COVID-19 Results Briefing

The Western Pacific Region

March 19, 2022

This document contains summary information on the latest projections from the IHME model on COVID-19 in the Western Pacific Region. The model was run on March 19, 2022, with data through March 14, 2022.

In the Western Pacific Region, although estimated COVID-19 infections declined by around 23% in the last week, reported cases, hospital census, and daily deaths increased compared to the week before. We are forecasting that the Omicron wave is still unfolding in countries such as South Korea, Vietnam, and Laos, where mean effective R is greater than 1. The rapid rise can be attributed to Omicron’s high infection capacity and the low level of previous infections in the country, combined with waning immunity from vaccines. However, our reference and alternative scenarios suggest that there should be a steady further decline in transmission.

Rising case numbers in select countries in Western Europe, including Germany, the UK, Austria, Switzerland, Italy, and Greece, are a concern. The increase has been attributed to one of three factors: 1) declining mask use and social distancing, 2) the slow spread of the BA.2 sub-variant of Omicron, 3) waning immunity from vaccines and previous infections, or all three combined. BA.2 has been present in many countries since December and more rapidly replaced BA.1 in Denmark. While BA.2 is able to replace BA.1, it has not necessarily led to a major sustained increase in transmission. In the Netherlands, the secondary increase of BA.2 appears to have already peaked. In some countries, such as South Africa, BA.2 spread has not led to any population-level increase in cases at all. Our models suggest that behavioral modification, particularly declines in mask use and social distancing, may be the most important explanation for the increasing case numbers in some countries in Europe. Our models do not suggest there will be much of an increase in the next weeks, if at all. However, it is certainly possible that the interaction of a rapid return to pre-COVID behavior, low vaccination rates, waning immunity, and the spread of BA.2 could bring a short period of increasing case numbers in some countries.

The regional forecasts for the next months are dominated by what happens in China. Lockdown and repeated mass testing worked to break Omicron transmission in Beijing and other cities in February. Whether the current larger Omicron outbreaks can be managed this way in Shanghai, Shenzhen, and other cities should become clear in the coming weeks. The situation in China is very challenging as the percentage of people previously infected is very low and there are reports of low vaccination rates among the older population. Preparing hospitals for a surge in admissions and intensive care use should be a priority. Efforts should focus on increasing the production of antivirals to save lives and reduce the pressure on hospitals. Our forecast of a peak epidemic in China in May is highly uncertain, as it depends critically on the Chinese government’s strategy for managing this complex situation. Preventive efforts should continue to reduce the spread of the virus using high-quality masks and increasing vaccination coverage, especially among the older and vulnerable population.
The 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. 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 co-morbidities or advanced age. More policy attention should be paid to ensuring that everyone who becomes symptomatic, particularly in high-risk groups, such as the population over 70, can get access to antivirals given their very substantial impact on the infection-fatality rate. International efforts to promote access and appropriate use of antivirals should be ramped up as it lags behind the policy attention on vaccination. 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 after this surge. Given the extremely low infection-fatality rate for Omicron in children, continued mask requirements for schoolchildren are not warranted.

Current situation

• Daily estimated infections in the last week decreased to 2,931,000 per day on average compared to 3,787,000 the week before (Figure 1.1). Daily hospital census in the last week (through March 14) increased to 98,000 per day on average compared to 82,000 the week before.

• Daily reported cases in the last week increased to 738,000 per day on average compared to 605,000 the week before (Figure 2.1).

• Reported deaths due to COVID-19 in the last week increased to 940 per day on average compared to 790 the week before (Figure 3.1).

• Total deaths due to COVID-19 in the last week increased to 1,900 per day on average compared to 1,800 the week before (Figure 3.1). This makes COVID-19 the number five cause of death in Western Pacific Region this week (Table 1). Estimated total daily deaths due to COVID-19 in the past week were 2.0 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 two countries (Figure 4.1).

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

• We estimate that 14% of people in Western Pacific 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 five countries (Figure 7.1).

• The infection-detection rate in Western Pacific Region was close to 20% 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). We estimate that the Alpha variant is circulating in eight countries, that the Beta variant is circulating in six countries, that the Delta variant is circulating in 14 countries and one subnational location, that the Gamma variant is circulating in three countries, and that the Omicron variant is circulating in 14 countries and one subnational location.

Trends in drivers of transmission

- Mobility last week was 3% lower than the pre-COVID-19 baseline (Figure 11.1). Mobility was lower than 30% of baseline in one country and one subnational location.
- As of March 14, in the COVID-19 Trends and Impact Survey, 64% of people self-report that they always wore a mask when leaving their home, the same percentage as last week (Figure 13.1).
- There were 1,803 diagnostic tests per 100,000 people on March 14 (Figure 15.1).
- As of March 14, 16 countries and two subnational locations have reached 70% or more of the population who have received at least one vaccine dose, and 12 countries and one subnational location have reached 70% or more of the population who are fully vaccinated (Figure 17.1). 81% of people in Western Pacific Region have received at least one vaccine dose, and 76% are fully vaccinated.
- In the Western Pacific Region, 94.2% 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. This is the same as last week. The proportion of the population who are open to receiving a COVID-19 vaccine ranges from 29% in Mongolia to 100% in Vietnam (Figure 19.1).
- In our current reference scenario, we expect that 1.6 billion people will be vaccinated with at least one dose by July 1 (Figure 20.1). We expect that 76% 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 rise to 10,592,350 by May 22, 2022 (Figure 22.1).
- Daily estimated infections in the **80% mask use scenario** will rise to 6,892,620 by June 2, 2022 (Figure 22.1).
- Daily estimated infections in the **third dose scenario** will rise to 8,350,280 by May 29, 2022 (Figure 22.1).

**Cases**

- Daily estimated cases in the **reference scenario** will rise to 10,333,540 by May 31, 2022 (Figure 22.2).
- Daily estimated cases in the **80% mask use scenario** will rise to 7,011,700 by June 10, 2022 (Figure 22.2).
- Daily estimated cases in the **third dose scenario** will rise to 8,210,550 by June 6, 2022 (Figure 22.2).

**Hospitalizations**

- Daily hospital census in the **reference scenario** will rise to 338,600 by June 9, 2022 (Figure 22.3).
- Daily hospital census in the **80% mask use scenario** will rise to 221,720 by June 20, 2022 (Figure 22.3).
- Daily hospital census in the **third dose scenario** will rise to 271,050 by June 15, 2022 (Figure 22.3).

**Deaths**

- In our **reference scenario**, our model projects 840,000 cumulative reported deaths due to COVID-19 on July 1. This represents 648,000 additional deaths from March 14 to July 1. Daily reported COVID-19 deaths in the **reference scenario** will rise to 17,630 by June 20, 2022 (Figure 22.4).
- Under our **reference scenario**, our model projects 1,182,000 cumulative total deaths due to COVID-19 on July 1. This represents 678,000 additional deaths from March 14 to July 1 (Figure 22.5).
• In our 80% mask use scenario, our model projects 573,000 cumulative reported deaths due to COVID-19 on July 1. This represents 381,000 additional deaths from March 14 to July 1. Daily reported COVID-19 deaths in the 80% mask use scenario will rise to 11,280 by July 1, 2022 (Figure 22.4).

• In our third dose scenario, our model projects 679,000 cumulative reported deaths due to COVID-19 on July 1. This represents 487,000 additional deaths from March 14 to July 1. Daily reported COVID-19 deaths in the third dose scenario will rise to 14,020 by June 27, 2022 (Figure 22.4).

• Figure 23.1 compares our reference scenario forecasts to other publicly archived models. Forecasts are widely divergent.

• At some point from March through July 1, three countries will have high or extreme stress on hospital beds (Figure 24.1). At some point from March through July 1, eight 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>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
<td>51,115</td>
<td>1</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>44,778</td>
<td>2</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>22,489</td>
<td>3</td>
</tr>
<tr>
<td>Tracheal, bronchus, and lung cancer</td>
<td>18,018</td>
<td>4</td>
</tr>
<tr>
<td>COVID-19</td>
<td>12,984</td>
<td>5</td>
</tr>
<tr>
<td>Alzheimer’s disease and other dementias</td>
<td>10,761</td>
<td>6</td>
</tr>
<tr>
<td>Stomach cancer</td>
<td>9,878</td>
<td>7</td>
</tr>
<tr>
<td>Lower respiratory infections</td>
<td>8,865</td>
<td>8</td>
</tr>
<tr>
<td>Hypertensive heart disease</td>
<td>7,494</td>
<td>9</td>
</tr>
<tr>
<td>Colon and rectum cancer</td>
<td>7,483</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

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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 | Higher school closure | Entry restrictions for some non-residents | Entry restrictions for all non-residents | Individual movements restricted | Individual curfew | Curfew for businesses | Individual curfew 6am−7am | Individual curfew 7am−8am | Individual curfew 8am−9am | Individual curfew 9am−10am | Individual curfew 10am−11am | Individual curfew 11am−12am | Individual curfew 12am−1pm | Individual curfew 1pm−2pm | Individual curfew 2pm−3pm | Individual curfew 3pm−4pm | Individual curfew 4pm−5pm | Individual curfew 5pm−6pm | Individual curfew 6pm−7pm | Individual curfew 7pm−8am | 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 workplaces closed | Stay home order | Stay home fine | Mask mandate | Mask mandate fine |
| Mandate in place | Mandate in place | Mandate imposed in some subnational locations | Mandate imposed in some subnational locations (imposed this week) | Mandate imposed in some subnational locations (updated from previous reporting) | No mandate | No mandate (imposed this week) | No mandate (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
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Figure 15.1: Trend in COVID-19 diagnostic tests per 100,000 people

![Graph showing trend in COVID-19 diagnostic tests per 100,000 population for different regions from February 2020 to April 2022. The graph shows a significant increase in testing in the Western Pacific Region.](image)

Figure 16.1: COVID-19 diagnostic tests per 100,000 people on March 14, 2022

![Map of the Western Pacific Region showing the number of COVID-19 diagnostic tests per 100,000 people on March 14, 2022.](image)

- African Region
- South-East Asia Region
- Eastern Mediterranean Region
- Region of the Americas
- European Region
- Western Pacific Region

![Legend for the map showing the number of COVID-19 diagnostic tests per 100,000 people.](image)
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>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Severe disease</td>
<td>Infection</td>
<td>Severe disease</td>
<td>Infection</td>
<td>Severe disease</td>
<td>Infection</td>
</tr>
<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>60%</td>
<td>62%</td>
<td>66%</td>
<td>62%</td>
<td>64%</td>
<td>61%</td>
</tr>
<tr>
<td>CoronaVac</td>
<td>50%</td>
<td>47%</td>
<td>50%</td>
<td>47%</td>
<td>49%</td>
<td>46%</td>
</tr>
<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>
</tr>
<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>
</tr>
<tr>
<td>Sinopharm</td>
<td>73%</td>
<td>68%</td>
<td>73%</td>
<td>68%</td>
<td>71%</td>
<td>67%</td>
</tr>
<tr>
<td>Sputnik-V</td>
<td>92%</td>
<td>85%</td>
<td>92%</td>
<td>85%</td>
<td>89%</td>
<td>85%</td>
</tr>
<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
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.