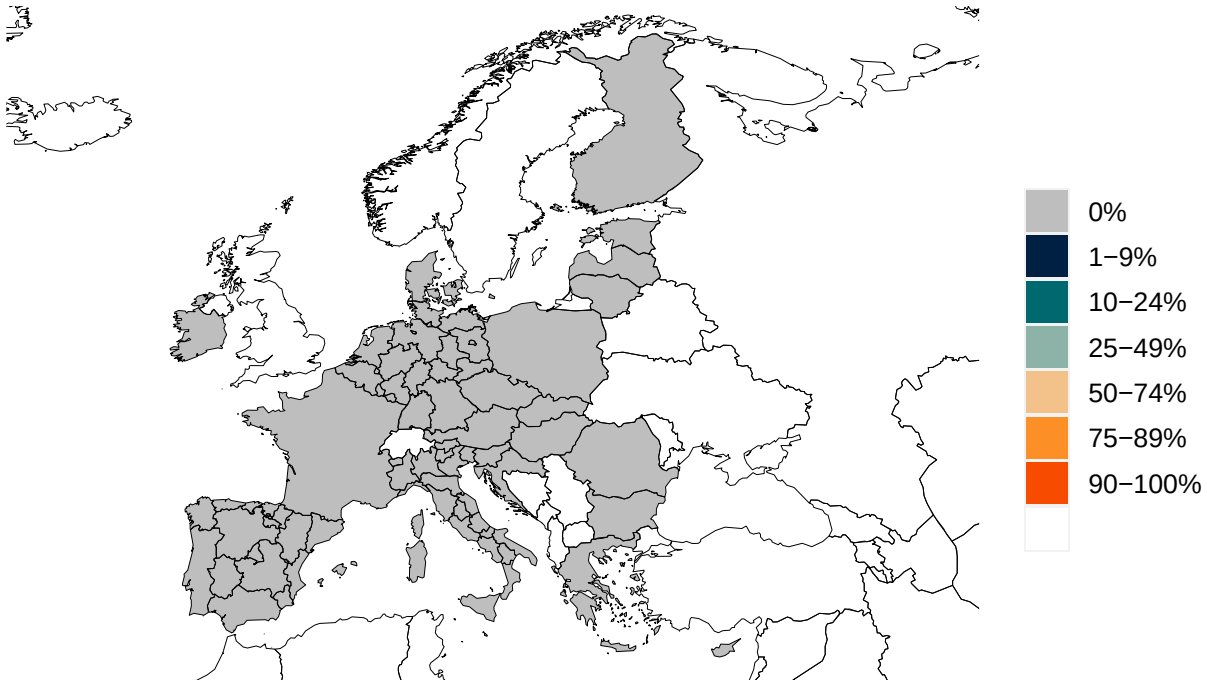


Figure 9.3 Estimated percent of new infections that are Delta variant

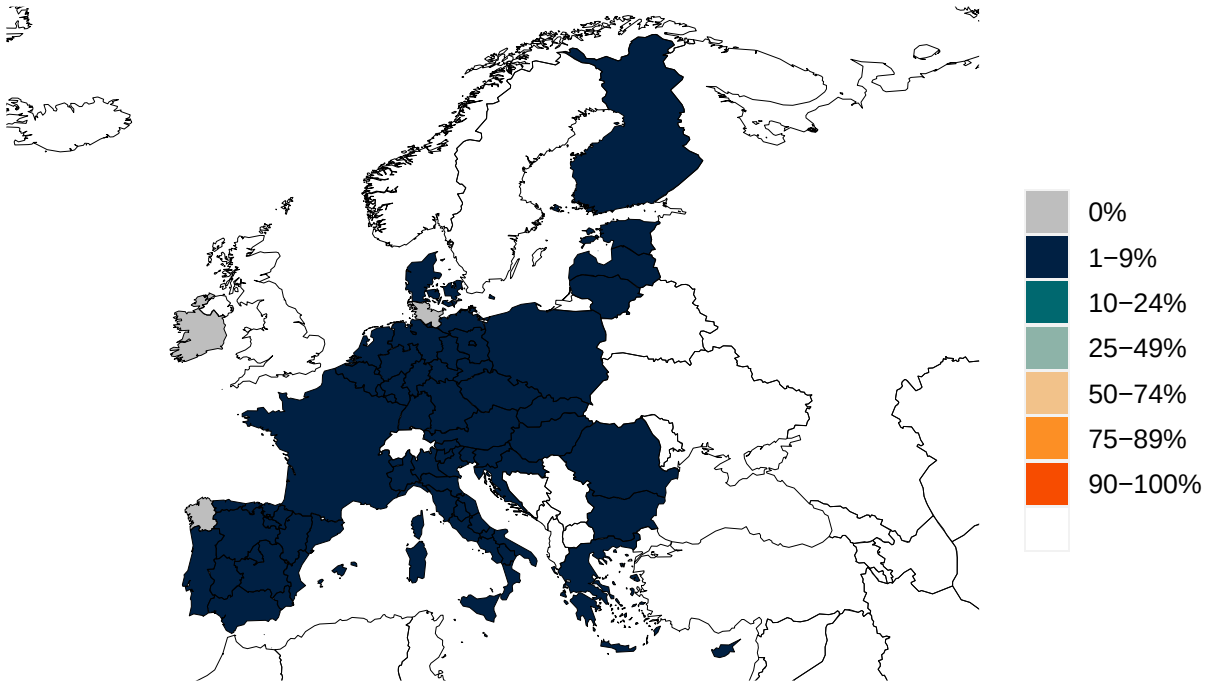


Figure 9.4 Estimated percent of new infections that are Gamma variant

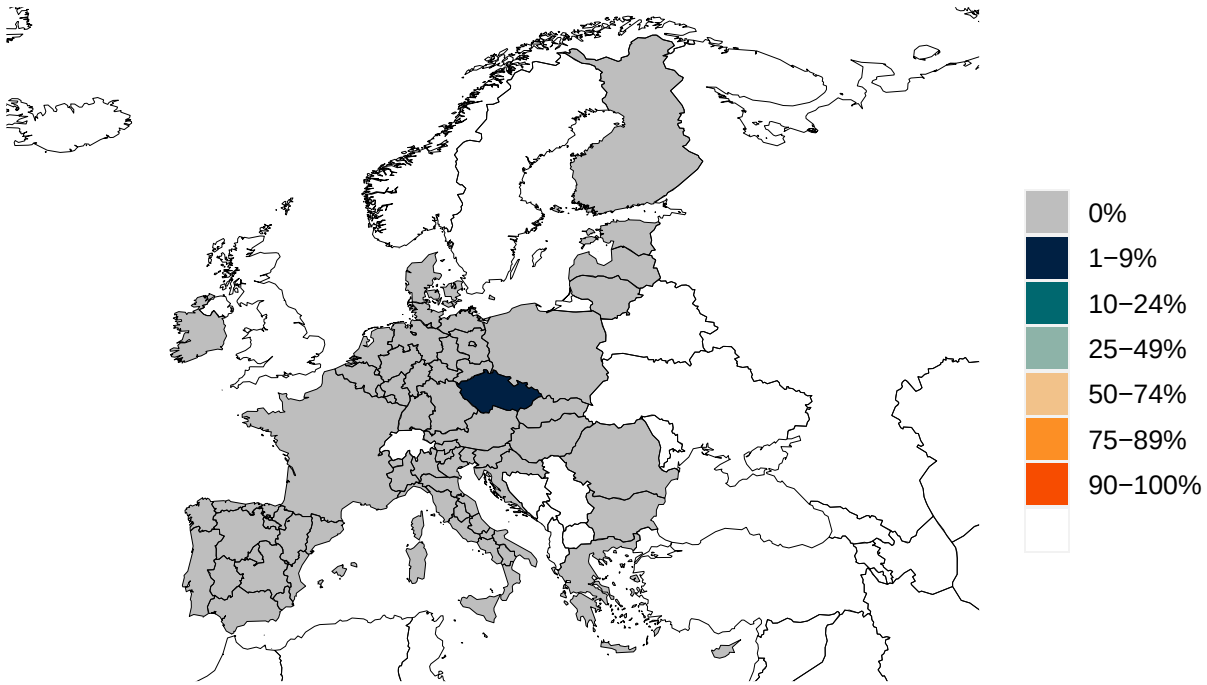


Figure 9.5 Estimated percent of new infections that are Omicron variant

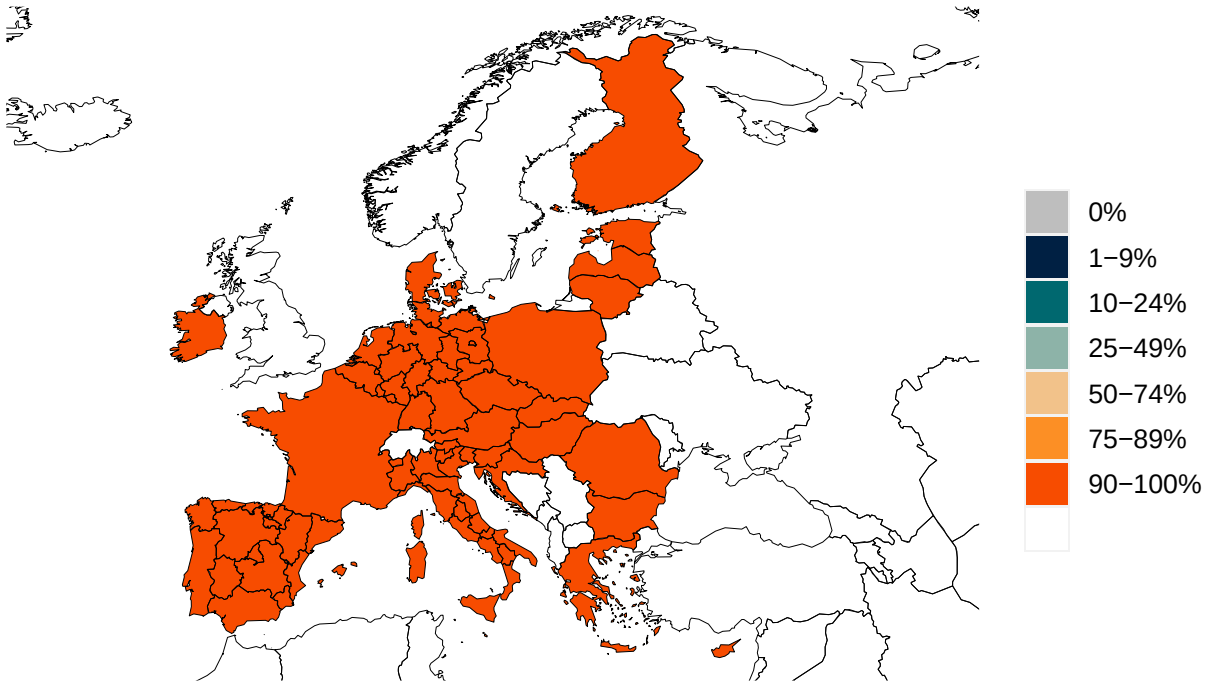
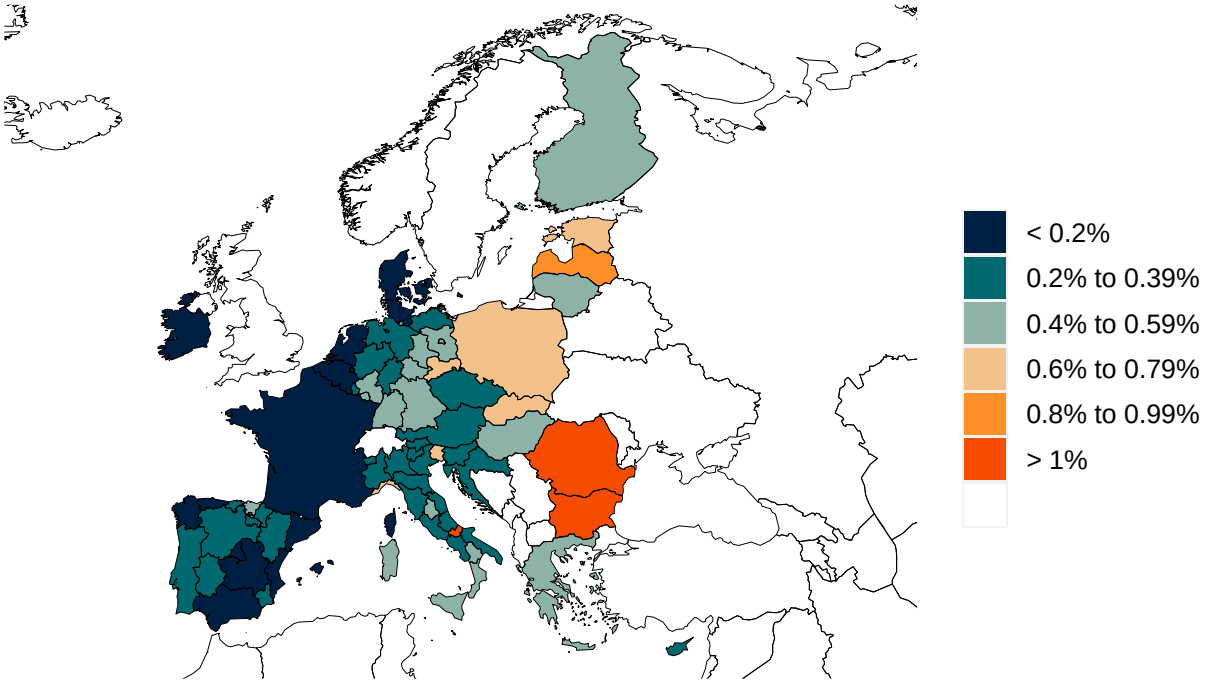


Figure 10.1. Infection-fatality rate on January 3, 2022. This is estimated as the ratio of COVID-19 deaths to estimated daily COVID-19 infections.



Critical drivers

Table 2. Current mandate implementation

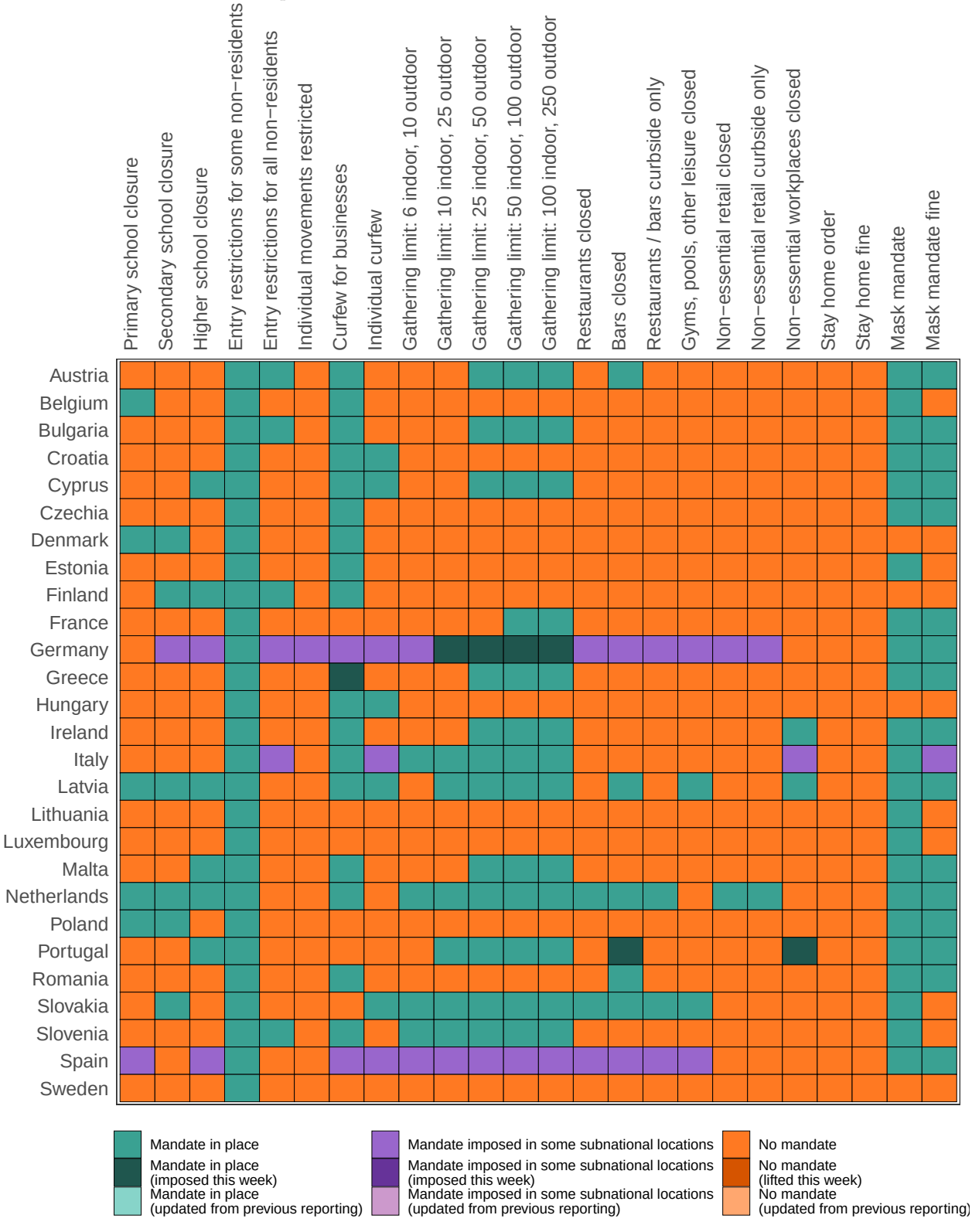


Figure 11.1. Trend in mobility as measured through smartphone app use, compared to January 2020 baseline

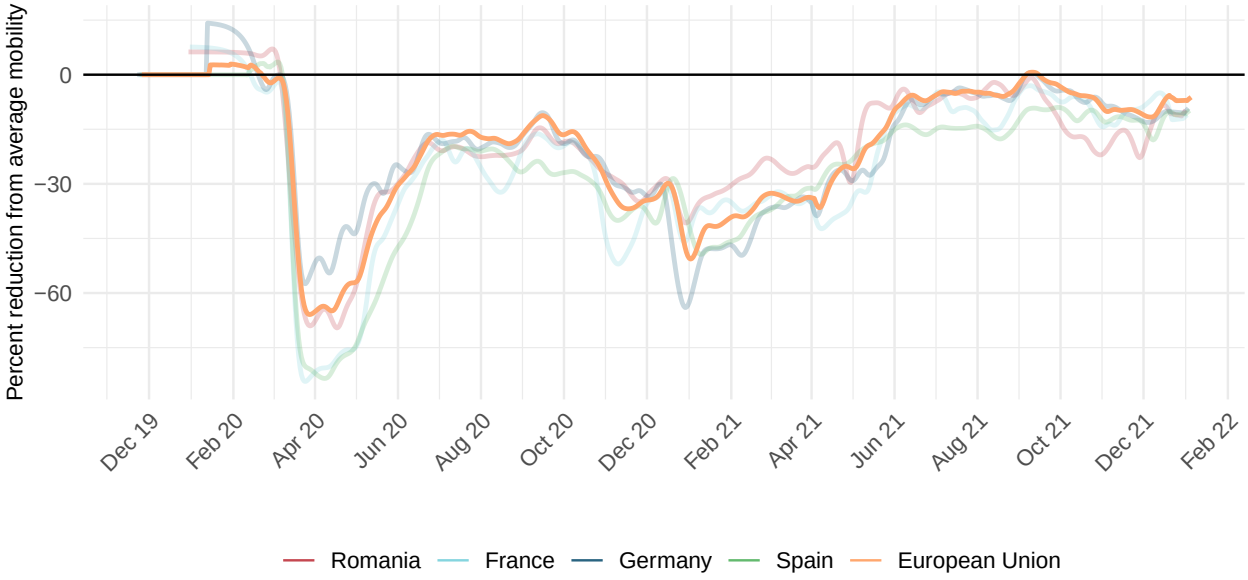


Figure 12.1. Mobility level as measured through smartphone app use, compared to January 2020 baseline (percent) on January 3, 2022

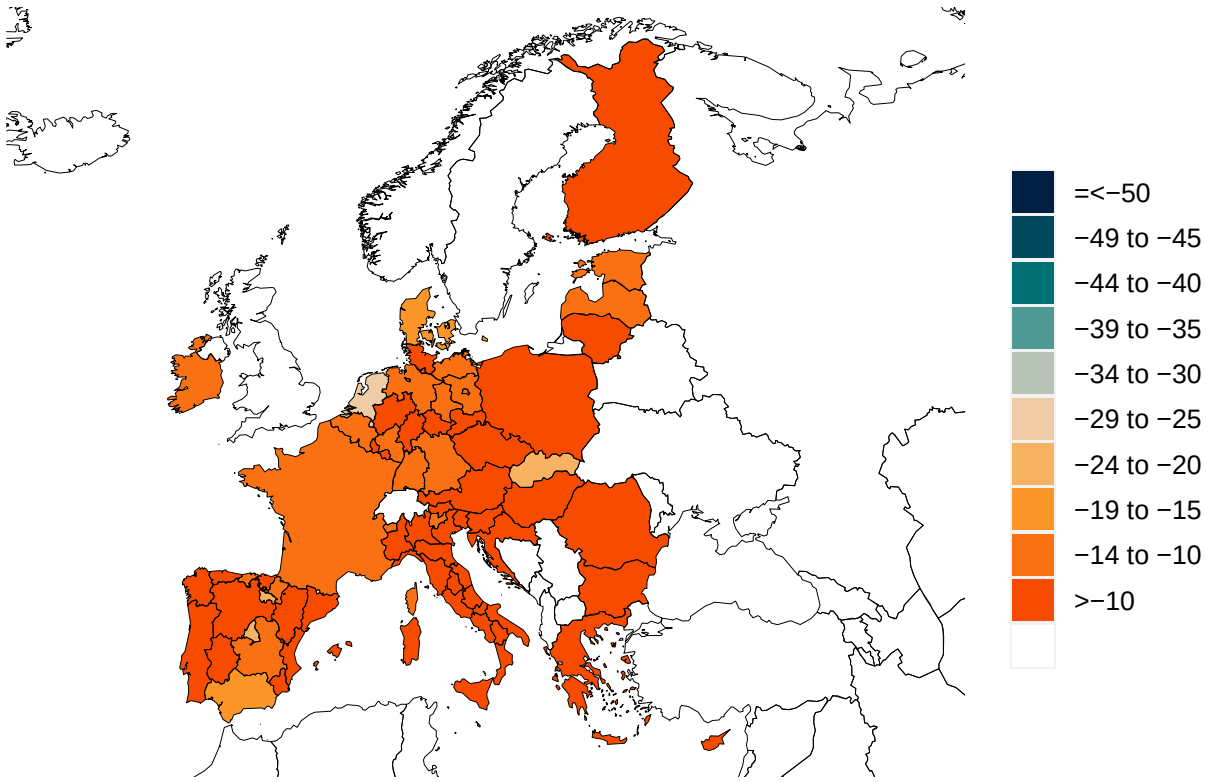


Figure 13.1. Trend in the proportion of the population reporting always wearing a mask when leaving home

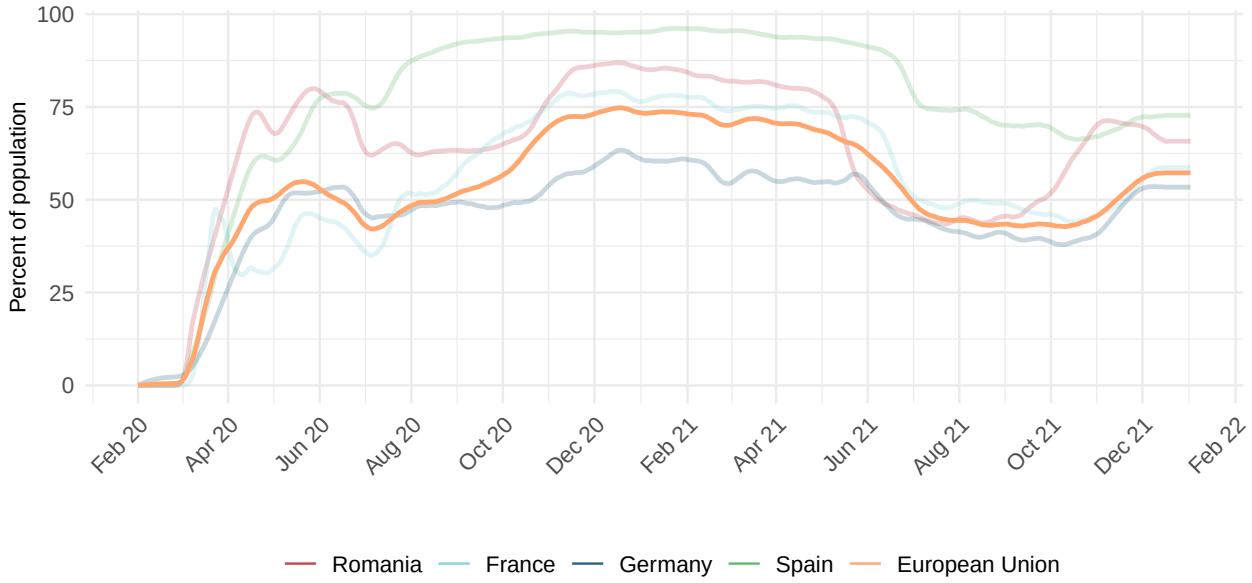


Figure 14.1. Proportion of the population reporting always wearing a mask when leaving home on January 3, 2022

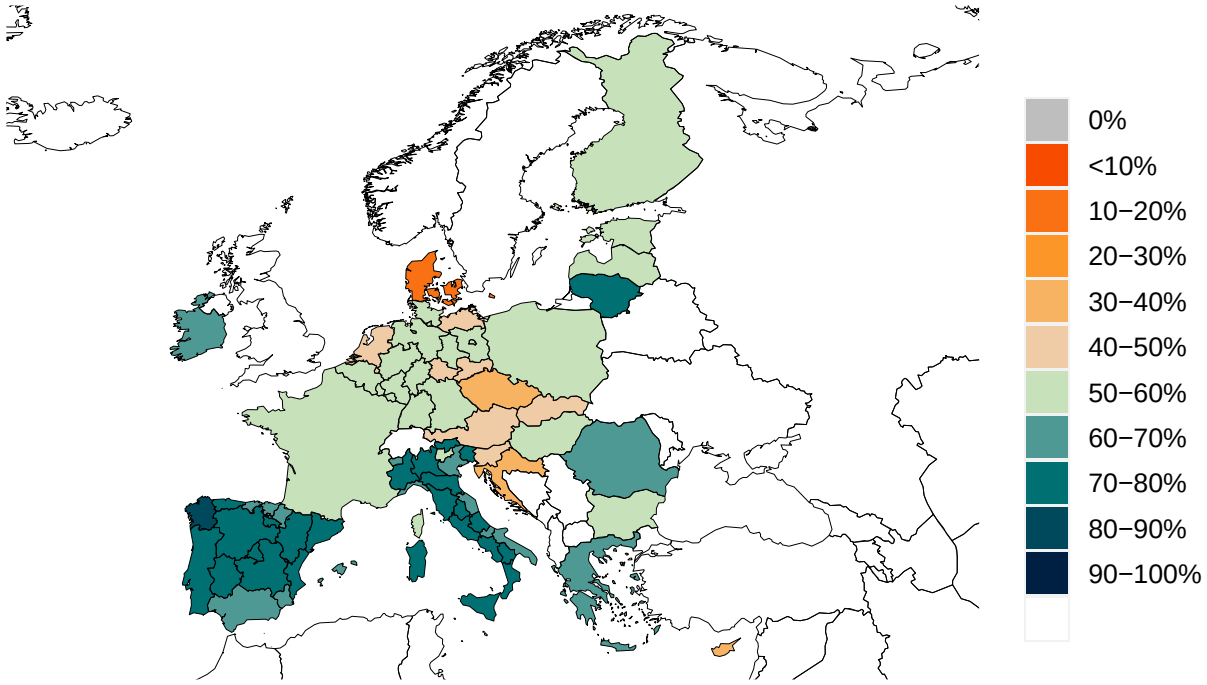


Figure 15.1. Trend in COVID-19 diagnostic tests per 100,000 people

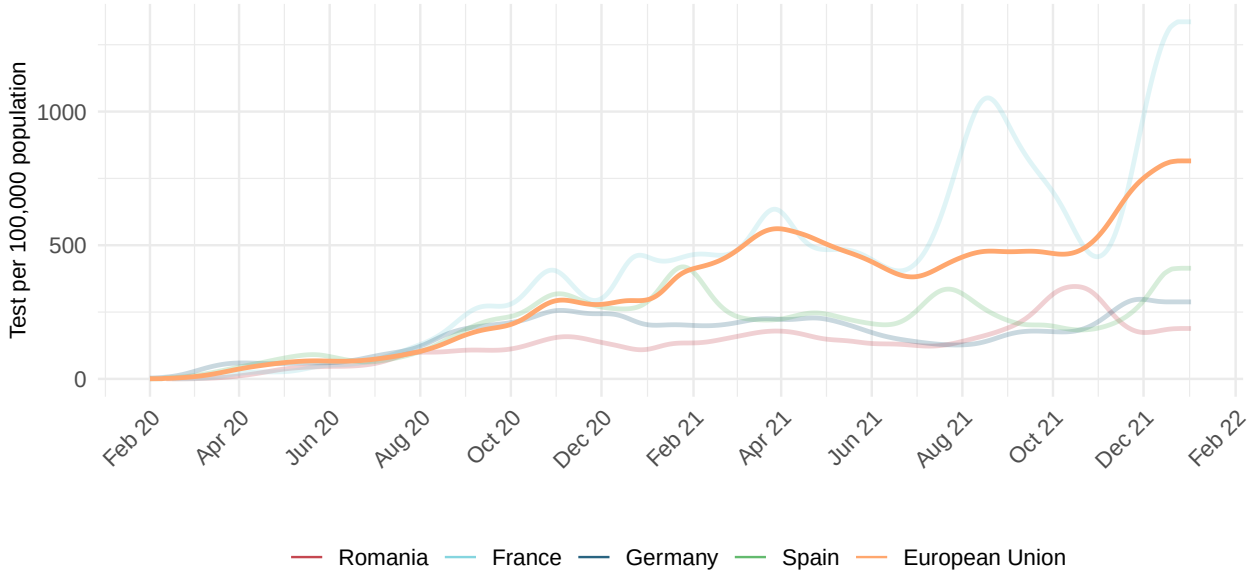


Figure 16.1. COVID-19 diagnostic tests per 100,000 people on January 3, 2022

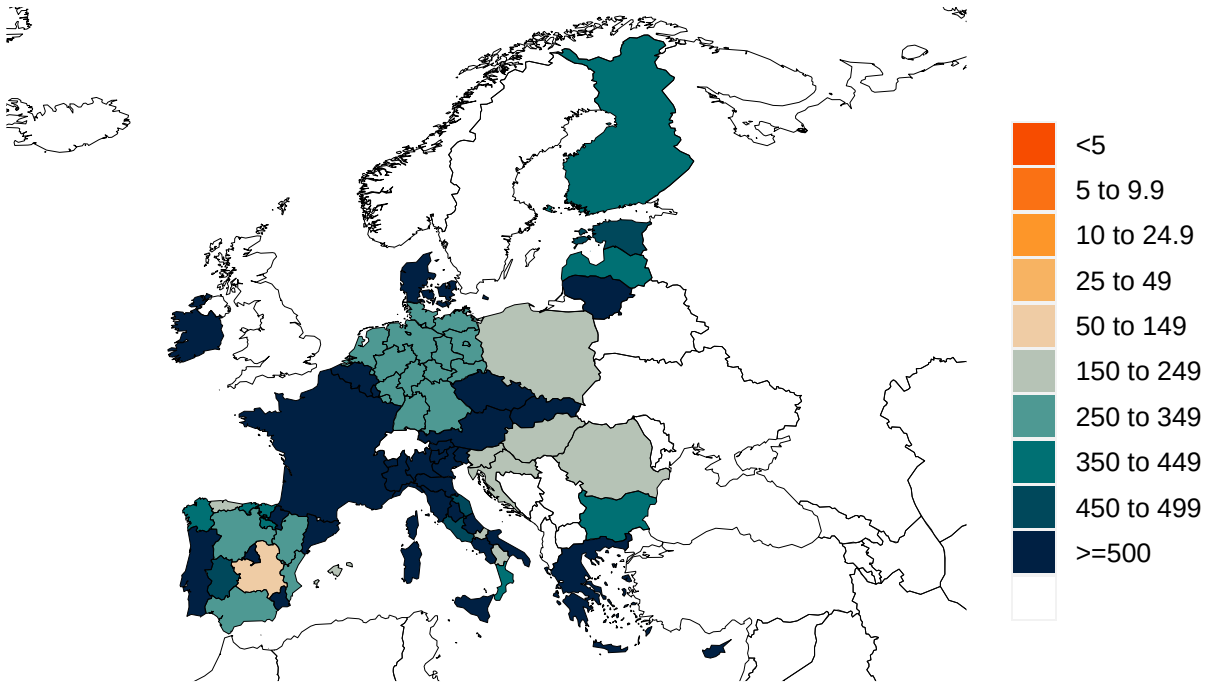


Table 3. Estimates of vaccine effectiveness for specific vaccines used in the model at preventing severe disease and infection. We use data from clinical trials directly, where available, and make estimates otherwise. More information can be found on our website.

	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%	94%	69%	94%	69%	94%	69%	71%	36%
CanSino	66%	62%	66%	62%	64%	61%	64%	61%	64%	61%	48%	32%
CoronaVac	50%	47%	50%	47%	49%	46%	49%	46%	49%	46%	37%	24%
Covaxin	78%	73%	78%	73%	76%	72%	76%	72%	76%	72%	57%	38%
Johnson & Johnson	86%	72%	86%	72%	76%	64%	76%	64%	76%	64%	57%	33%
Moderna	97%	92%	97%	92%	97%	91%	97%	91%	97%	91%	73%	48%
Novavax	89%	83%	89%	83%	86%	82%	86%	82%	86%	82%	65%	43%
Pfizer/BioNTech	95%	86%	95%	86%	95%	84%	95%	84%	95%	84%	72%	44%
Sinopharm	73%	68%	73%	68%	71%	67%	71%	67%	71%	67%	53%	35%
Sputnik-V	92%	86%	92%	86%	89%	85%	89%	85%	89%	85%	67%	44%
Other vaccines	75%	70%	75%	70%	73%	69%	73%	69%	73%	69%	55%	36%
Other vaccines (mRNA)	91%	86%	91%	86%	88%	85%	88%	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 January 3, 2022

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

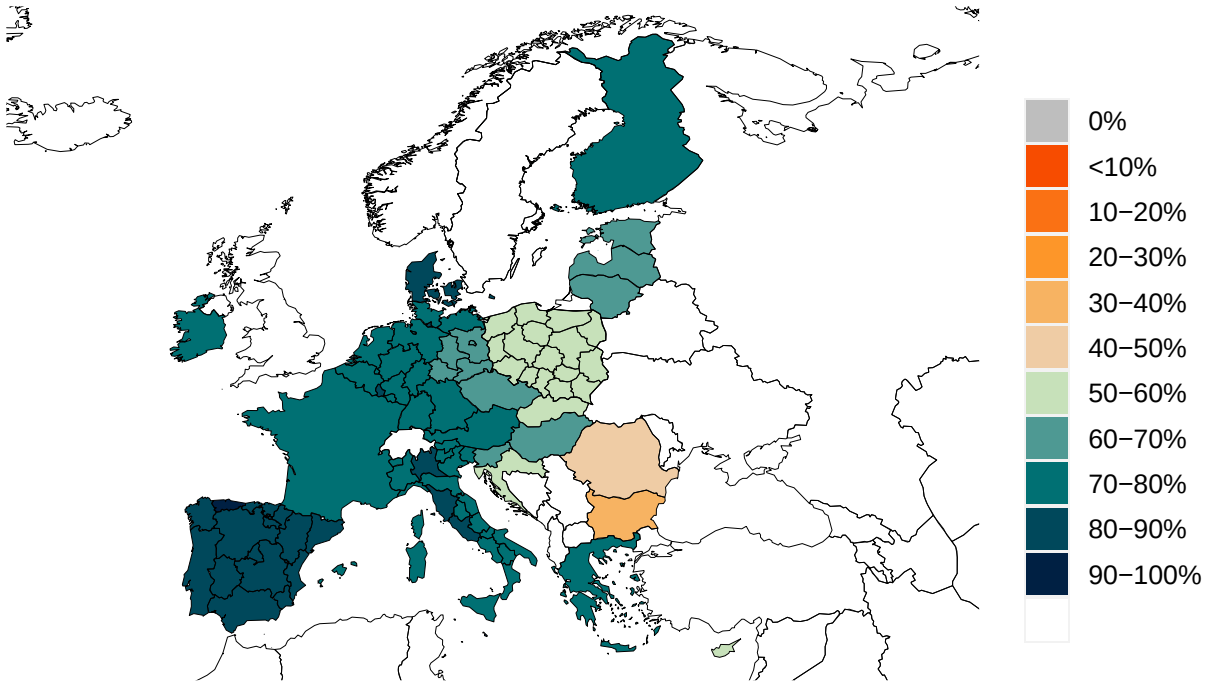


Figure 17.2 Percent of the population fully vaccinated against SARS-CoV-2

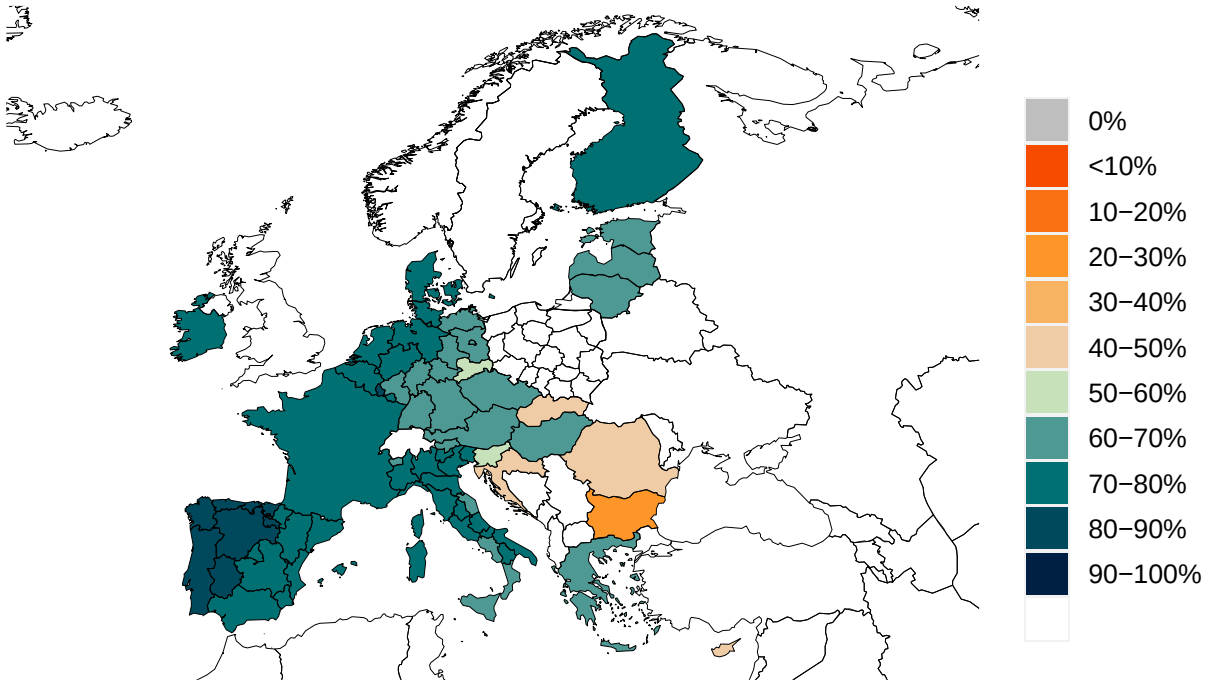


Figure 18.1. Trend in the estimated proportion of the population that is 12 years and older that has been vaccinated or would probably or definitely receive the COVID-19 vaccine if available. Note that vaccine acceptance is calculated using survey data from the 18+ population.

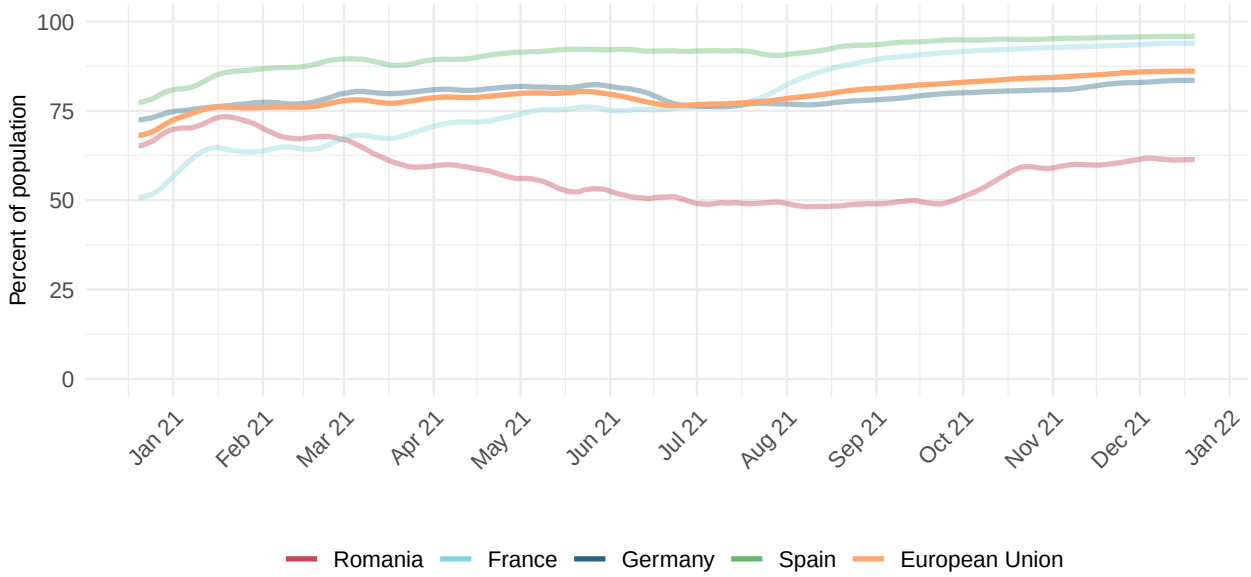


Figure 19.1. Estimated proportion of the population that is 12 years and older that has been vaccinated or would probably or definitely receive the COVID-19 vaccine if available. Note that vaccine acceptance is calculated using survey data from the 18+ population.

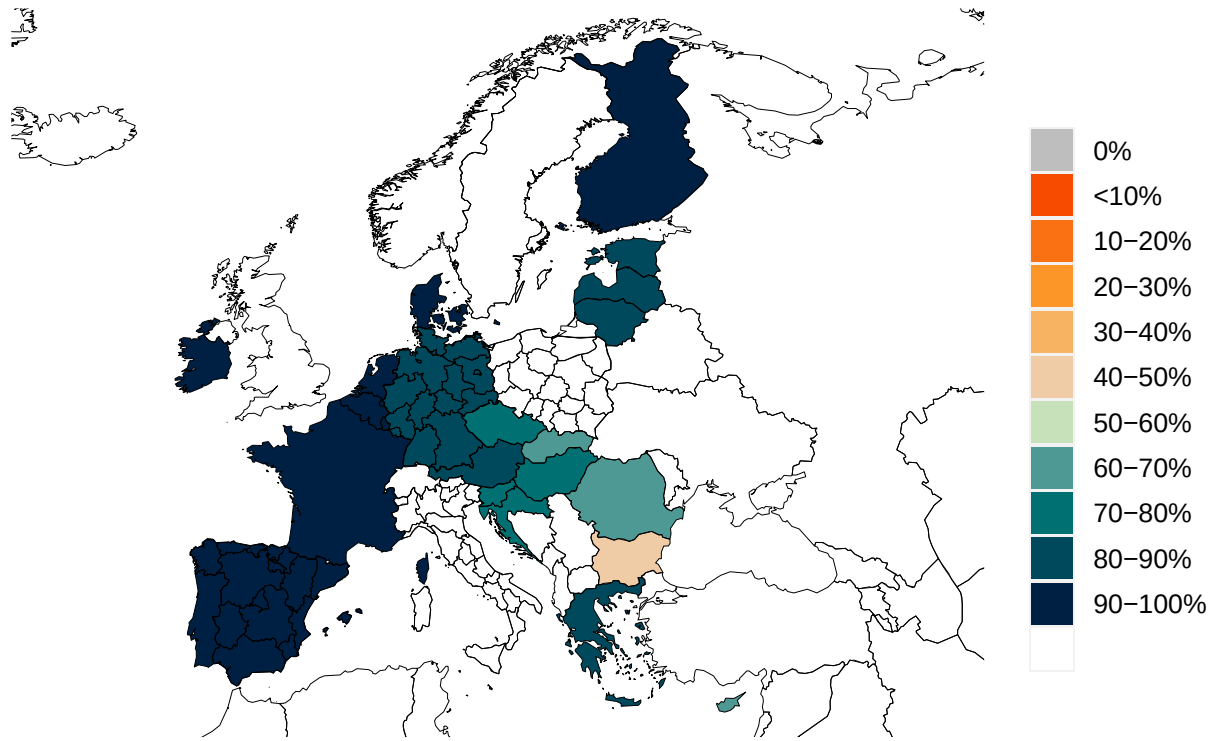
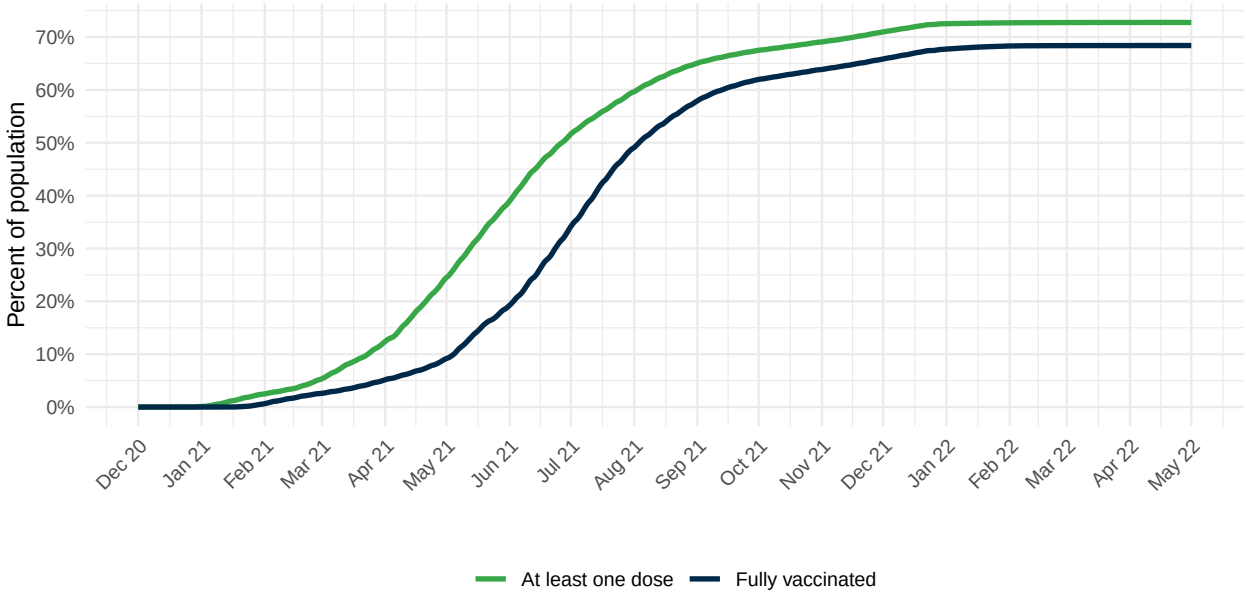


Figure 20.1. Percent of people who receive at least one dose of a COVID-19 vaccine and those who are fully vaccinated



Projections and scenarios

We produce five 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.
- Omicron variant spreads according to our flight and local spread model.

- 80% of those who have had two doses of vaccine (or one dose for Johnson & Johnson) receive a third dose at 6 months after their second dose.

The **high severity of Omicron scenario** modifies the reference scenario assumption in two ways:

- The infection-hospitalization ratio for Omicron is 2.3 times as high as compared to the reference scenario.
- The infection-fatality rate is 4.6 times as high as compared to the reference scenario.

The **80% mask use scenario** makes all the same assumptions as the reference scenario but assumes all locations reach 80% mask use within 7 days. If a location currently has higher than 80% use, mask use remains at the current level.

The **third dose scenario** is the same as the reference scenario but assumes that 100% of those who have received two doses of vaccine will get a third dose at 6 months.

The **reduced vaccine hesitancy scenario** assumes that those in each location who respond on surveys that they probably will not receive a vaccine are persuaded or mandated to receive a vaccine.

Figure 21.1. Daily COVID-19 infections until May 01, 2022 for five scenarios

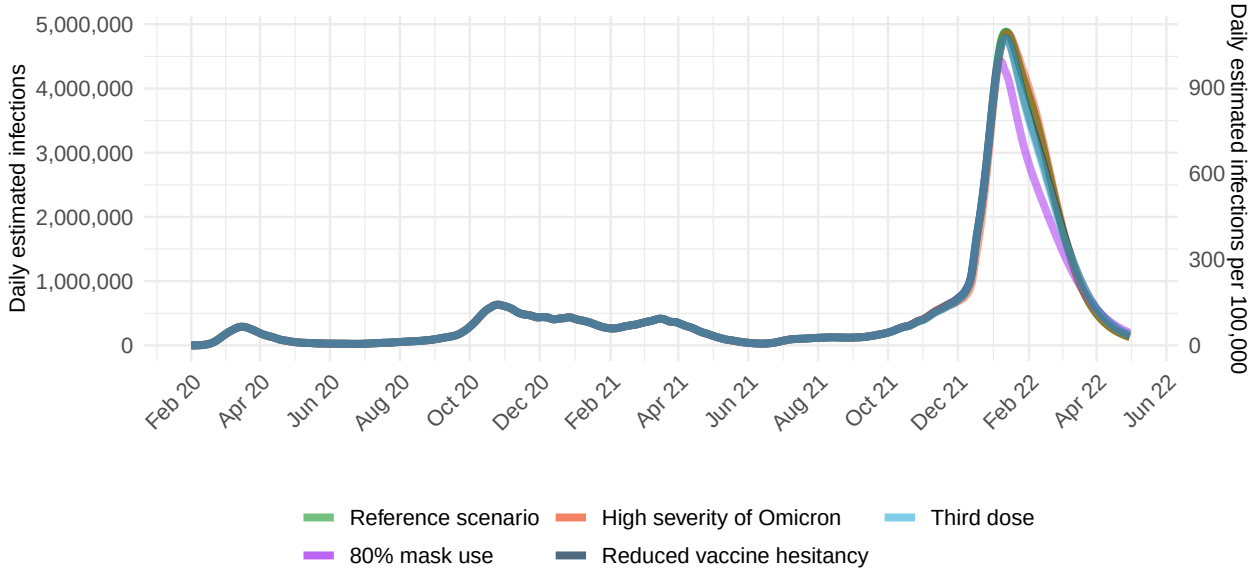


Figure 21.2. Daily COVID-19 reported cases until May 01, 2022 for five scenarios

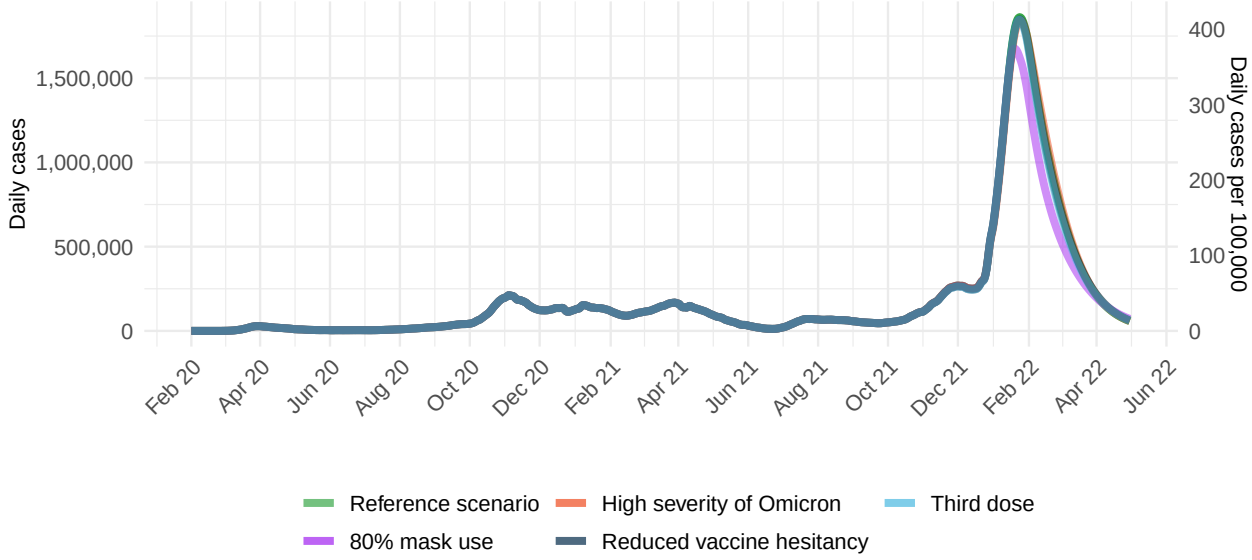


Figure 21.3. Daily COVID-19 hospital census until May 01, 2022 for five scenarios

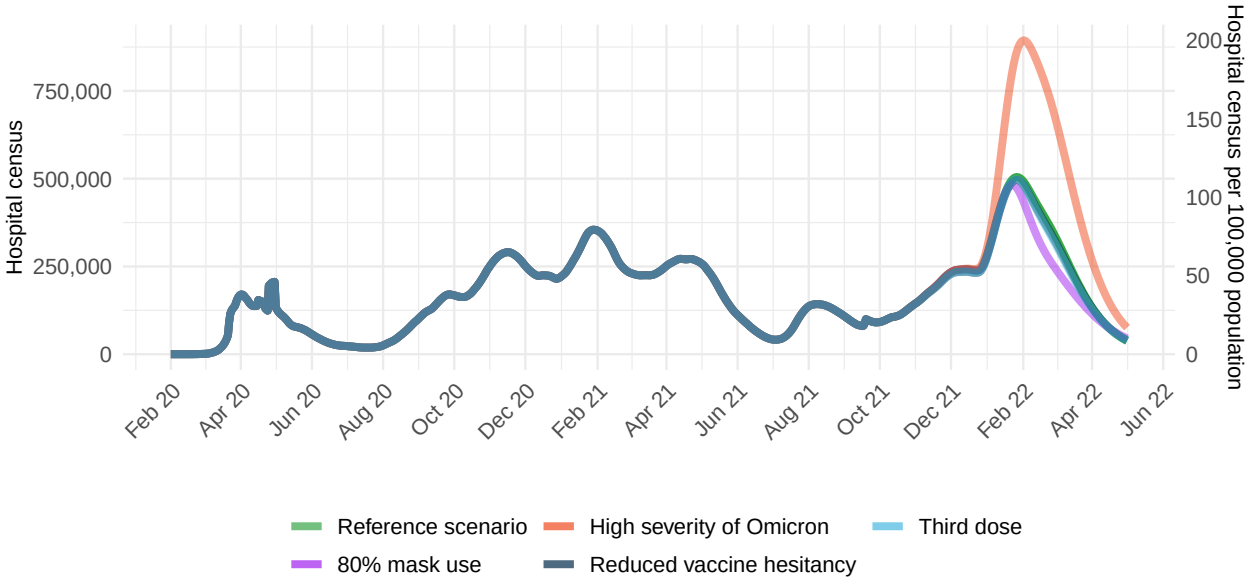


Figure 21.4 Reported daily COVID-19 deaths per 100,000

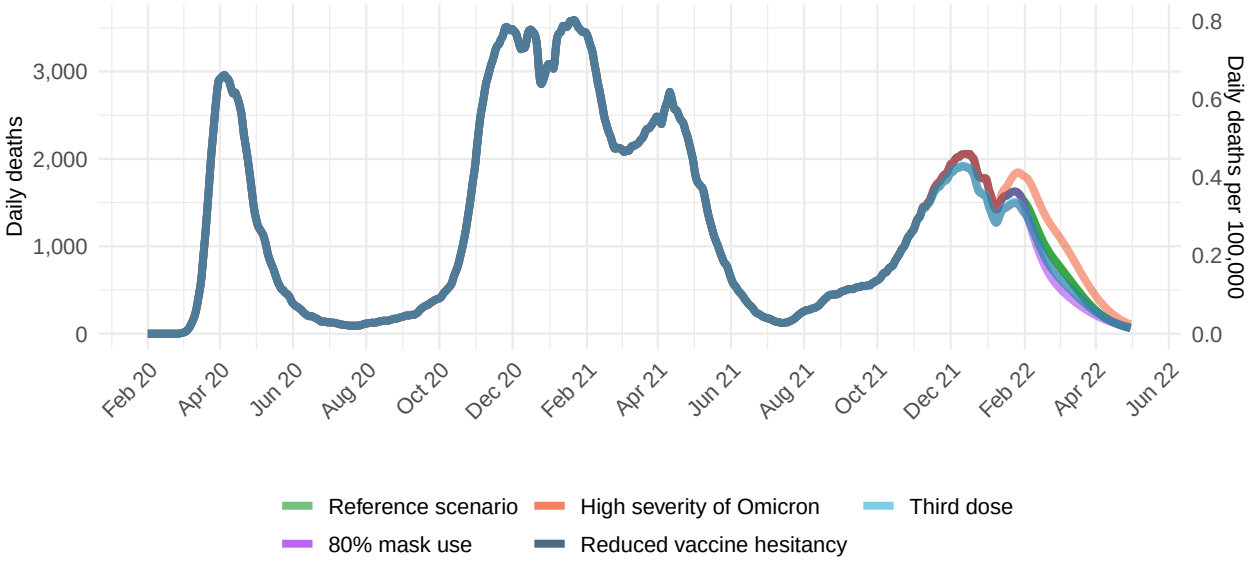


Figure 21.5 Total daily COVID-19 deaths per 100,000

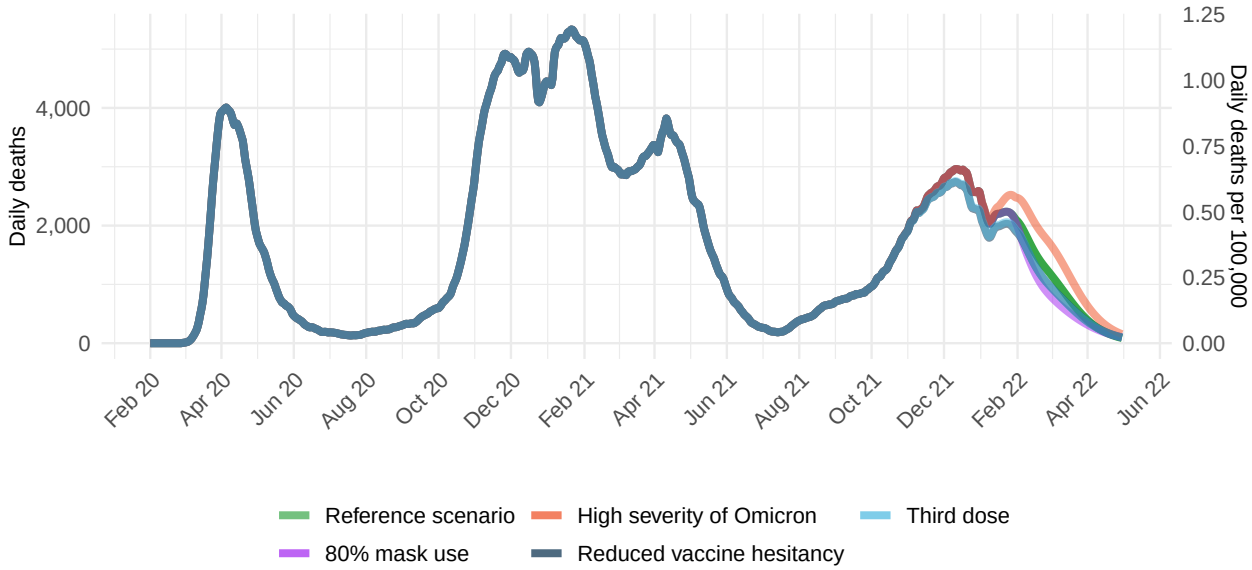


Figure 22.1. Comparison of reference model projections with other COVID modeling groups. For this comparison, we are including projections of daily COVID-19 deaths from other modeling groups when available, last model update in brackets: Delphi from the Massachusetts Institute of Technology (Delphi) [January 7, 2022], Imperial College London (Imperial) [December 13, 2021], the SI-KJalpha model from the University of Southern California (SIKJalpha) [January 4, 2022], and the ECDC Ensemble Model (ECDC) [January 3, 2022]. Daily deaths from other modeling groups are smoothed to remove inconsistencies with rounding. Regional values are aggregates from available locations in that region.

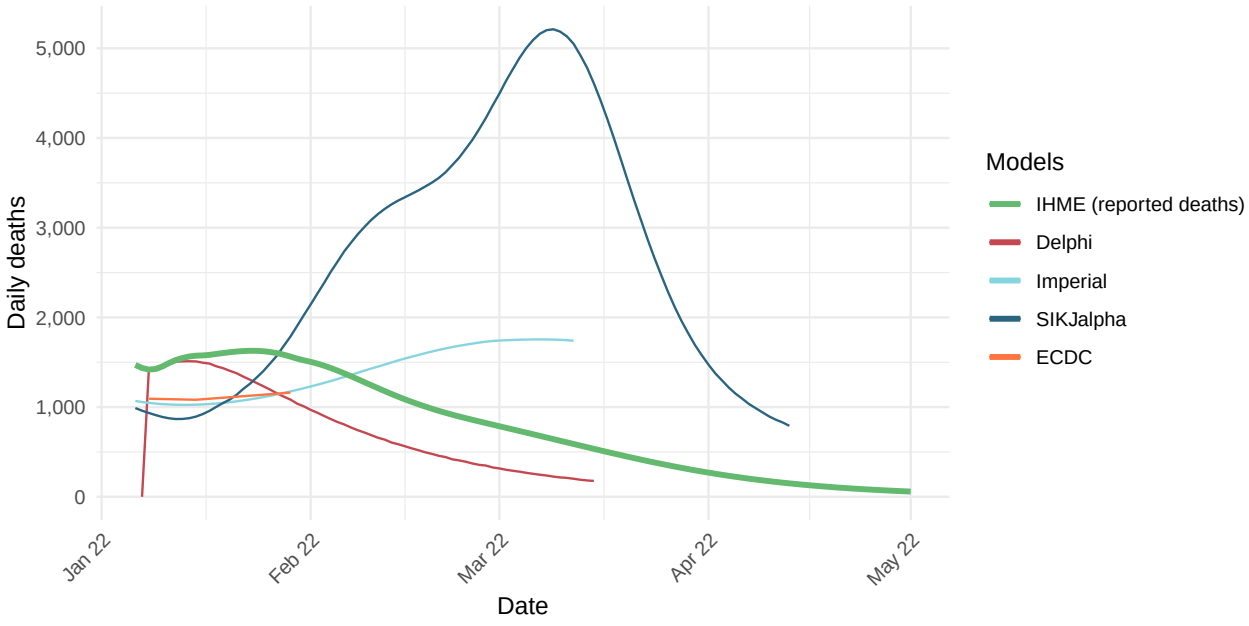


Figure 23.1. The estimated inpatient hospital usage is shown over time. The percent of hospital beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of beds occupied by COVID-19 patients. Less than 5% is considered *low stress*, 5-9% is considered *moderate stress*, 10-19% is considered *high stress*, and 20% or greater is considered *extreme stress*.

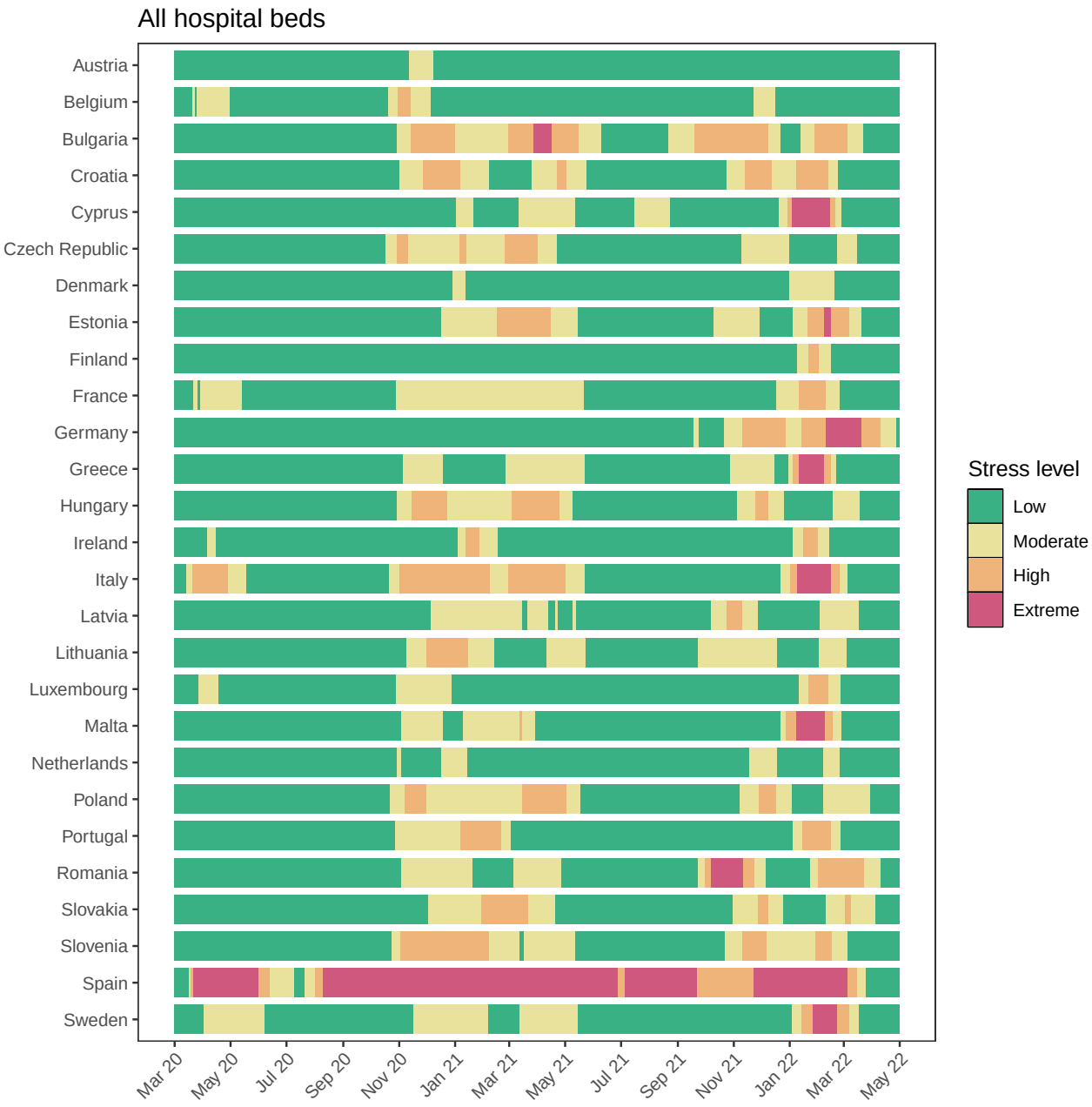
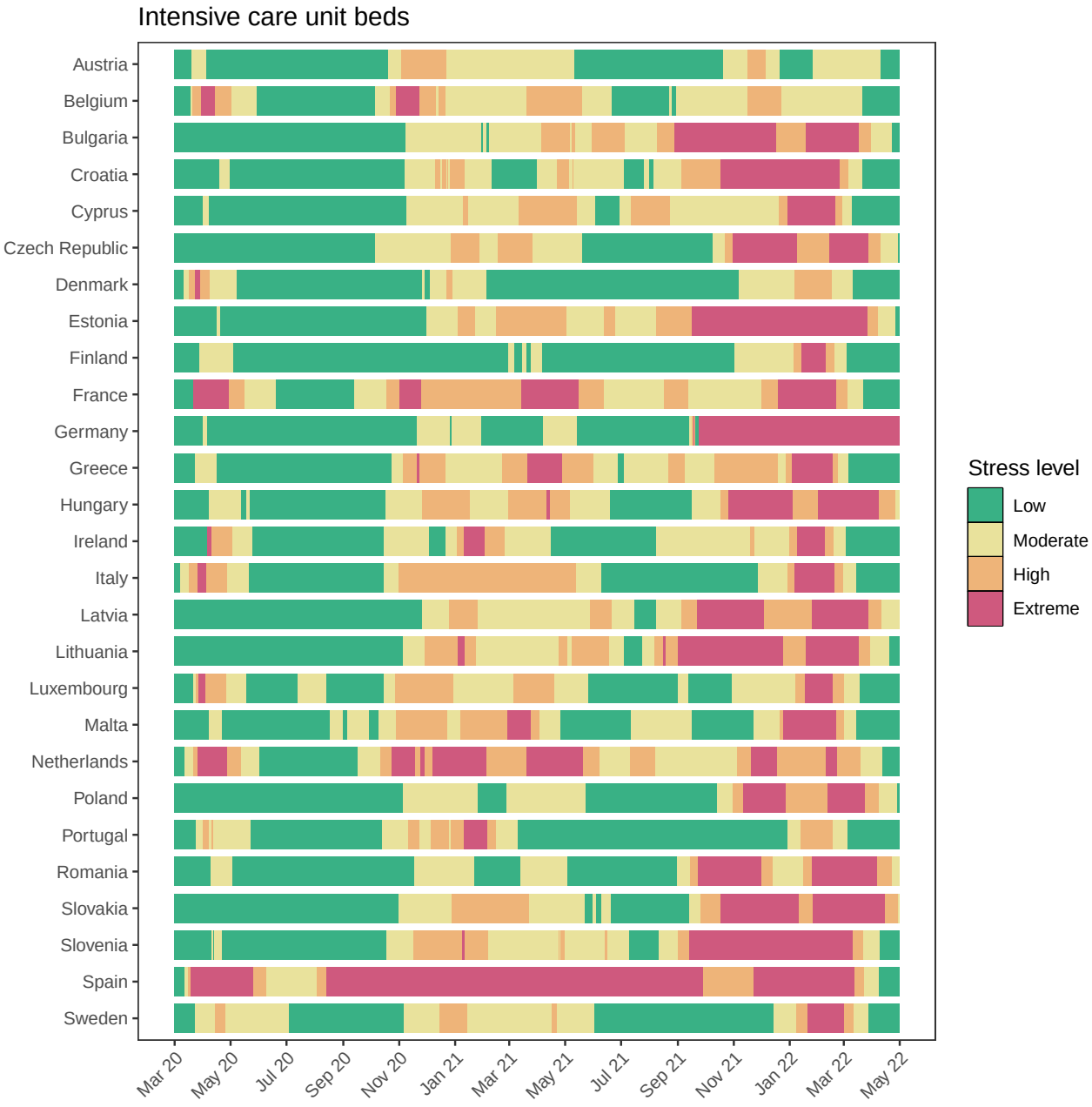


Figure 24.1. The estimated intensive care unit (ICU) usage is shown over time. The percent of ICU beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of ICU beds occupied by COVID-19 patients. Less than 10% is considered *low stress*, 10-29% is considered *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.