COVID-19 Results Briefing

European Union

March 19, 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 March 19, 2022, with data through March 14, 2022.

The recent weeks are a tale of two halves for the EU. In Ireland, France, Germany, Italy, Greece, and Cyprus, transmission has started to increase again after many weeks of decline. In the rest of the EU, transmission continues to decline. The Netherlands had a recent secondary increase after the Omicron peak, but this appears to have stopped already. The increases are associated with the replacement of the BA.1 subvariant by BA.2 and, at the same time, declines in mask use and social distancing. The experience of Denmark and the Netherlands suggests that these BA.2-associated secondary increases should not last long. In fact, much of the secondary surge may be as much due to rapid changes in behavior as compared to somewhat greater transmissibility of BA.2. One possibility is that BA.2 can infect those previously infected with BA.1, which, given steady declines in immunity with time since vaccination and infection, could fuel longer increases. Nevertheless, our reference scenario has shorter periods of rising transmission in some countries and then a return to declines in transmission.

At this point, it is difficult to estimate the impact that the war in Ukraine and the forced movement of millions of refugees from Ukraine into the EU countries may have on transmission. Nevertheless, the high levels of prior infection in Ukraine despite low vaccination levels may mean that there will not be a dramatic increase in COVID-related hospitalizations or deaths in refugees.

The high levels of population immunity from Omicron infection and vaccination will slowly but steadily decline from a peak in early April. As future new variants circulate, we do expect further increases in transmission later in the year, particularly in the fall and winter. Strategies to manage these future increases should include use of a fourth dose of vaccination at the point that a major increase is emerging. We do not think a push for fourth-dose vaccination now for the potential BA.2 secondary wave would be warranted, except in those with comorbidities or advanced age. Increasing first-dose vaccination among the hesitant has largely come to a standstill; it appears unlikely much more progress will be made in this area over the coming months. More policy attention should be paid to ensuring that everyone who becomes symptomatic, particularly in high-risk groups, can get access to antivirals given their very substantial impact on the infection-fatality rate. Even if transmission does increase for a period due to reduced mask use and social distancing combined with BA.2, we do not think that implementation of mask or social distancing mandates would be warranted. Given the extremely low infection-fatality rate for Omicron in children, continued mask requirements for school children are not warranted.

Current situation
• Estimated daily infections in the last week decreased to 2.0 million per day on average compared to 2.3 million the week before (Figure 1.1).

• Daily hospital census in the last week (through March 14) increased to 77,000 per day on average compared to 74,000 the week before.

• Daily reported cases in the last week increased to 633,000 per day on average compared to 504,000 the week before (Figure 2.1).

• Reported deaths due to COVID-19 in the last week decreased to 1,200 per day on average compared to 1,400 the week before (Figure 3.1).

• Total deaths due to COVID-19 in the last week decreased to 1,900 per day on average compared to 2,300 the week before (Figure 3.1). This makes COVID-19 the number two cause of death in the European Union this week (Table 1). Estimated total daily deaths due to COVID-19 in the past week were 1.7 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 countries and four subnational locations (Figure 4.1).

• The daily rate of total deaths due to COVID-19 is greater than 4 per million in 16 countries and 20 subnational locations (Figure 4.2).

• We estimate that 69% of people in the European Union have been infected at least once as of March 14 (Figure 6.1).

• Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 13 countries and 39 subnational locations (Figure 7.1). There is a clear West to East pattern with increasing transmission in the West except Spain and declining transmission in the East.

• The infection-detection rate in the European Union was close to 29% on March 14 (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). The Omicron variant remains dominant in all countries of the EU.

Trends in drivers of transmission

• Austria has relaxed some mandates. Some form of mask mandates remain in effect in 21 member states.

• Mobility last week was 3% lower than the pre-COVID-19 baseline (Figure 11.1). Mobility was lower than 30% of baseline in no countries and no subnational locations.

• As of March 14, in the COVID-19 Trends and Impact Survey, 47% of people self-report that they always wore a mask when leaving their home (Figure 13.1). Mask use is highest in Spain, Italy, and Greece.

• There were 716 diagnostic tests per 100,000 people on March 14 (Figure 15.1).
• As of March 14, 17 countries and 52 subnational locations have reached 70% or more of the population who have received at least one vaccine dose, and 15 member states and 49 subnational locations have reached 70% or more of the population who are fully vaccinated (Figure 17.1). 75% of people in the European Union have received at least one vaccine dose, and 70% are fully vaccinated.

• In the European Union, 82.7% of the population that is 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. The proportion of the population who are open to receiving a COVID-19 vaccine ranges from 42% in Bulgaria to 97% in Luxembourg (Figure 19.1).

• In our current reference scenario, we expect that 335.6 million people will be vaccinated with at least one dose by July 1 (Figure 20.1). We expect that 71% of the population will be fully vaccinated by July 1.

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 seven 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 six months after their second dose.

The 80% mask use scenario makes all the same assumptions as the reference scenario but assumes all locations reach 80% mask use within seven 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 six months.

Projections

Infections

• Daily estimated infections in the reference scenario will decline to 17,480 by July 1, 2022 (Figure 22.1).

• Daily estimated infections in the 80% mask use scenario will decline to 5,930 by July 1, 2022 (Figure 22.1).

• Daily estimated infections in the third dose scenario will decline to 16,040 by July 1, 2022 (Figure 22.1).
Cases

- Daily estimated cases in the **reference scenario** will rise to 668,550 by March 15 and then decline steadily (Figure 22.2).
- Daily estimated cases in the **80% mask use scenario** follow a similar trajectory to the reference case (Figure 22.2).
- Daily estimated cases in the **third dose scenario** follow a similar trajectory to the reference case (Figure 22.2).

Hospitalizations

- Daily hospital census in the **reference scenario** will rise to 84,400 by March 19, 2022, and then decline steadily (Figure 22.3).
- Daily hospital census in the **80% mask use scenario** will rise to 84,400 by March 19, 2022, and then decline steadily (Figure 22.3).
- Daily hospital census in the **third dose scenario** will rise to 84,370 by March 19, 2022, and then decline steadily (Figure 22.3).

Deaths

- In our **reference scenario**, our model projects 1,086,000 cumulative reported deaths due to COVID-19 on July 1. This represents 46,000 additional deaths from March 14 to July 1. Daily reported COVID-19 deaths in the **reference scenario** will rise to 1,210 by March 28, 2022 (Figure 22.4).
- Under our **reference scenario**, our model projects 1,728,000 cumulative total deaths due to COVID-19 on July 1. This represents 77,000 additional deaths from March 14 to July 1 (Figure 22.5).
- In our **80% mask use scenario**, our model projects 1,082,000 cumulative reported deaths due to COVID-19 on July 1. This represents 42,000 additional deaths from March 14 to July 1. Daily reported COVID-19 deaths in the **80% mask use scenario** will rise to 1,210 by March 28, 2022 (Figure 22.4).
- In our **third dose scenario**, our model projects 1,086,000 cumulative reported deaths due to COVID-19 on July 1. This represents 46,000 additional deaths from March 14 to July 1. Daily reported COVID-19 deaths in the **third dose scenario** will rise to 1,210 by March 28, 2022 (Figure 22.4).
- Figure 23.1 compares our reference scenario forecasts to other publicly archived models. The IHME model suggests a period of modest increase in daily deaths and then a decline from April. Other models suggest steady declines.
- At some point from March through July 1, one country will have high or extreme stress on hospital beds (Figure 24.1). At some point from March through July 1, 12 countries will have high or extreme stress on intensive care unit (ICU) capacity (Figure 25.1).
Model updates

We had previously developed a model in which deaths and the infection-fatality ratio, hospital admissions and the infection-hospitalization ratio, and cases and the infection-detection ratio were all passed into a single run of our ODE system to simultaneously fit past transmission intensity for a given location over time. We have seen improved stability when instead we first derive transmission intensity based on each of the three abovementioned pairs of daily reported epi statistics and estimated ratios in separate SEIR models and then average them.
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

<table>
<thead>
<tr>
<th>Cause name</th>
<th>Weekly deaths</th>
<th>Ranking</th>
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<tr>
<td>Ischemic heart disease</td>
<td>18,714</td>
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<td>COVID-19</td>
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<td>Stroke</td>
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<td>Tracheal, bronchus, and lung cancer</td>
<td>6,216</td>
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<td>Alzheimer’s disease and other dementias</td>
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<td>Chronic obstructive pulmonary disease</td>
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<td>Colon and rectum cancer</td>
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<td>Lower respiratory infections</td>
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<td>Hypertensive heart disease</td>
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<td>Chronic kidney disease</td>
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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 March 14, 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 March 14, 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 March 14, 2022.

Figure 7.1: Mean effective R on March 3, 2022. 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 March 14, 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 March 14, 2022. This is estimated as the ratio of COVID-19 deaths to estimated daily COVID-19 infections.
Critical drivers

Table 2: Current mandate implementation

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<td>Stay home fine</td>
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*Mandate in place (imposed this week) Mandate in place (updated from previous reporting) Mandate imposed in some subnational locations (imposed this week) Mandate imposed in some subnational locations (updated from previous reporting)

*Not all locations are measured at the subnational level.
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 March 14, 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 March 14, 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 March 14, 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.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Ancestral</th>
<th>Alpha</th>
<th>Beta</th>
<th>Gamma</th>
<th>Delta</th>
<th>Omicron</th>
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<tr>
<td></td>
<td>Severe</td>
<td>Infection</td>
<td>Severe</td>
<td>Infection</td>
<td>Severe</td>
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<tr>
<td>AstraZeneca</td>
<td>94%</td>
<td>63%</td>
<td>94%</td>
<td>63%</td>
<td>94%</td>
<td>69%</td>
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<tr>
<td>CanSino</td>
<td>66%</td>
<td>62%</td>
<td>66%</td>
<td>62%</td>
<td>64%</td>
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<tr>
<td>CoronaVac</td>
<td>50%</td>
<td>47%</td>
<td>50%</td>
<td>47%</td>
<td>49%</td>
<td>46%</td>
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<tr>
<td>Covaxin</td>
<td>78%</td>
<td>73%</td>
<td>78%</td>
<td>73%</td>
<td>76%</td>
<td>72%</td>
</tr>
<tr>
<td>Johnson &amp; Johnson</td>
<td>86%</td>
<td>72%</td>
<td>86%</td>
<td>72%</td>
<td>76%</td>
<td>64%</td>
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<tr>
<td>Moderna</td>
<td>97%</td>
<td>92%</td>
<td>97%</td>
<td>92%</td>
<td>97%</td>
<td>91%</td>
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<tr>
<td>Novavax</td>
<td>89%</td>
<td>83%</td>
<td>89%</td>
<td>83%</td>
<td>86%</td>
<td>82%</td>
</tr>
<tr>
<td>Pfizer/BioNTech</td>
<td>95%</td>
<td>86%</td>
<td>95%</td>
<td>86%</td>
<td>95%</td>
<td>84%</td>
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<tr>
<td>Sinopharm</td>
<td>73%</td>
<td>68%</td>
<td>73%</td>
<td>68%</td>
<td>71%</td>
<td>67%</td>
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<tr>
<td>Sputnik-V</td>
<td>92%</td>
<td>86%</td>
<td>92%</td>
<td>86%</td>
<td>89%</td>
<td>85%</td>
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<tr>
<td>Other vaccines</td>
<td>75%</td>
<td>70%</td>
<td>75%</td>
<td>70%</td>
<td>73%</td>
<td>69%</td>
</tr>
<tr>
<td>Other vaccines (mRNA)</td>
<td>91%</td>
<td>86%</td>
<td>91%</td>
<td>86%</td>
<td>88%</td>
<td>85%</td>
</tr>
</tbody>
</table>
Percent of the population having received at least one dose (17.1) and fully vaccinated against SARS-CoV-2 (17.2) by March 14, 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

Figure 21.1: Percent of people who are immune to Delta or Omicron. Immunity is based on protection due to prior vaccination and infection(s). Moreover, variant-specific immunity is also based on variant-variant specific protection.
Projections and scenarios

Figure 22.1: Daily COVID-19 infections until July 01, 2022 for three scenarios

Figure 22.2: Daily COVID-19 reported cases until July 01, 2022 for three scenarios
Figure 22.3: Daily COVID-19 hospital census until July 01, 2022 for three scenarios

Hospital census

Hospital census per 100,000 population

Reference
80% mask use
Third dose

The European Union
Figure 22.4: Reported daily COVID-19 deaths per 100,000
Figure 22.5: Total daily COVID-19 deaths per 100,000
Figure 23.1: 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) [March 20, 2022], Imperial College London (Imperial) [January 20, 2022], the SI-KJaIpha model from the University of Southern California (SIKJaIpha) [March 20, 2022], and the ECDC Ensemble Model (ECDC) [March 14, 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 24.1: 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.

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 25.1: 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.