

COVID-19 Results Briefing

United Kingdom

June 4, 2021

This document contains summary information on the latest projections from the IHME model on COVID-19 in United Kingdom. The model was run on June 3, 2021 with data through June 1, 2021.

Current situation

- Daily reported cases in the last week increased to 2,800 per day on average compared to 1,600 the week before (Figure 1).
- Daily deaths in the last week decreased to 6 per day on average compared to 11 the week before (Figure 2). Estimated total daily COVID-19 deaths were 1 times larger than the reported number of deaths. This makes COVID-19 the number 48 cause of death in United Kingdom this week (Table 1).
- No locations had daily death rates greater than 4 per million (Figure 3).
- We estimated that 18% of people in United Kingdom have been infected as of June 1 (Figure 5).
- Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 2 countries (Figure 6).
- The infection detection rate in United Kingdom was close to 77% on June 1 (Figure 7).
- In United Kingdom we estimate that the primary circulating variants are escape variants (B.1.351, B.1.617, or P.1). We estimate that B.1.351 is circulating in 4 countries, that B.1.617 is circulating in 3 countries, and that P.1 or P.3 is circulating in 3 countries.

Trends in drivers of transmission

- Mobility last week was 23% lower than the pre-COVID-19 baseline (Figure 10). Mobility was near baseline (within 10%) in no countries. Mobility was lower than 30% of baseline in no locations.
- As of June 1, we estimated that 56% of people always wore a mask when leaving their home compared to 56% last week (Figure 12). Mask use was lower than 50% in no countries.
- There were 1304 diagnostic tests per 100,000 people on June 1 (Figure 14).
- In United Kingdom 83.5% of people say they would accept or would probably accept a vaccine for COVID-19. This is down by 0.9 percentage points from last week. The fraction of the population who are open to receiving a COVID-19 vaccine ranges from 72% in Northern Ireland to 86% in Scotland (Figure 18).
- In our current reference scenario, we expect that 42.25 million people will be vaccinated by September 1 (Figure 19).

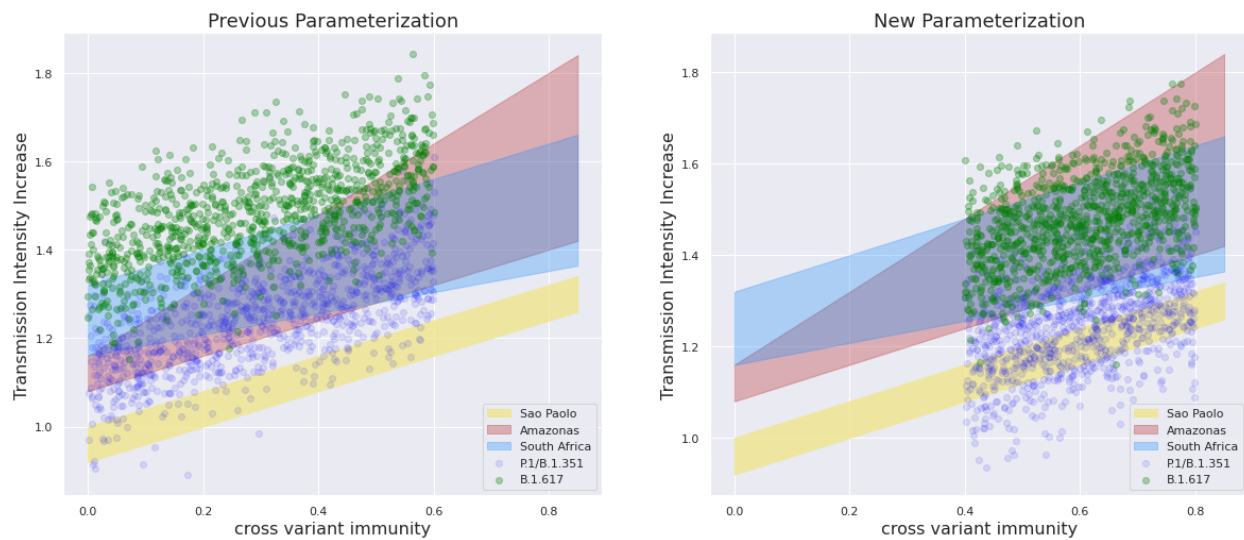
Projections

- In our **reference scenario**, which represents what we think is most likely to happen, our model projects 153,000 cumulative deaths on September 1. This represents 1,000 additional deaths from June 1 to September 1 (Figure 20). Daily deaths are expected to decline steadily until September 1 (Figure 21).
- If **universal mask coverage (95%)** were attained in the next week, our model projects 630 fewer cumulative deaths compared to the reference scenario on September 1 (Figure 20).
- Under our **worse scenario**, our model projects 154,000 cumulative deaths on September 1, an additional 1,100 deaths compared to our reference scenario (Figure 20).
- By September 1, we project that 400 lives will be saved by the projected vaccine rollout.
- Figure 23 compares our reference scenario forecasts to other publicly archived models. Forecasts are widely divergent.
- At some point from June through September 1, 3 countries will have high or extreme stress on hospital beds (Figure 24). At some point from June through September 1, 4 countries will have high or extreme stress on intensive care unit (ICU) capacity (Figure 25).

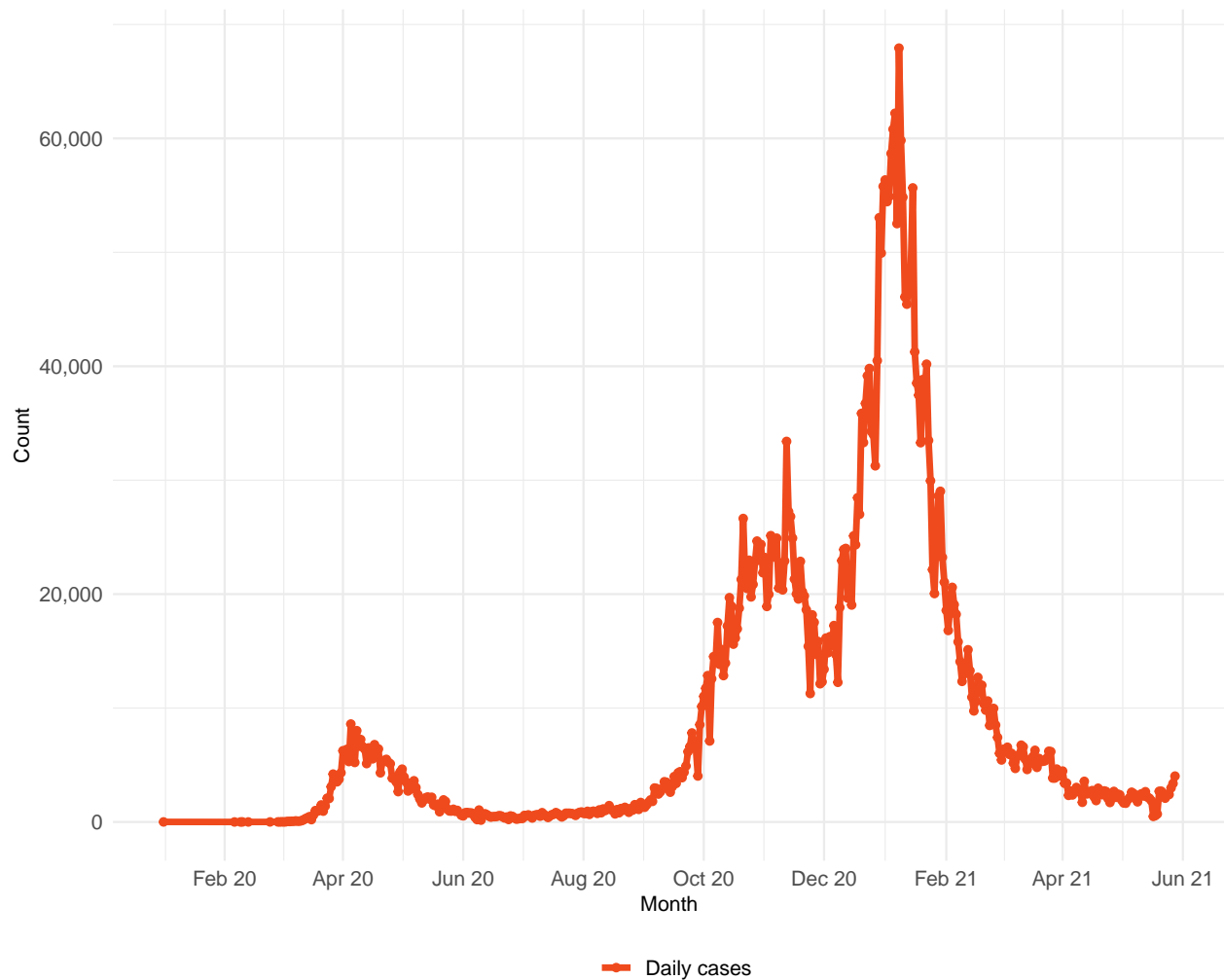
Model updates

This week, we have made some changes to how we estimate total COVID-19 mortality (which was described in more detail [here](#)). We added more data that have become available over the past month; also, to account for the impact of the significant reduction in flu cases on all-cause mortality during the COVID-19 epidemic, we have systematically excluded weeks and months traditionally affected by flu by location based on the seasonality of reported flu cases in the past. For countries in the Northern Hemisphere, including Europe and North America, we excluded data from January to March. For most countries in the Southern Hemisphere, data from months between June and August are generally excluded.

This week we also increased our assumed cross-variant immunity from an average of 30% to an average of 60% based on studies on neutralizing antibodies that suggest cross-variant immunity may be higher than we currently estimate. We have also adjusted the relationship between cross-variant immunity and the transmission intensity increase of the escape variants such that the increase in transmission intensity is on average the same as it was last week – 124% for B.1.351 and P.1, and 148% for B.1.617.



In addition, we have included in this week's analysis of past infections seroprevalence surveys in the Russian Federation, which increase our estimates of seroprevalence considerably. Finally, based on the analysis by Public Health England of the effectiveness of the AstraZeneca vaccine in preventing infections in cases of B.1.617, we have revised upward AstraZeneca's effectiveness for escape variants.

Figure 1. Reported daily COVID-19 cases

Table 1. Ranking of 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	1,796	1
Stroke	974	2
Chronic obstructive pulmonary disease	845	3
Tracheal, bronchus, and lung cancer	824	4
Lower respiratory infections	805	5
Alzheimer's disease and other dementias	624	6
Colon and rectum cancer	466	7
Prostate cancer	307	8
Breast cancer	293	9
Pancreatic cancer	232	10
COVID-19	44	48

Figure 2. Smoothed trend estimate of reported daily COVID-19 deaths (blue) and total daily COVID-19 deaths (orange).

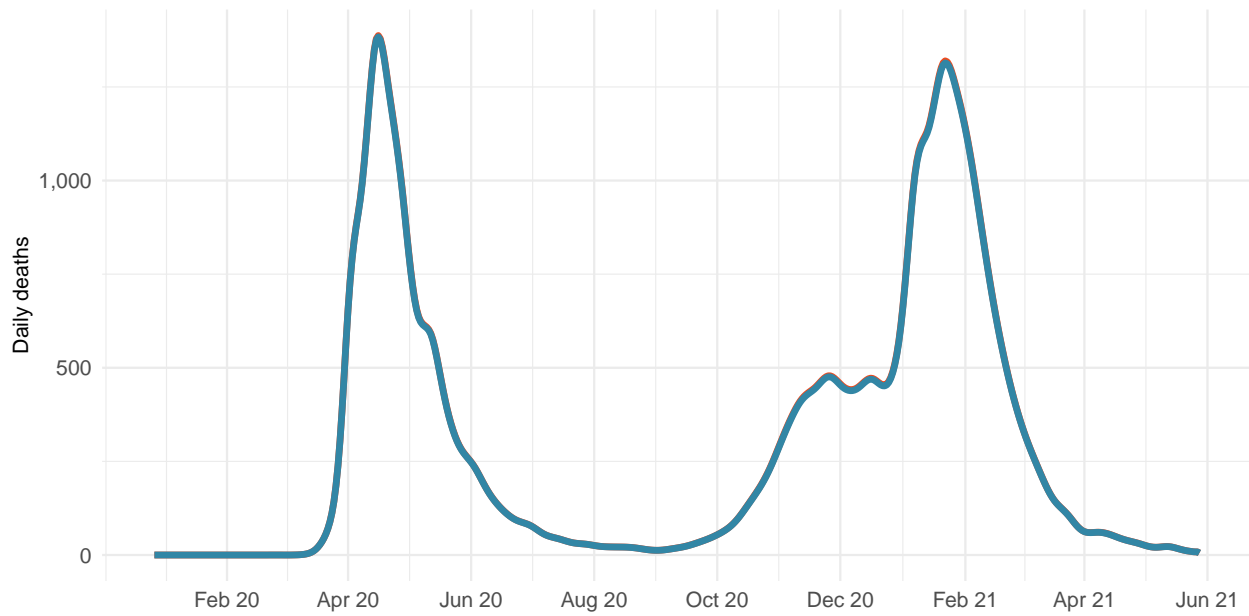


Figure 3. Daily COVID-19 death rate per 1 million on June 1, 2021

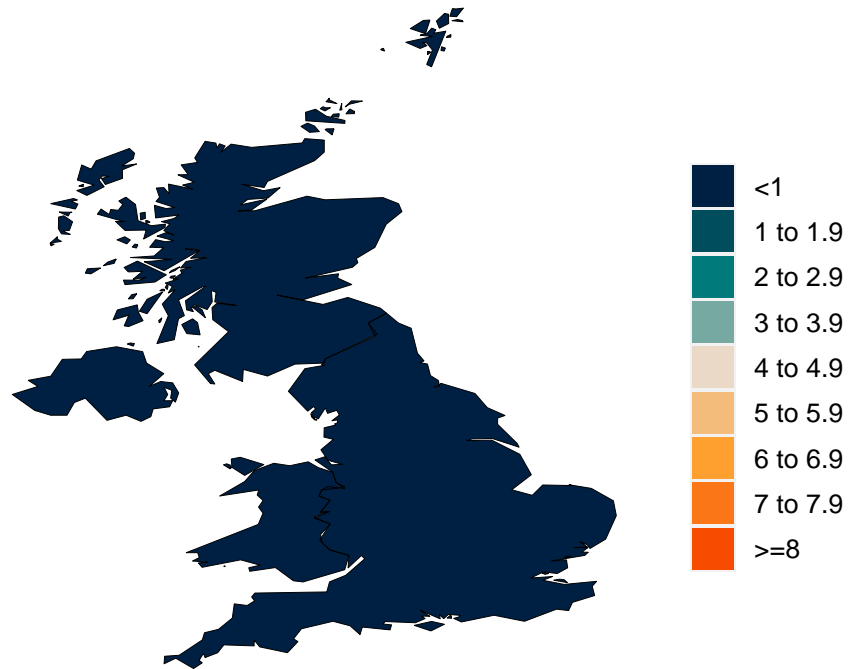


Figure 4. Cumulative COVID-19 deaths per 100,000 on June 1, 2021

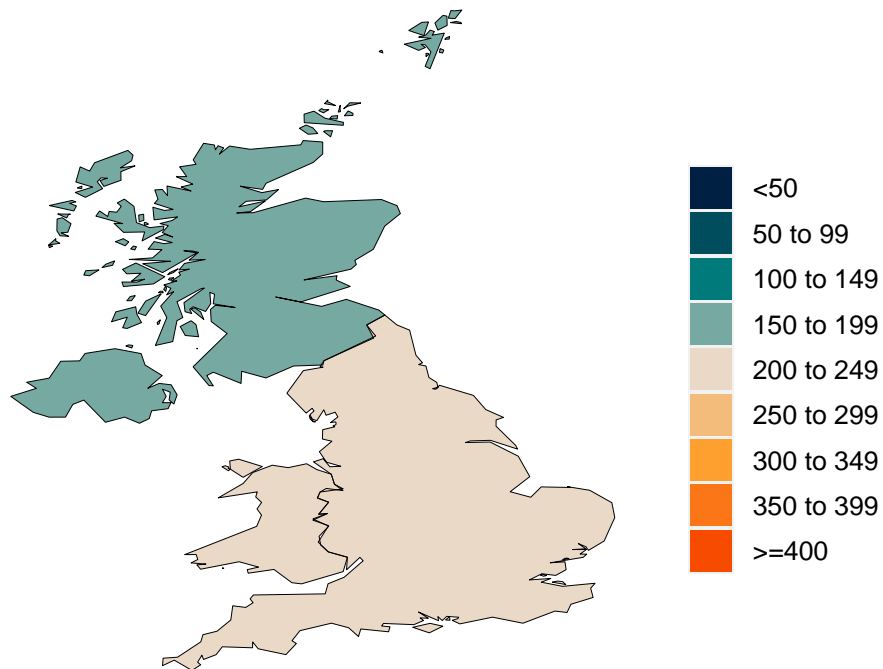


Figure 5. Estimated percent of the population infected with COVID-19 on June 1, 2021

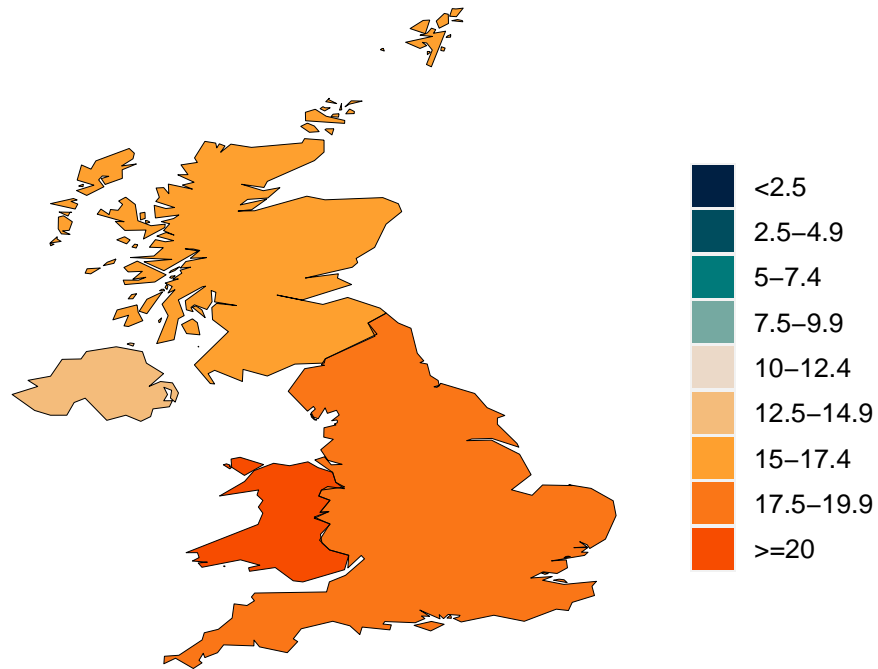
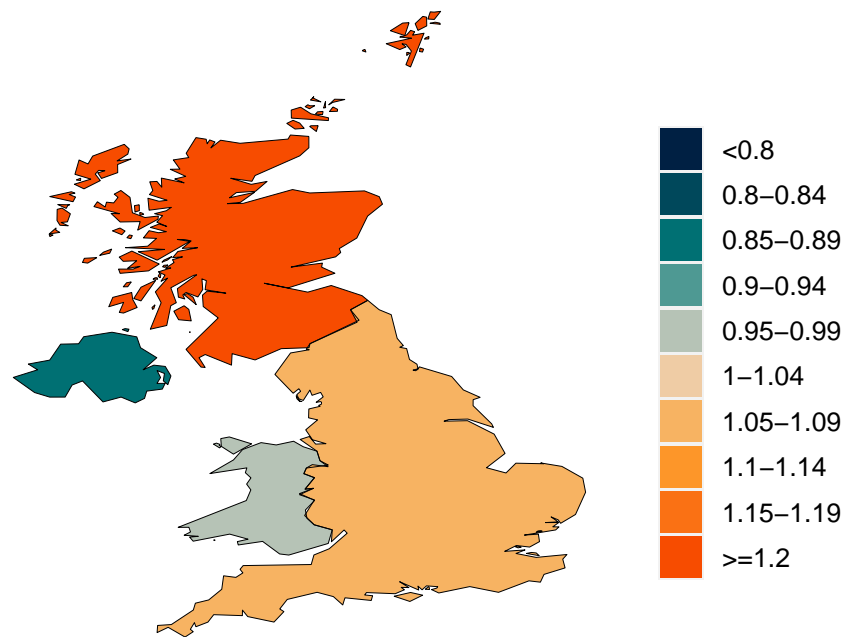
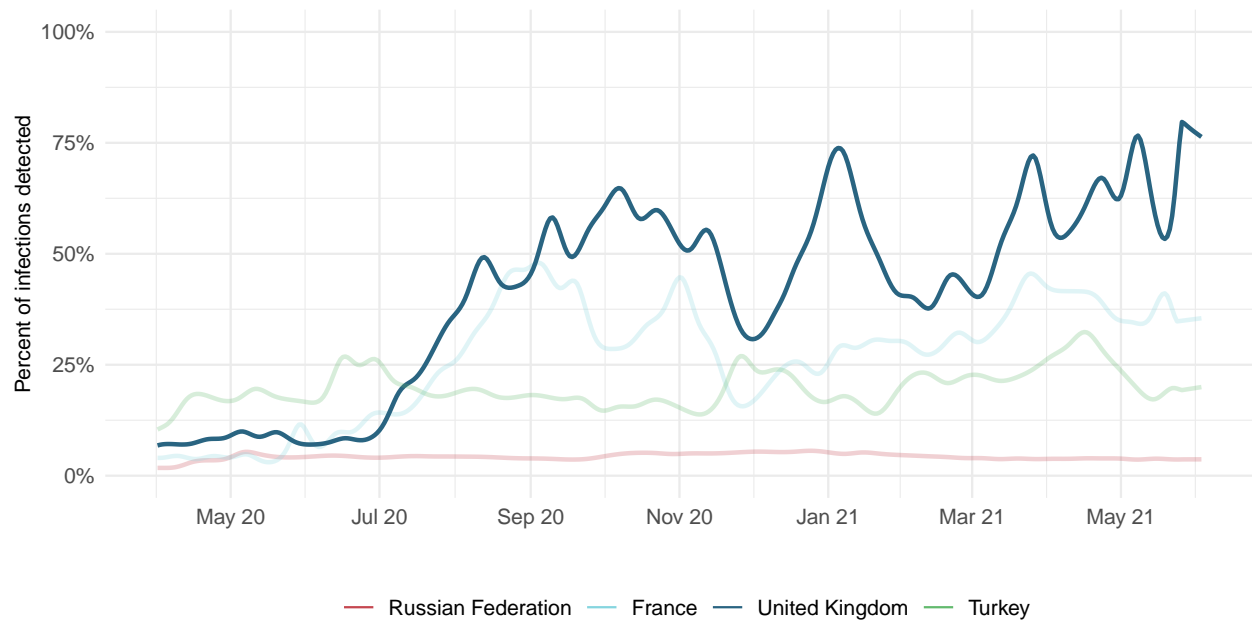


Figure 6. Mean effective R on May 21, 2021



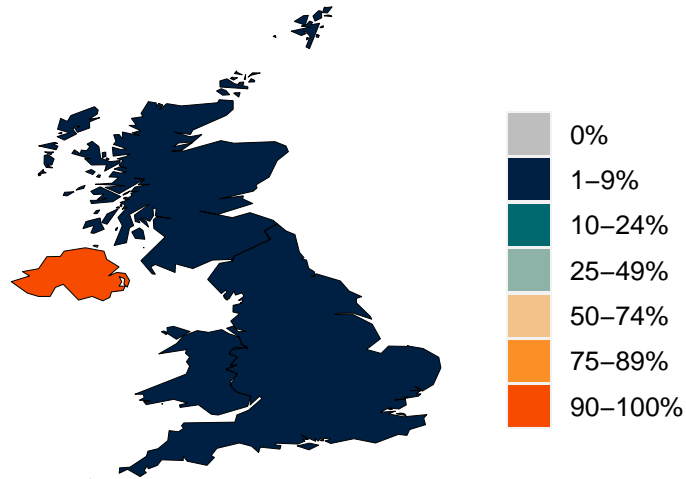
The estimate of effective R is based on the combined analysis of deaths, case reporting, and hospitalizations where available. Current reported cases reflect infections 11-13 days prior, so estimates of effective R can only be made for the recent past. Effective R less than 1 means that transmission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

Figure 7. Percent of COVID-19 infections detected


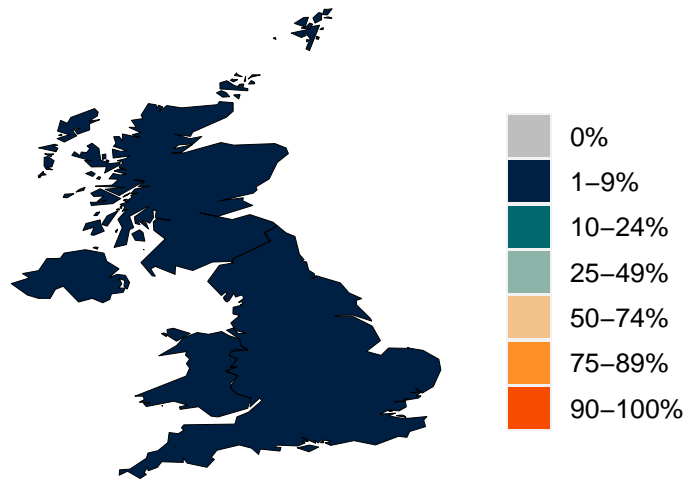
This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model. Due to measurement errors in cases and testing rates, the infection to detection percentage can exceed 100% at particular points in time.

Figure 8. Estimated percent of circulating SARS-CoV-2 for primary variant families on June 1, 2021

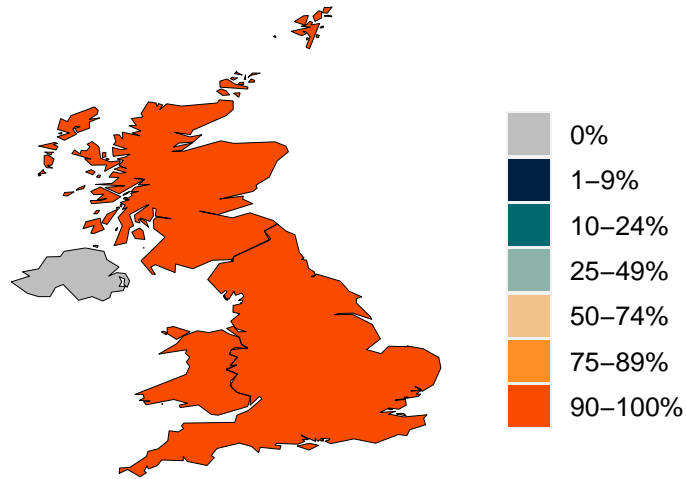
A. Estimated percent B.1.1.7 variant



B. Estimated percent B.1.351 variant



C. Estimated percent B.1.617 variant



D. Estimated percent P.1 or P.3 variant

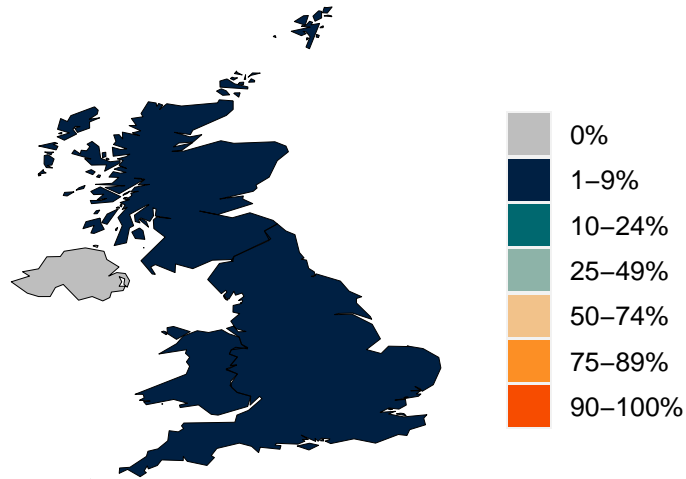
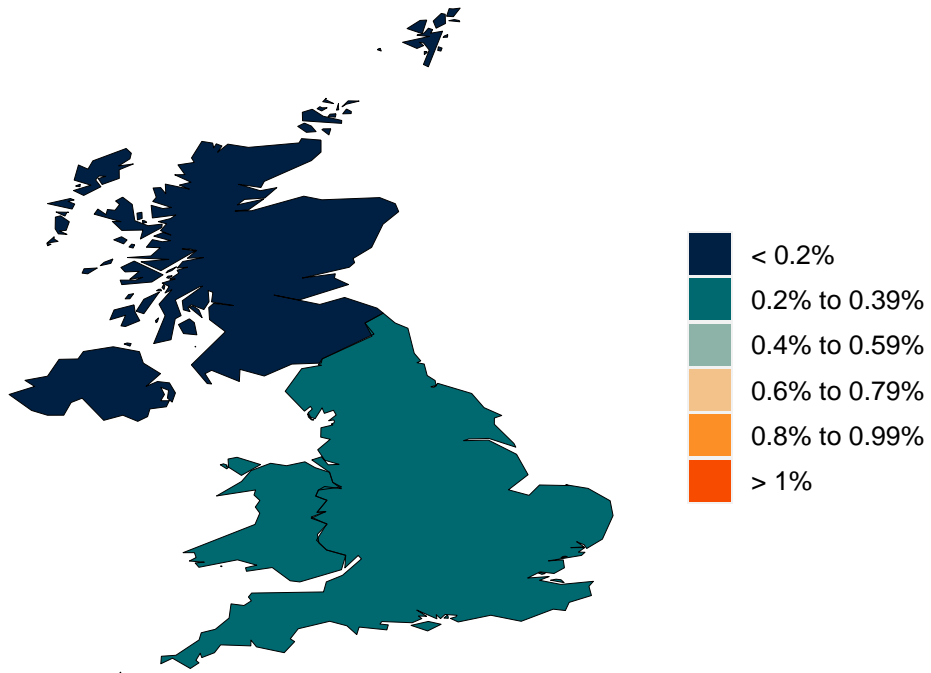


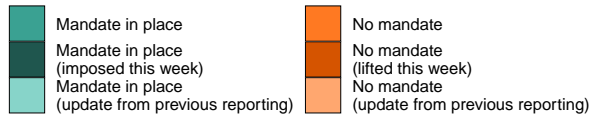
Figure 9. Infection-fatality ratio on June 1, 2021



Critical drivers

Table 2. Current mandate implementation

	Primary school closure	Secondary school closure	Higher school closure	Borders closed to any non-resident	Borders closed to all non-residents	Individual movements restricted	Curfew for businesses	Individual curfew	Gathering limit: 6 indoor, 10 outdoor	Gathering limit: 10 indoor, 25 outdoor	Gathering limit: 25 indoor, 50 outdoor	Gathering limit: 50 indoor, 100 outdoor	Gathering limit: 100 indoor, 250 outdoor	Restaurants closed	Bars closed	Restaurants / bars closed	Restaurants / bars curbside only	Gyms, pools, other leisure closed	Non-essential retail closed	Non-essential retail curbside only	Non-essential workplaces closed	Stay home order	Stay home fine	Mask mandate	Mask mandate fine
England	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	
Northern Ireland	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	
Scotland	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	
Wales	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	Teal	



*Not all locations are measured at the subnational level.

Figure 10. Trend in mobility as measured through smartphone app use compared to January 2020 baseline

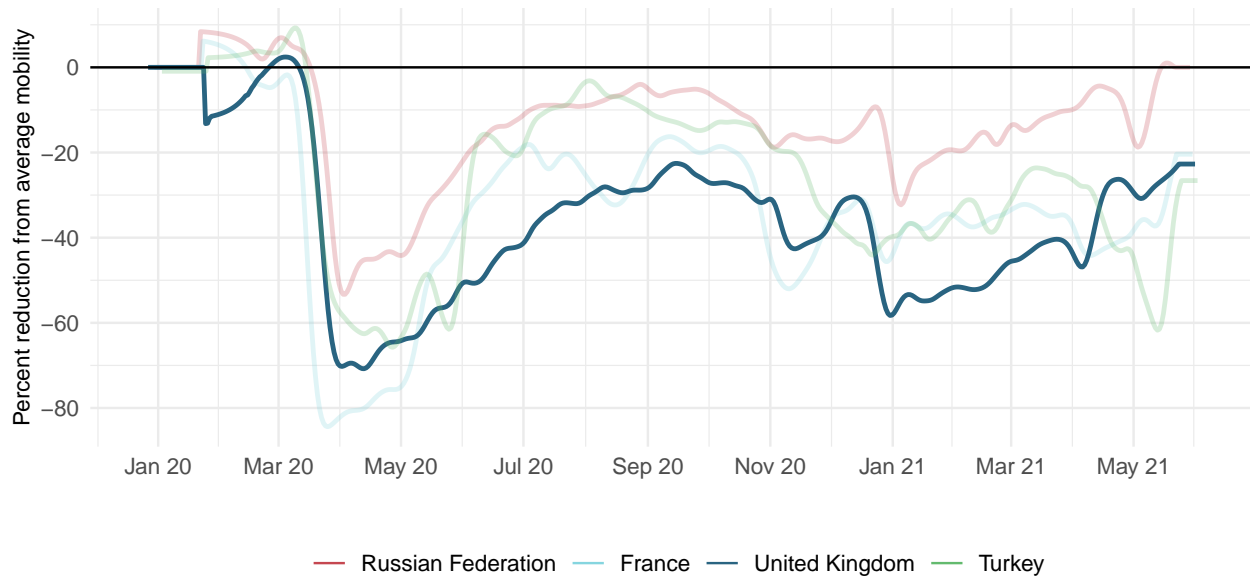


Figure 11. Mobility level as measured through smartphone app use compared to January 2020 baseline (percent) on June 1, 2021

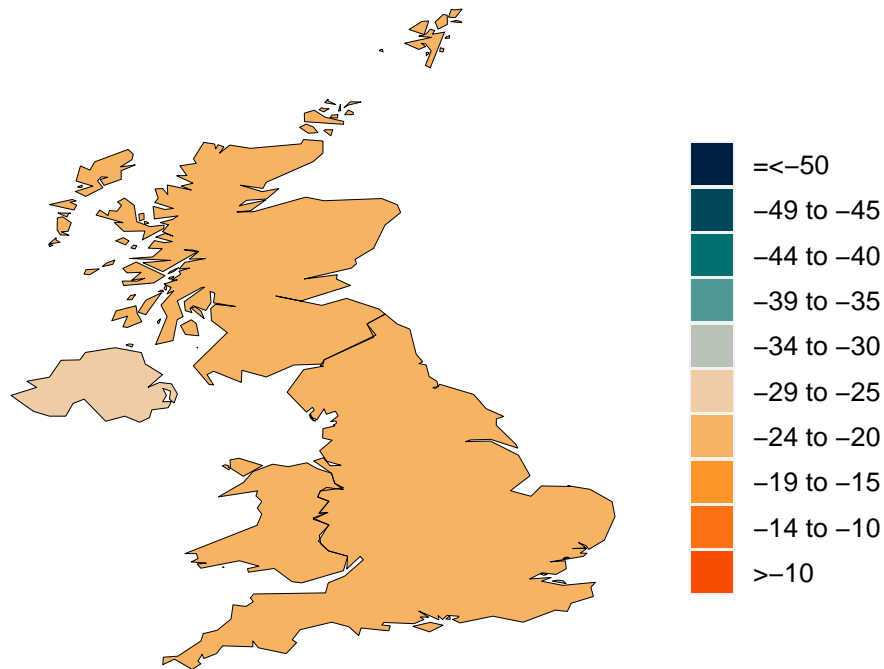


Figure 12. Trend in the proportion of the population reporting always wearing a mask when leaving home

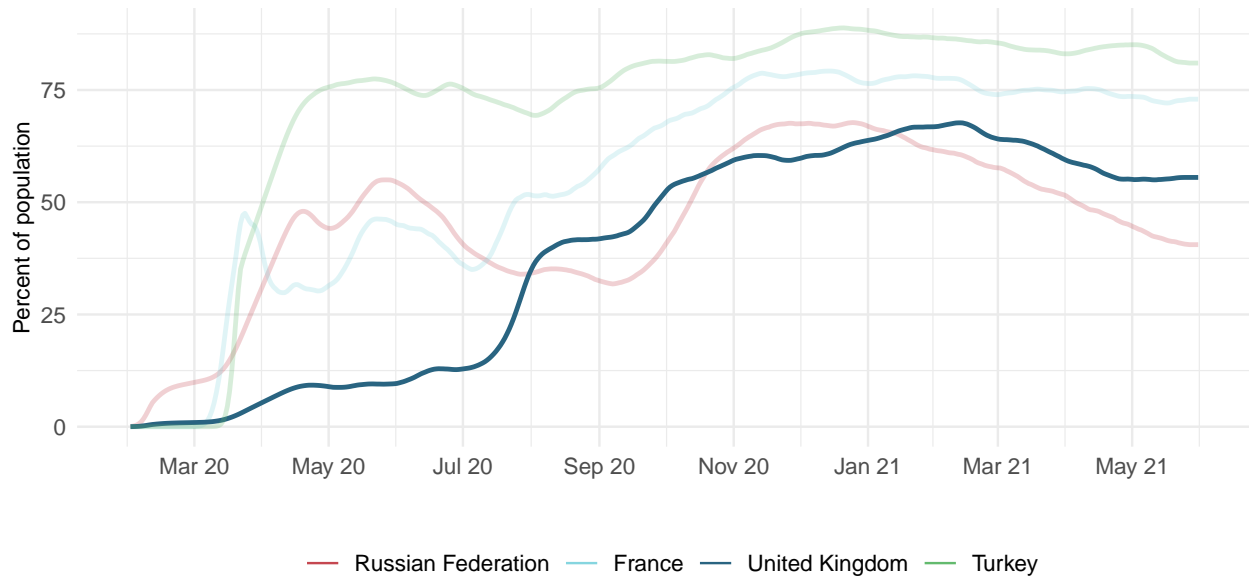


Figure 13. Proportion of the population reporting always wearing a mask when leaving home on June 1, 2021

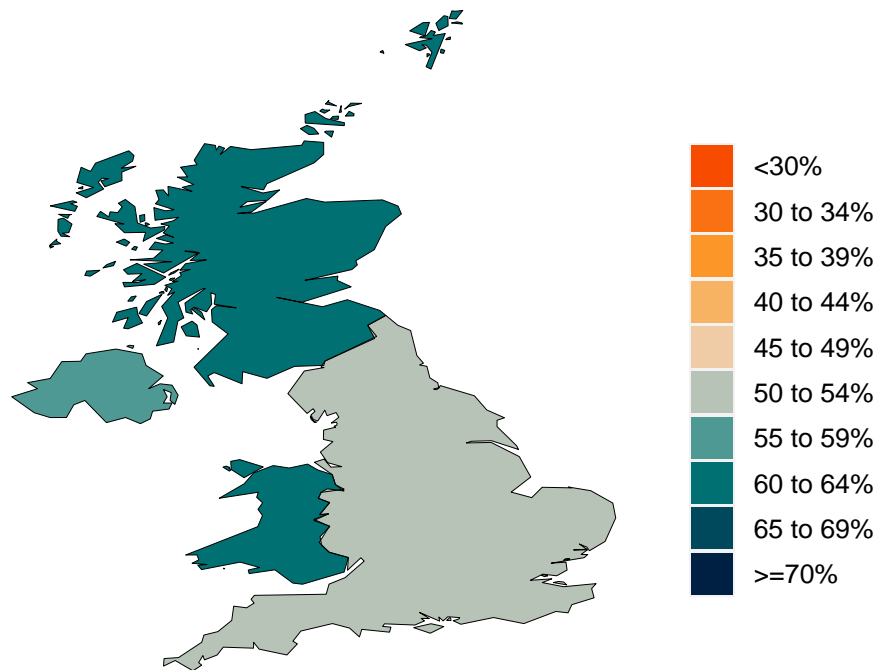


Figure 14. Trend in COVID-19 diagnostic tests per 100,000 people

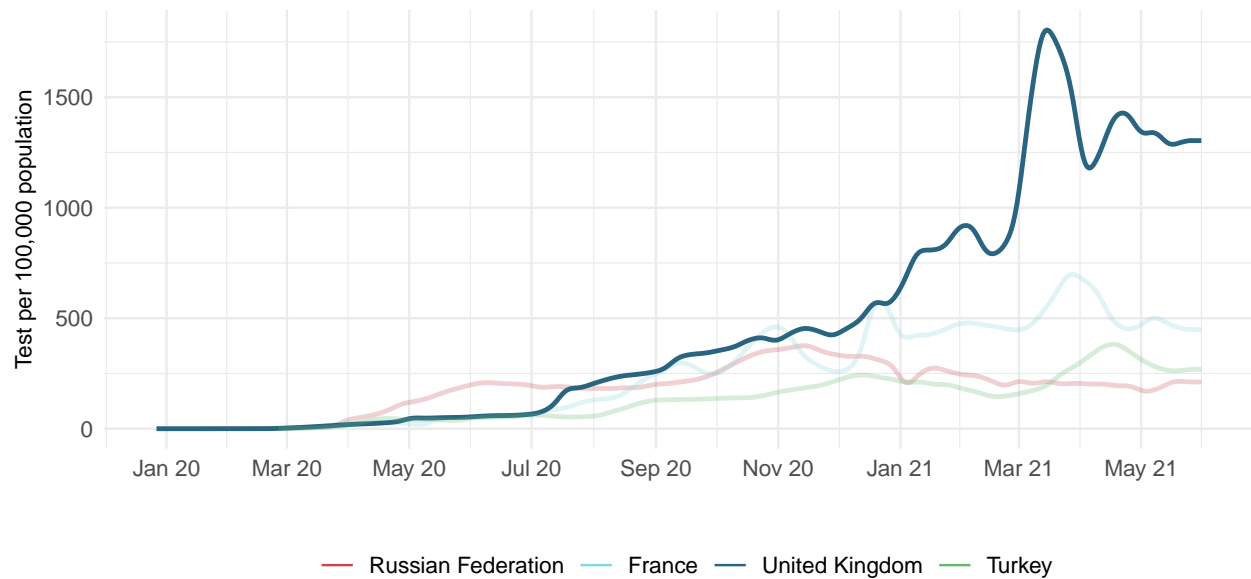


Figure 15. COVID-19 diagnostic tests per 100,000 people on June 1, 2021

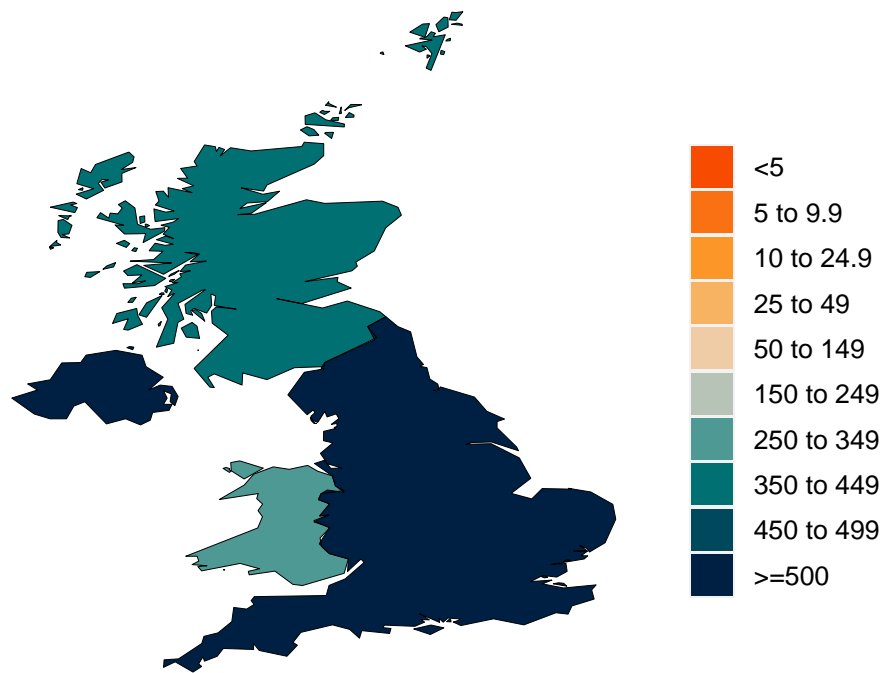


Figure 16. Increase in the risk of death due to pneumonia on February 1 compared to August 1

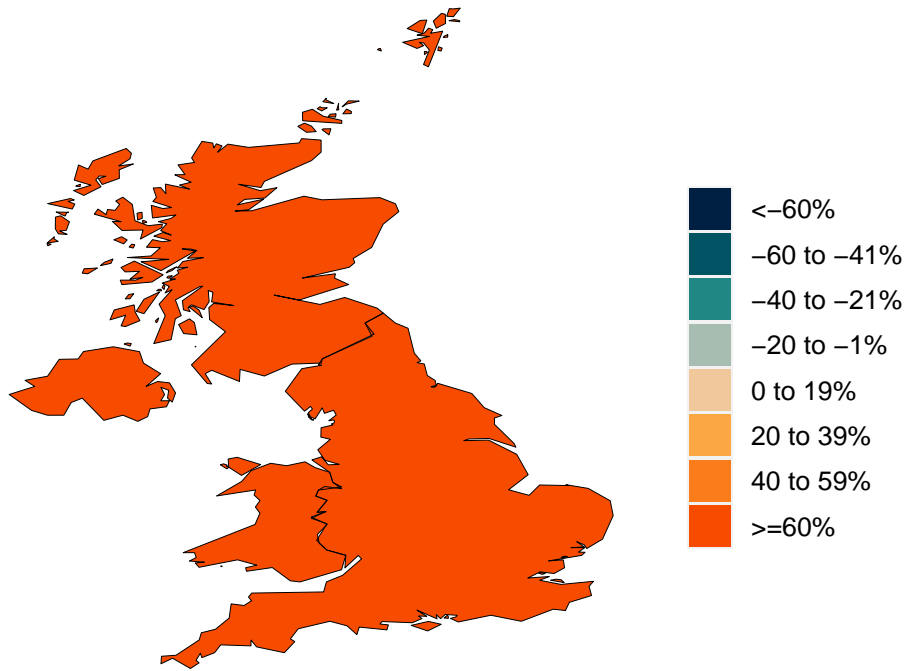


Table 3. Estimates of vaccine efficacy for specific vaccines used in the model at preventing disease and infection

Vaccine	Efficacy at preventing disease: D614G & B.1.1.7	Efficacy at preventing infection: D614G & B.1.1.7	Efficacy at preventing disease: B.1.351, B.1.617, & P.1	Efficacy at preventing infection: B.1.351, B.1.617, & P.1
AstraZeneca	74%	52%	35%	31%
CoronaVac	50%	44%	32%	28%
Covaxin	78%	69%	50%	44%
Janssen	72%	72%	64%	57%
Moderna	94%	89%	89%	85%
Novavax	89%	79%	49%	43%
Pfizer/BioNTech	91%	86%	86%	82%
Sinopharm	73%	65%	47%	41%
Sputnik-V	92%	81%	59%	52%
Tianjin	66%	58%	42%	37%
CanSino				
Other vaccines	75%	66%	57%	50%
Other vaccines (mRNA)	91%	86%	86%	82%

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](#).

Figure 17. 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

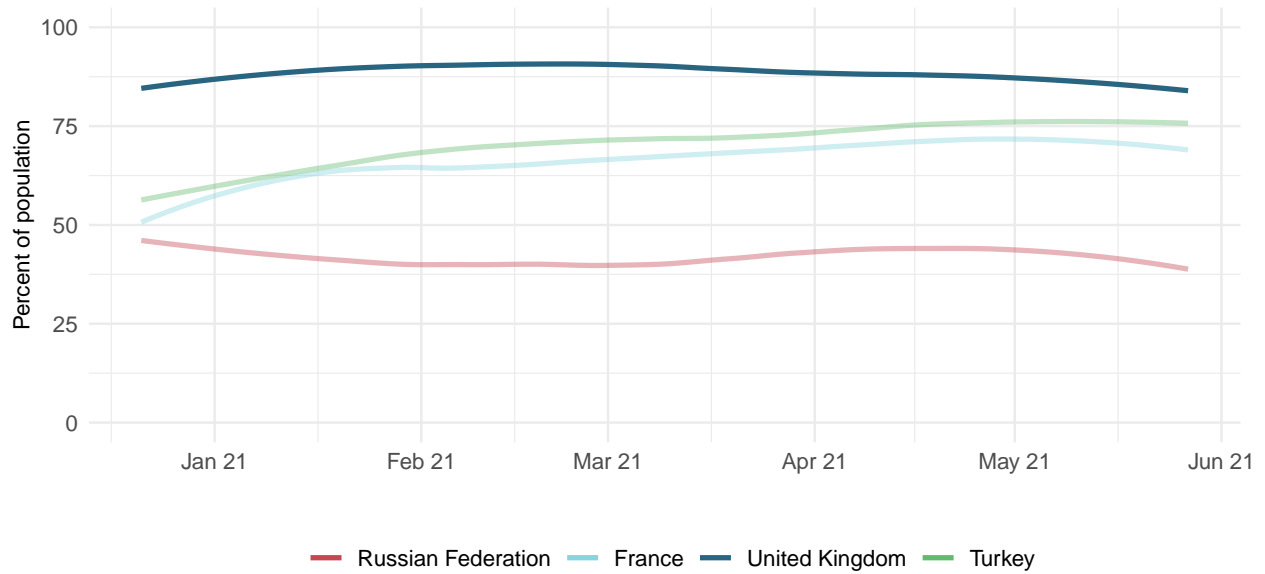


Figure 18. Estimated proportion of the adult (18+) population that has been vaccinated or would probably or definitely receive the COVID-19 vaccine if available

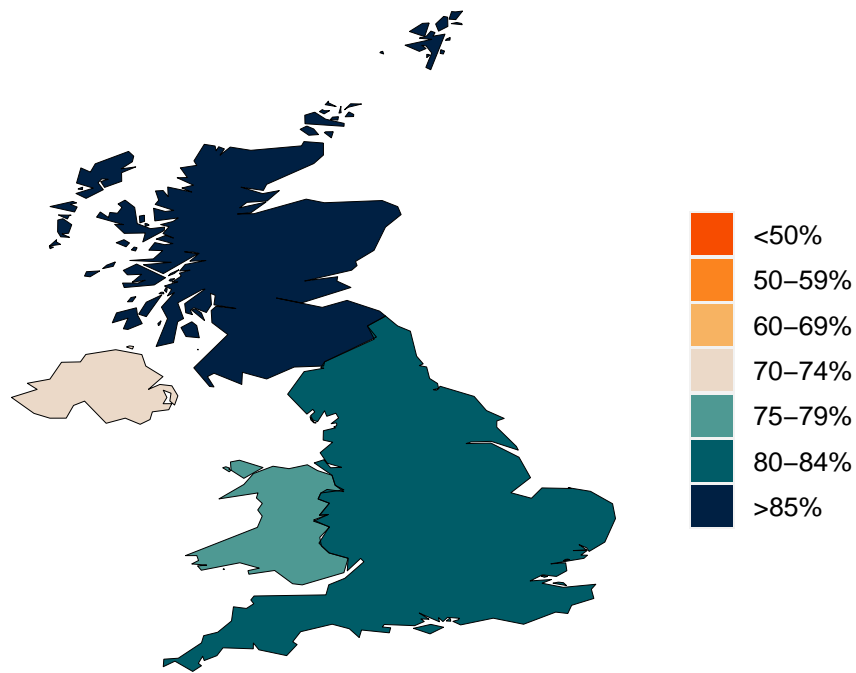
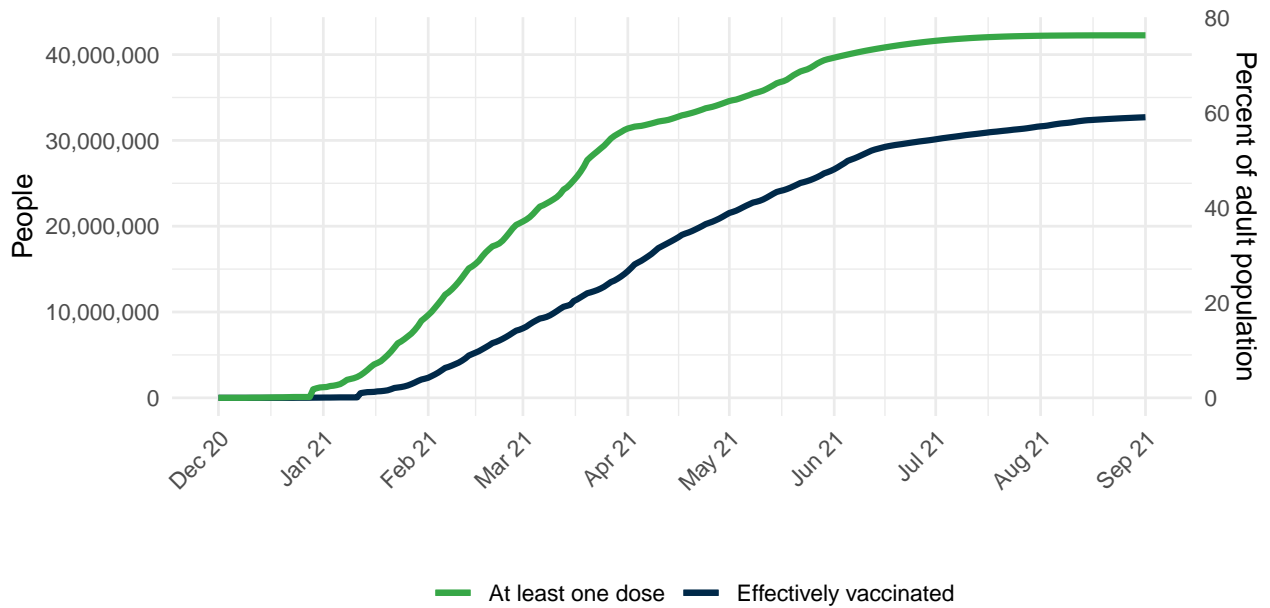


Figure 19. Number of people who receive any vaccine and those who are effectively vaccinated and protected against disease, accounting for efficacy, loss to follow up for two-dose vaccines, partial immunity after one dose, and immunity after two doses.



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.
- 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 scenario assumes that mandates are re-imposed when daily deaths reach 15 per million.
- Variants B.1.1.7 (first identified in the UK), B.1.351 (first identified in South Africa), and P1 (first identified in Brazil) continue to spread from locations with (a) more than 5 sequenced variants, and (b) reports of community transmission, to adjacent locations following the speed of variant scale-up observed in the regions of the United Kingdom.
- In one-quarter of those vaccinated, mobility increases toward pre-COVID-19 levels.

The **worse scenario** modifies the reference scenario assumptions in three ways:

- First, it assumes that variants B.1.351 or P.1 begin to spread within three weeks in adjacent locations that do not already have B.1.351 or P.1 community transmission.
- Second, it assumes that all those vaccinated increase their mobility toward pre-COVID-19 levels.
- Third, it assumes that among those vaccinated, mask use starts to decline exponentially one month after completed vaccination.

The **universal masks scenario** makes all the same assumptions as the reference scenario but also assumes 95% of the population wear masks in public in every location.

Figure 20. Cumulative COVID-19 deaths until September 01, 2021 for three scenarios

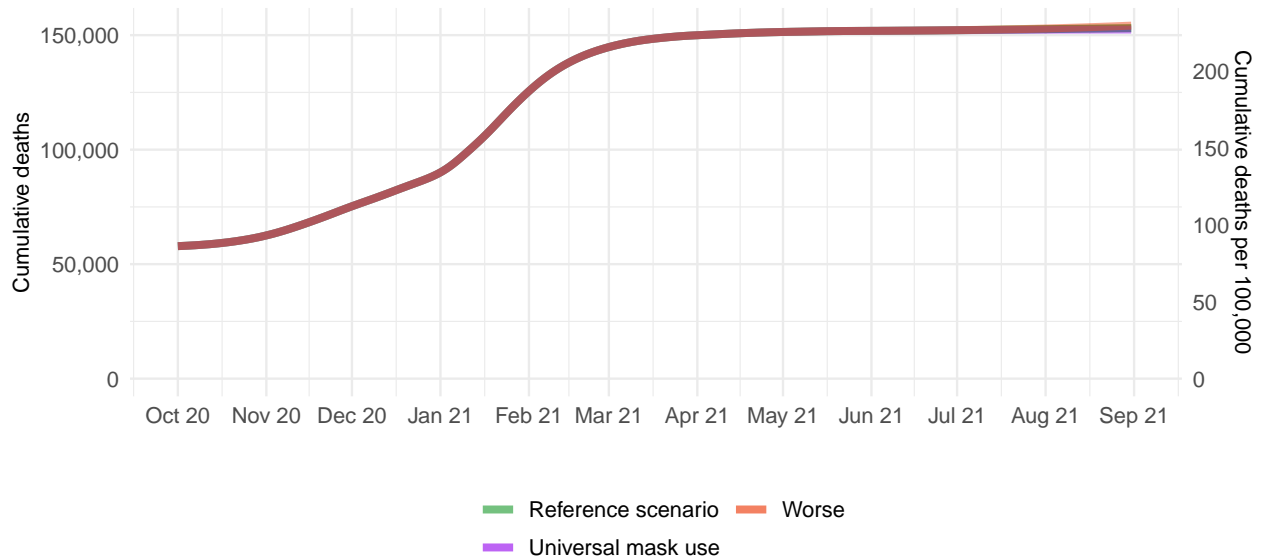


Figure 21. Daily COVID-19 deaths until September 01, 2021 for three scenarios

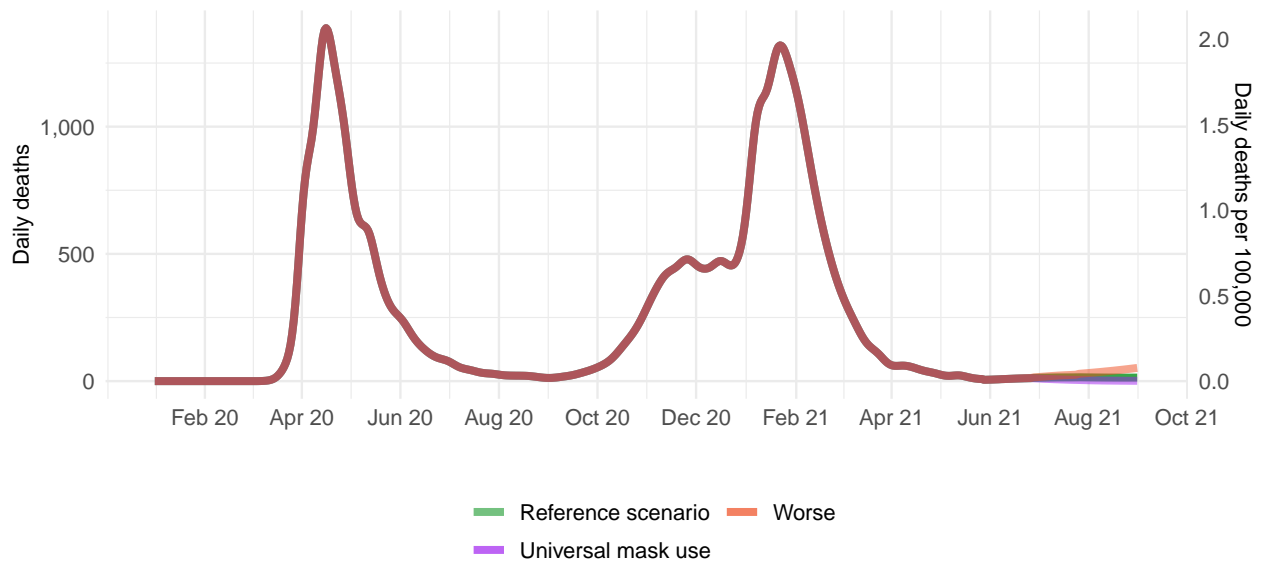


Figure 22. Daily COVID-19 infections until September 01, 2021 for three scenarios

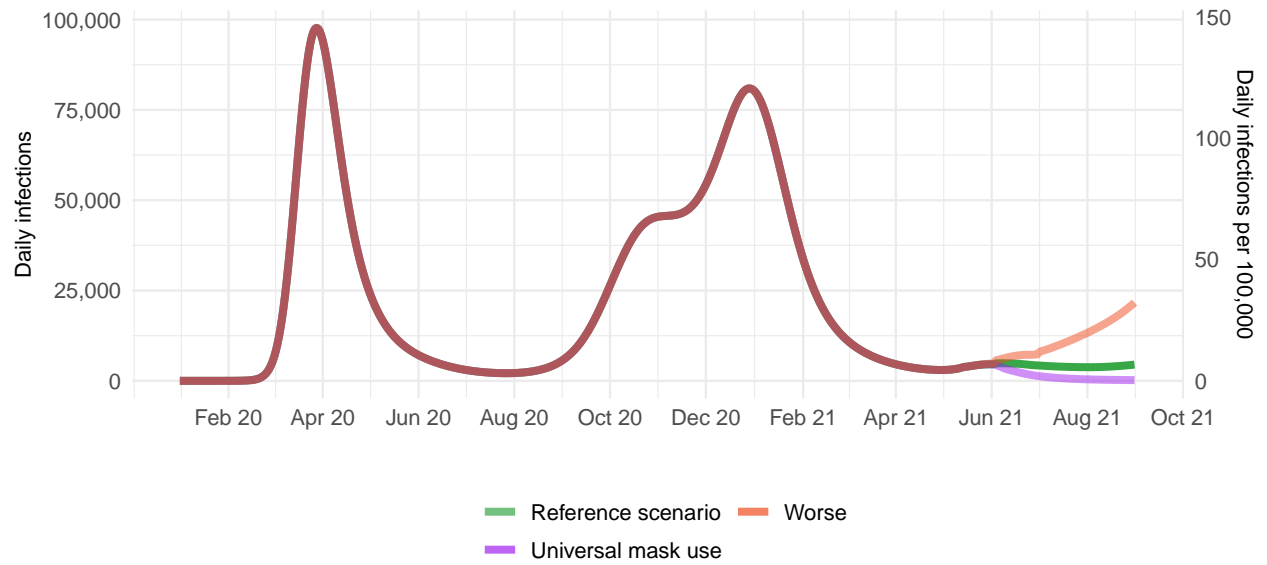
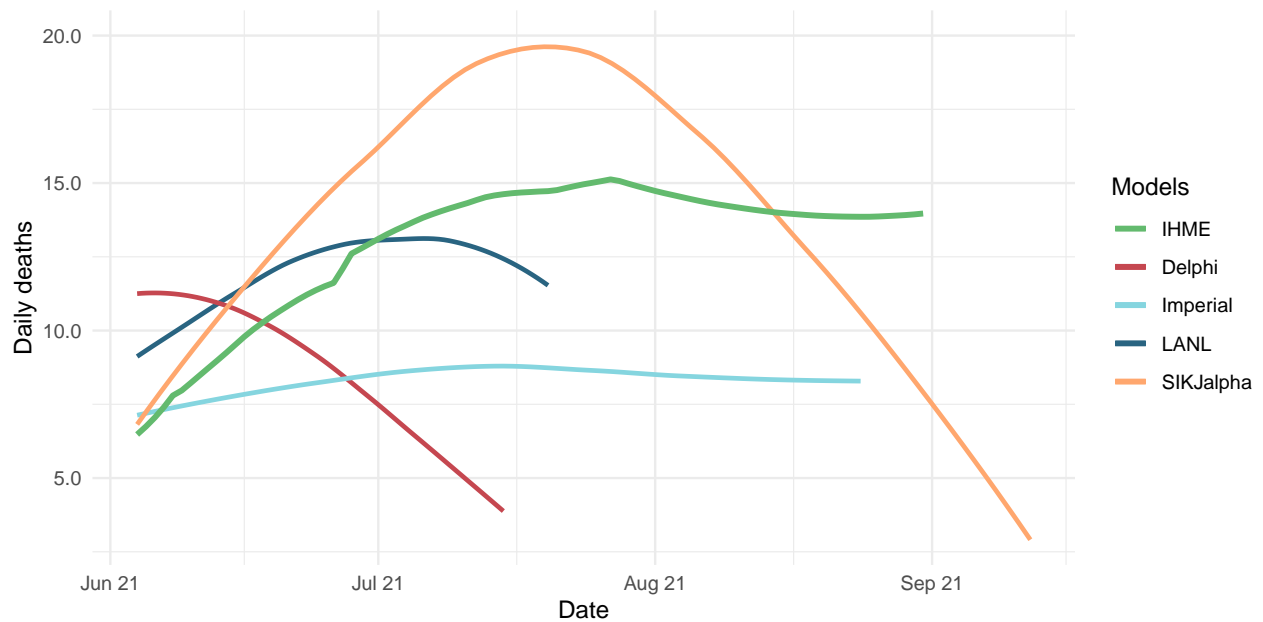
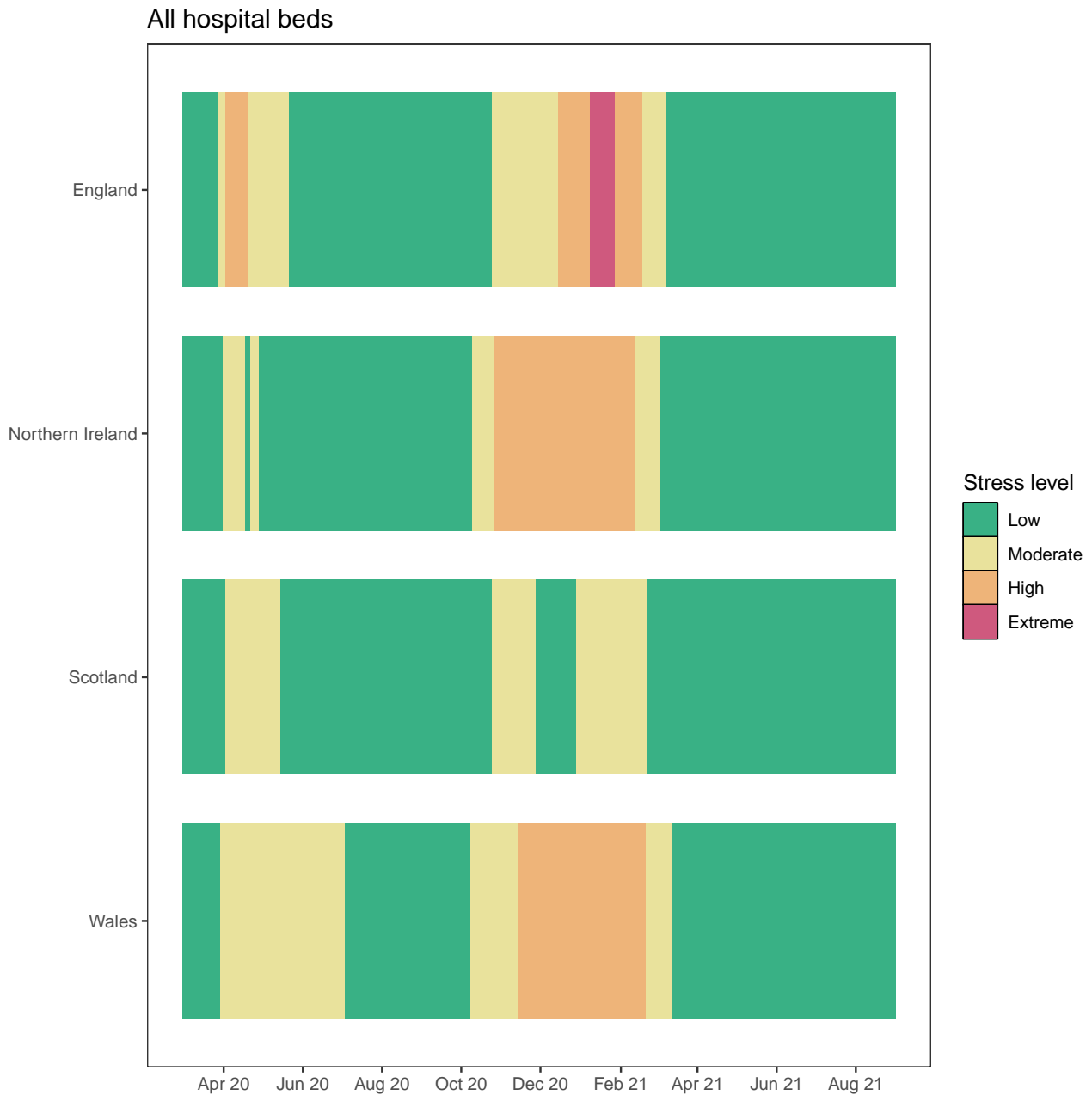


Figure 23. Comparison of reference model projections with other COVID modeling groups



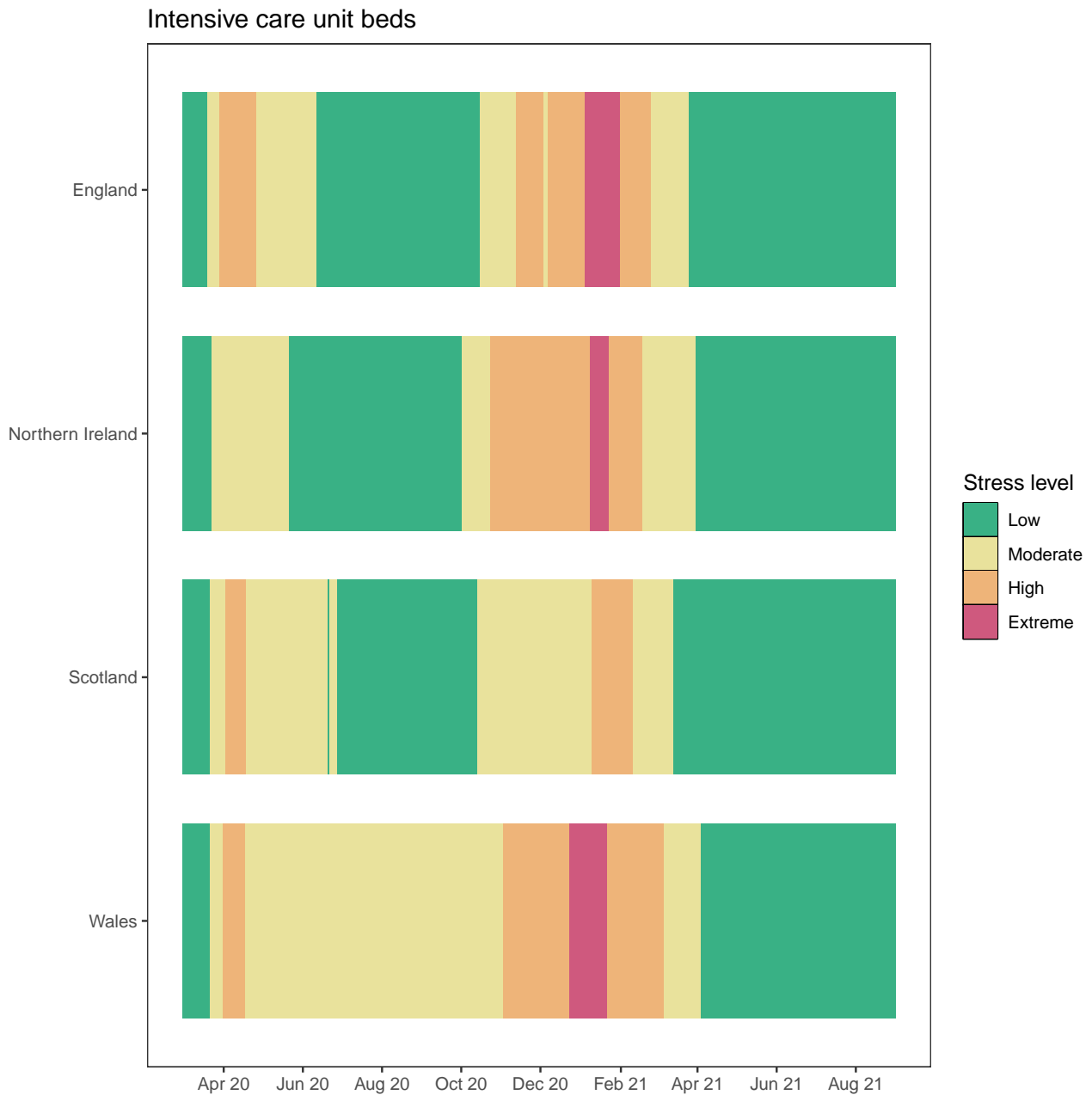
For this comparison, we are including projections of daily COVID-19 deaths from other modeling groups when available: Delphi from the Massachusetts Institute of Technology ([Delphi](#)), Imperial College London ([Imperial](#)), The Los Alamos National Laboratory ([LANL](#)), and the SI-KJalpha model 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 24. 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 25. 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 [Global COVID-19 Symptom Survey](#) (this research is based on survey results from University of Maryland Social Data Science Center with Facebook's support) and the [US COVID-19 Symptom Survey](#) (this research is based on survey results from Carnegie Mellon University's Delphi Research Group with Facebook's support). 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>.

Questions? Requests? Feedback? Please contact us at <https://www.healthdata.org/covid/contact-us>.