COVID-19 Results Briefing

European Union

August 4, 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 3, 2021, with data through August 2, 2021.

Trends in the pandemic in the EU are very divergent. In the eastern parts of the EU, surges have not begun in Poland and Czechia, but surges have started in most other countries. In the western part of the EU, transmission has peaked and is declining in the Netherlands, Portugal, Malta, and Cyprus, but is intensifying in most other countries. For the EU overall, the increase in reported cases and hospitalizations continues to be much greater than the increase in mortality. In our reference scenario, we expect daily reported cases to rise to around 230,000 by November and stay at that level through until December 1. Daily deaths in our model will begin increasing and reach 1,500 by December 1. Faster increases in mobility captured in our worse scenario demonstrate that the Delta surges could be worse, with much larger increases in cases, hospitalizations and deaths, and an earlier peak. Even by the end of November, we expect that only 61% of the region will be immune to Delta variant infection. This leaves a considerable fraction of the population able to sustain transmission in the likely winter surge in 2022. This week’s forecasts have incorporated a higher estimated effectiveness for some vaccines in preventing hospitalization and death, including for the Oxford/AstraZeneca vaccine, based on results from post-vaccination studies from Canada, Scotland, England, and Israel. Our model, however, does not take into account waning immunity yet; given evidence on waning effectiveness of even mRNA vaccines against the Delta infection, our results are likely optimistic, particularly for late fall. We remain unable to fully account for the abrupt peaks and declines in reported cases seen in some countries like the Netherlands, and these may be related to differential transmission in younger age groups. Given the enormous uncertainty in the longer-term trajectory for the Delta surges in different EU member states, the main policy strategies remain the same: 1) making every effort to increase vaccination, particularly reaching the hesitant; 2) use of mask recommendations or mandates for both the unvaccinated and vaccinated in settings of increasing transmission; 3) use of other social distancing mandates, when and if hospitalizations and deaths begin to rise substantially; and 4) more detailed reporting of cases, hospitalizations, and deaths disaggregated by vaccination status and other variables so vaccine effectiveness can be monitored in each country. We continue to expect in late fall and winter a combined impact of COVID-19 and flu on hospital systems.

Current situation

- Daily infections in the last week have increased to over 227,000, up from 190,000 the week before (Figure 1). Daily hospital census over the last week has increased to 50,100.
• Daily reported cases in the last week (through August 2) increased to 78,400 per day on average compared to 70,600 the week before (Figure 2).

• Reported deaths due to COVID-19 in the last week increased to 180 per day on average compared to 150 the week before (Figure 3).

• Excess deaths due to COVID-19 in the last week increased to 290 per day on average compared to 240 the week before (Figure 3). This makes COVID-19 the number 15 cause of death in the European Union this week (Table 1). Estimated excess daily deaths due to COVID-19 were 1.7 times larger than the reported number of deaths.

• No locations had daily reported COVID-19 death rates greater than 4 per million (Figure 4).

• No locations had daily excess death rates greater than 4 per million (Figure 4).

• We estimated that 25% of people in the European Union have been infected as of August 2 (Figure 6).

• Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in the majority of the EU (Figure 7). Transmission is declining in Portugal, Cyprus, Malta, the Netherlands, and 9 regions in Spain. Transmission is close to constant in Denmark, Belgium, Czechia, and several regions in Spain. Transmission is increasing in the rest of the EU.

• The infection-detection rate in the European Union was close to 50% on August 2 (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). Based on the available evidence, the Delta variant is the dominant variant throughout the EU.

### Trends in drivers of transmission

• Lithuania lifted some border restrictions. Mask mandates remain in place in 17 member states. Gathering restrictions of some form are still in place in most countries, and few countries have business restrictions in place except for 6 with bar restrictions (Table 2).

• Mobility last week was 3% lower than the pre-COVID-19 baseline (Figure 11).

• As of August 2, in the COVID-19 Trends and Impact Survey, 45% of people self-report that they always wore a mask when leaving their home (Figure 13). The decline in mask use that began in January appears to have halted in the last week.

• There were 357 diagnostic tests per 100,000 people on August 2 (Figure 15).

• In the European Union, 73.3% of adults say they would accept or would probably accept a vaccine for COVID-19. This is down by 0.1 percentage points from last week. The fraction of the adult population who are open to receiving a COVID-19 vaccine ranges from 36% in Bulgaria to 88% in Portugal (Figure 19).
Based on past infection and cross-variant immunity for the Delta variant and vaccination on the effectiveness of each vaccine in preventing infection with the Delta variant, we estimate that 46% of the population is immune to Delta variant infection. Through ongoing Delta transmission and increases in vaccination, the fraction immune should increase to 61% of the population by December 1 (Figure 21).

Projections

- In our reference scenario, which represents what we think is most likely to happen, our model projects 872,000 cumulative reported deaths due to COVID-19 on December 1. This represents 121,000 additional deaths from August 2 to December 1. Daily reported deaths will rise to 1,500 on December 1, 2021 (Figure 22).

- Under our reference scenario, our model projects 1,504,000 cumulative excess deaths due to COVID-19 on December 1. This represents 197,000 additional deaths from August 2 to December 1 (Figure 22).

- If universal mask coverage (95%) were attained in the next week, our model projects 73,000 fewer cumulative reported deaths compared to the reference scenario on December 1.

- Under our worse scenario, our model projects 972,000 cumulative reported deaths on December 1, an additional 100,000 deaths compared to our reference scenario. Daily reported deaths in the worse scenario will rise to over 2,700 by mid-to-late October (Figure 22).

- Daily infections in the reference scenario will rise to over 450,000 by early November and then stay constant through to December 1 (Figure 23). Daily infections in the worse scenario rise to over 900,000 by late September and then decline (Figure 23).

- Daily reported cases in the reference scenario will rise to over 230,000 by the second week of November and then remain at that level until December 1 (Figure 24). Daily cases in the worse scenario rise to 475,000 by early October and then decline (Figure 24).

- Figure 25 compares our reference scenario forecasts to other publicly archived models. Three models (Imperial, LANL, and MIT [Delphi]) project daily deaths remaining below 500 through until mid-October. The IHME and USC models project steady increases in daily deaths over the next 4 months.

- At some point from August through December 1, 15 member states will have high or extreme stress on hospital beds (Figure 26). At some point from August through December 1, 22 member states will have high or extreme stress on intensive care unit (ICU) capacity (Figure 27).
Model updates

In this week’s estimates, we have modified the effectiveness of the mRNA vaccines (Pfizer and Moderna) and AstraZeneca based on studies that show higher vaccine efficacy for preventing severe disease, hospitalization, and death, compared to all symptomatic disease. This adjustment more accurately reflects how these estimates of vaccine effectiveness are used in our model; that is, to reduce the infection-fatality rate (IFR) and the infection-hospitalization rate (IHR). We used the average ratio of vaccine effectiveness for hospitalization compared to symptomatic disease from studies in the United Kingdom and Canada (1,2,3,4) to modify the estimated effectiveness from the clinical trials for these vaccines. This was done separately for ancestral variants (based on B.1.1.7) and current variants of concern (based on B.1.617.2). The largest change, based on these data, was for the AstraZeneca vaccine, as shown in our updated vaccine effectiveness table. To be consistent with this new approach, we also used the vaccine effectiveness against severe disease for the Janssen (Johnson & Johnson) vaccine instead of the efficacy against all symptomatic disease, using results from the clinical trial (5,6,7).

4. https://www.medrxiv.org/content/10.1101/2021.06.28.21259420v2
5. https://www.fda.gov/media/146218/download
6. https://www.fda.gov/media/146217/download
7. https://www.fda.gov/media/146219/download
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

<table>
<thead>
<tr>
<th>Cause name</th>
<th>Weekly deaths</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ischemic heart disease</td>
<td>18,714</td>
<td>1</td>
</tr>
<tr>
<td>Stroke</td>
<td>10,303</td>
<td>2</td>
</tr>
<tr>
<td>Tracheal, bronchus, and lung cancer</td>
<td>6,216</td>
<td>3</td>
</tr>
<tr>
<td>Alzheimer’s disease and other dementias</td>
<td>5,827</td>
<td>4</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>4,608</td>
<td>5</td>
</tr>
<tr>
<td>Colon and rectum cancer</td>
<td>4,100</td>
<td>6</td>
</tr>
<tr>
<td>Lower respiratory infections</td>
<td>3,503</td>
<td>7</td>
</tr>
<tr>
<td>Hypertensive heart disease</td>
<td>2,797</td>
<td>8</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>2,430</td>
<td>9</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>2,213</td>
<td>10</td>
</tr>
<tr>
<td>COVID-19</td>
<td>2,023</td>
<td>15</td>
</tr>
</tbody>
</table>

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 2, 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 2, 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 2, 2021

**Figure 7.** Mean effective R on July 22, 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 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 2, 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 variant
Figure 10. Infection-fatality ratio on August 2, 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 | Individual curfew | Curfew for businesses | 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 curbside only | Gyms, pools, other leisure closed | Non-essential retail closed | Non-essential workplaces closed | Stay home order | Stay home fine | Mask mandate | Mask mandate fine |
|-----------------------|-------------------------|----------------------|-----------------------------------|-----------------------------------|------------------------------------|------------------|----------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|------------------|----------------|----------------------|----------------------|-----------------|----------------|------------------|------------------|-----------------|-----------------|
| Austria               | Belgium                 | Bulgaria             | Croatia                           | Cyprus                            | Czechia                           | Denmark          | Estonia             | Finland                   | France                                | Germany                               | Greece                                 | Hungary                                   | Ireland                           | Italy                      | Latvia                      | Lithuania                  | Luxembourg                | Malta                       | Poland                         | Portugal                      | Romania                     | Slovakia                    | Slovenia                    | Spain                        | Sweden                      |               |
|                       |                        |                     |                                   |                                   |                                   |                  |                     |                          |                                      |                                       |                                       |                                       |                         |                           |                           |                          |                              |                              |                             |                             |                             |                             |                             |                             |

*m *Not all locations are measured at the subnational level.*
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 August 2, 2021
**Figure 13.** Trend in the proportion of the population reporting always wearing a mask when leaving home

![Trend in the proportion of the population reporting always wearing a mask when leaving home](image)

**Figure 14.** Proportion of the population reporting always wearing a mask when leaving home on August 2, 2021

![Proportion of the population reporting always wearing a mask when leaving home on August 2, 2021](image)
**Figure 15.** Trend in COVID-19 diagnostic tests per 100,000 people

**Figure 16.** COVID-19 diagnostic tests per 100,000 people on August 2, 2021
Figure 17. 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. 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.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Efficacy at preventing disease: D614G &amp; B.1.1.7</th>
<th>Efficacy at preventing infection: D614G &amp; B.1.1.7</th>
<th>Efficacy at preventing disease: B.1.351, B.1.617, &amp; P.1</th>
<th>Efficacy at preventing infection: B.1.351, B.1.617, &amp; P.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>AstraZeneca</td>
<td>85%</td>
<td>52%</td>
<td>83%</td>
<td>51%</td>
</tr>
<tr>
<td>CoronaVac</td>
<td>50%</td>
<td>44%</td>
<td>43%</td>
<td>38%</td>
</tr>
<tr>
<td>Covaxin</td>
<td>78%</td>
<td>69%</td>
<td>68%</td>
<td>60%</td>
</tr>
<tr>
<td>Janssen</td>
<td>86%</td>
<td>72%</td>
<td>85%</td>
<td>56%</td>
</tr>
<tr>
<td>Moderna</td>
<td>94%</td>
<td>89%</td>
<td>93%</td>
<td>80%</td>
</tr>
<tr>
<td>Novavax</td>
<td>89%</td>
<td>79%</td>
<td>79%</td>
<td>69%</td>
</tr>
<tr>
<td>Pfizer/BioNTech</td>
<td>92%</td>
<td>86%</td>
<td>90%</td>
<td>78%</td>
</tr>
<tr>
<td>Sinopharm</td>
<td>73%</td>
<td>65%</td>
<td>63%</td>
<td>56%</td>
</tr>
<tr>
<td>Sputnik-V</td>
<td>92%</td>
<td>81%</td>
<td>80%</td>
<td>70%</td>
</tr>
<tr>
<td>Tianjin</td>
<td>66%</td>
<td>58%</td>
<td>57%</td>
<td>50%</td>
</tr>
<tr>
<td>CanSino</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other vaccines</td>
<td>75%</td>
<td>66%</td>
<td>65%</td>
<td>57%</td>
</tr>
<tr>
<td>Other vaccines (mRNA)</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
**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. 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.
- 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 P.1 (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.

The worse scenario modifies the reference scenario assumptions in two 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.

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 21.** Daily COVID-19 deaths until December 01, 2021 for three scenarios

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

B. Excess daily COVID-19 deaths per 100,000
Figure 22. Daily COVID-19 infections until December 01, 2021 for three scenarios

Figure 23. Daily COVID-19 reported cases until December 01, 2021 for three scenarios
Figure 24. 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 25. 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 26. 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.