COVID-19 Results Briefing

The European Region

March 19, 2022

This document contains summary information on the latest projections from the IHME model on COVID-19 in the WHO European Region. 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 region. In Ireland, the UK, France, Germany, Italy, Greece, and Cyprus transmission has started to increase again after many weeks of decline. In the rest of the region, 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 BA1 sub-variant with BA2, and at the same time, declines in mask use and social distancing are observed. The experience of Denmark and the Netherlands suggests that these BA2-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 much greater transmissibility of BA2. One possibility is that BA2 can infect those previously infected with BA1, which given steady declines in immunity with time since vaccination and infection, could fuel longer increases. Nevertheless, our reference scenario suggests shorter periods of rising transmission in some countries and then a return to declining 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 other countries in the region may have on transmission. The war will make COVID-19 reporting highly unreliable. Nevertheless, the high levels of prior COVID-19 infection in Ukraine, despite low vaccination levels, may mean that there will not be a dramatic increase in hospitalizations or deaths in Ukraine due to COVID-19.

The high levels of population immunity from Omicron infection and vaccination will slowly but steadily decline. As 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, but only at the point that a major increase is emerging. We do not think a push for fourth dose of COVID vaccination now for the potential BA2 secondary wave would be warranted, except in those with existing co-morbidities or for older adults. Increasing first dose vaccination among the vaccine-hesitant has largely come to a standstill; it appears unlikely significant 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 reduced infection-fatality rate. Even if transmission does increase for a period due to reduced mask use and social distancing combined with BA2, 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 schoolchildren are not warranted.
Current situation

- Estimated daily infections in the last week decreased to 2.9 million per day on average compared to 3.5 million the week before (Figure 1.1).
- Daily hospital census in the last week (through March 14) decreased to 131,000 per day on average compared to 147,000 the week before.
- Daily reported cases in the last week increased to 864,000 per day on average compared to 759,000 the week before (Figure 2.1).
- Reported deaths due to COVID-19 in the last week decreased to 2,600 per day on average compared to 3,400 the week before (Figure 3.1).
- Total deaths due to COVID-19 in the last week decreased to 3,900 per day on average compared to 5,000 the week before (Figure 3.1). This makes COVID-19 the number two cause of death in European Region 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 16 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 24 countries and 20 subnational locations (Figure 4.2).
- We estimate that 73% of people in the European Region 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 17 countries and 43 subnational locations (Figure 7.1). There is a clear east-west pattern of increasing transmission in the west and declining transmission in the east, with some standout exceptions, including Spain.
- The infection-detection rate in the European Region was close to 24% 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). Omicron is the dominant variant in all countries of the region.

Trends in drivers of transmission

- Most countries continue to have a mask mandate, and nearly half have some form of gathering restrictions still in place.
- Mobility last week was 2% 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, 43% of people self-report that they always wore a mask when leaving their home (Figure 13.1).
There were 590 diagnostic tests per 100,000 people on March 14 (Figure 15.1).

As of March 14, 25 countries and 56 subnational locations have reached 70% or more of the population who have received at least one vaccine dose, and 19 countries and 52 subnational locations have reached 70% or more of the population who are fully vaccinated (Figure 17.1). **66% of people in the European Region have received at least one vaccine dose, and 61% are fully vaccinated.**

In the European Region, 78.5% 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 open to receiving a COVID-19 vaccine ranges from 29% in Tajikistan to 99% in Iceland (Figure 19.1).

In our current reference scenario, we expect that 616.3 million people will be vaccinated with at least one dose by July 1 (Figure 20.1). We expect that 62% 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.
- The 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 45,810 by July 1, 2022 (Figure 22.1).
- Daily estimated infections in the **80% mask use scenario** will decline to 10,640 by July 1, 2022 (Figure 22.1).
- Daily estimated infections in the **third dose scenario** will decline to 38,430 by July 1, 2022 (Figure 22.1).

Cases

- Daily estimated cases in the **reference scenario** will rise and reach a peak in the third week of March and then decline (Figure 22.2).
- Daily estimated cases in the **80% mask use scenario** have a similar trajectory to the reference scenario (Figure 22.2).
- Daily estimated cases in the **third dose scenario** have a similar trajectory to the reference scenario (Figure 22.2).

Hospitalizations

- Daily hospital census in the **reference scenario** will decline to 2,690 by July 1, 2022 (Figure 22.3).
- Daily hospital census in the **80% mask use scenario** will decline to 770 by July 1, 2022 (Figure 22.3).
- Daily hospital census in the **third dose scenario** will decline to 2,400 by July 1, 2022 (Figure 22.3).

Deaths

- In our **reference scenario**, our model projects 2,413,000 cumulative reported deaths due to COVID-19 on July 1. This represents 71,000 additional deaths from March 14 to July 1. Daily reported COVID-19 deaths in the **reference scenario** will decline to very low levels by July 1, 2022 (Figure 22.4).
- Under our **reference scenario**, our model projects 3,570,000 cumulative total deaths due to COVID-19 on July 1. This represents 111,000 additional deaths from March 14 to July 1 (Figure 22.5).
- In our **80% mask use scenario**, our model projects 2,406,000 cumulative reported deaths due to COVID-19 on July 1. This represents 63,000 additional deaths from March 14 to July 1. Daily reported COVID-19 deaths in the **80% mask use scenario** will decline to 10 by July 1, 2022 (Figure 22.4).
In our **third dose scenario**, our model projects 2,412,000 cumulative reported deaths due to COVID-19 on July 1. This represents 70,000 additional deaths from March 14 to July 1. Daily reported COVID-19 deaths in the **third dose scenario** will decline to 40 by July 1, 2022 (Figure 22.4).

Figure 23.1 compares our reference scenario forecasts to other publicly archived models. Models all suggest declining daily deaths, although the SIKJalpha model has a small increase after May.

At some point from March through July 1, two countries will have high or extreme stress on hospital beds (Figure 24.1). At some point from March through July 1, 19 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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<tbody>
<tr>
<td>Ischemic heart disease</td>
<td>44,253</td>
<td>1</td>
</tr>
<tr>
<td>COVID-19</td>
<td>27,053</td>
<td>2</td>
</tr>
<tr>
<td>Stroke</td>
<td>22,622</td>
<td>3</td>
</tr>
<tr>
<td>Tracheal, bronchus, and lung cancer</td>
<td>8,918</td>
<td>4</td>
</tr>
<tr>
<td>Alzheimer’s disease and other dementias</td>
<td>8,022</td>
<td>5</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>6,719</td>
<td>6</td>
</tr>
<tr>
<td>Colon and rectum cancer</td>
<td>5,881</td>
<td>7</td>
</tr>
<tr>
<td>Lower respiratory infections</td>
<td>5,254</td>
<td>8</td>
</tr>
<tr>
<td>Cirrhosis and other chronic liver diseases</td>
<td>4,290</td>
<td>9</td>
</tr>
<tr>
<td>Hypertensive heart disease</td>
<td>3,949</td>
<td>10</td>
</tr>
</tbody>
</table>

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

The European Region
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

| Primary school closure | Secondary school closure | Entry restrictions for non-residents | Individual movements restricted | Individual curfew | Entry restrictions for all non-residents | 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 | Restaurants / bars closed | Bars closed | Restaurants / bars curbside only | Gyms, pools, other leisure closed | Non-essential retail closed | Non-essential workplaces closed | Restaurants / bars closed | Bars closed | Restaurants / bars curbside only | Gyms, pools, other leisure closed | Non-essential retail closed | Non-essential workplaces closed |
|------------------------|--------------------------|--------------------------------------|-----------------------------------|--------------------|----------------------------------------|-----------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|-----------------------------|-----------------|-------------------------------------|----------------------------------------|-------------------------------|----------------------------------------|---------------------------------------------|-----------------|-------------------------------------|----------------------------------------|-------------------------------|----------------------------------------|---------------------------------------------|-----------------|-------------------------------------|----------------------------------------|-------------------------------|----------------------------------------|---------------------------------------------|
| Albania                | Andorra                  | Armenia                              | Austria                           | Azerbaijan         | Belarus                                | Belgium              | Bosnia and Herzegovina                 | Bulgaria                      | Croatia                           | Czechia                               | Denmark                               | Estonia                       | Finland                     | France                           | Germany                         | Greece                        | Hungary                      | Iceland                     | Ireland                          | Israel                        | Italy                         | Kazakhstan                  | Kyrgyzstan                               | Latvia                       | Lithuania                         | Luxembourg                   | Malta                          | Malta                        | Montenegro                   | Netherlands                  | North Macedonia                  | Norway                       | Poland                          | Portugal                    | Republic of Moldova               | Romania                     | Russian Federation              | San Marino                  | Serbia                        | Slovakia                   | Slovenia                       | Spain                        | Sweden                       | Switzerland                 | Turkey                       | Ukraine                      | United Kingdom                 | Uzbekistan                  | 

*Not all locations are measured at the subnational level.*

**Notes:**
- Primary school closure
- Secondary school closure
- Entry restrictions for non-residents
- Individual movements restricted
- Individual curfew
- Entry restrictions for all non-residents
- 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

[Source: covid19.healthdata.org, Institute for Health Metrics and Evaluation]
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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<tbody>
<tr>
<td></td>
<td>Severe</td>
<td></td>
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<tr>
<td></td>
<td>disease</td>
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<tr>
<td></td>
<td>Infection</td>
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<td>Infection</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>
</tr>
<tr>
<td>CanSino</td>
<td>66%</td>
<td>62%</td>
<td>66%</td>
<td>62%</td>
<td>64%</td>
<td>61%</td>
</tr>
<tr>
<td>CoronaVac</td>
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<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>
</tr>
<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</td>
<td></td>
<td>91%</td>
<td>86%</td>
<td>91%</td>
<td>86%</td>
<td>88%</td>
</tr>
</tbody>
</table>

(mRNA)
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
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-KJalpha model from the University of Southern California (SIKJalpha) [March 20, 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.
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.