COVID-19 Results Briefing

The South-East Asia Region

September 30, 2021

This document contains summary information on the latest projections from the IHME model on COVID-19 in the South-East Asia Region. The model was run on September 28, 2021, with data through September 27, 2021.

COVID-19 cases, hospitalizations, and deaths continued to decline over the past week across the South-East Asia Region. While this declining trend is expected to continue at a regional level over the next several weeks, transmission is likely to begin increasing in November and December in the Northern Hemisphere with the onset of winter. Within our reference scenario, the region is expected to reach 722,000 cumulative reported deaths by 01 January 2022, representing an additional 50,000 deaths between now and the end of the year. With testing rates low and declining (SEARO has the second lowest of any WHO region), we urge caution and quick responses to any detected rise in cases by adopting effective mitigation measures like promoting mask use and regulating the size of public gatherings. As schools return to in-person learning, infections within younger age groups should be monitored closely, especially within multigenerational homes. Increasing vaccination levels will protect many from COVID-19 hospitalization or death, as the region is likely to reach 1.1 billion people having received at least one vaccine dose by the start of next year; however, with increasing mobility and declining mask use, seasonal illnesses like influenza will likely increase stress on hospital resources. Mask use can aid in reducing transmission of both COVID-19 and influenza; therefore, seasonal mask use may be highly effective in reducing stress on health care resources in the coming winter months. Our model shows that the continued and potentially increasing rates of mask use can save lives; if mask use increased to 95% of people in the region wearing a mask when outside their homes, 11,000 lives could be saved by the end of this year. Additionally, there is an increasing body of evidence that immunity derived from either vaccination or natural infection wanes over time, meaning the risk of breakthrough infections or reinfection will likely increase over time as well. Data on confirmed infections that include vaccination status as well as genomic sequencing to detect the potential emergence of additional variants will be essential components in developing effective mitigation and booster vaccination strategies. As the Delta-driven surges resulted in high levels of past infections and as vaccination levels increase, many will be tempted to assume current declining trends equate to the end of the pandemic; however, decision-makers and health system leaders should be prepared for the real risk for this trend to reverse in November and December.

Current situation

- Daily infections in the last week decreased to 459,300 per day on average compared to 534,000 the week before (Figure 1). Daily hospital census in the last week (through September 27) decreased to 128,400 per day on average compared to 149,400 the week before.
• Daily reported cases in the last week decreased to 68,700 per day on average compared to 80,800 the week before (Figure 2).

• Reported deaths due to COVID-19 in the last week decreased to 750 per day on average compared to 880 the week before (Figure 3).

• Excess deaths due to COVID-19 in the last week decreased to 1,700 per day on average compared to 2,100 the week before (Figure 3). This makes COVID-19 the number 5 cause of death in the South-East Asia Region this week (Table 1). Estimated excess daily deaths due to COVID-19 in the past week were 2.3 times larger than the reported number of deaths.

• The daily reported COVID-19 death rate is greater than 4 per million in no locations (Figure 4).

• The daily rate of excess deaths due to COVID-19 is greater than 4 per million in Sri Lanka (Figure 4).

• We estimate that 57% of people in the South-East Asia Region have been infected as of September 27 (Figure 6).

• Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in one country – the Maldives – and 9 states and union territories within India (Figure 7).

• The infection-detection rate in the South-East Asia Region was close to 8% on September 20 (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). We estimate that the Beta variant is circulating in 1 country, that the Delta variant is circulating in 10 countries, and that the Gamma variant is circulating in no countries.

Trends in drivers of transmission

• Mobility last week was 15% lower than the pre-COVID-19 baseline (Figure 11). Mobility was near baseline (within 10%) in Bangladesh, Bhutan, and Nepal. Mobility was lower than 30% of baseline in Maldives, Myanmar, Sri Lanka, and Timor-Leste.

• As of September 27, in the COVID-19 Trends and Impact Survey, 67% of people self-report that they always wore a mask when leaving their home compared to 68% last week (Figure 13).

• There were 96 diagnostic tests per 100,000 people on September 27 (Figure 15).

• As of September 20, two countries have reached 70% or more of the population who have received at least one vaccine dose and one country has reached 70% or more of the population who are fully vaccinated (Figure 17).
• In the South-East Asia Region, 83.5% 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. This is down by 0.1 percentage points from last week. The proportion of the population who are open to receiving a COVID-19 vaccine ranges from 62% in Maldives to 95% in Sri Lanka (Figure 19).

• In our current reference scenario, we expect that 1.1 billion people will be vaccinated with at least one dose by January 1 (Figure 20). We expect that 41% of the population will be fully vaccinated by January 1.

• Based on the estimate of the population that have been infected with COVID-19 and vaccinated to date, combined with assumptions on protection against infection with the Delta variant provided by either natural infection, vaccination, or both, we estimate that 57% of the region is immune to the Delta variant. In our current reference scenario, we expect that by January 1, 63% of people will be immune to the Delta variant (Figure 21). These two calculations do not take into account waning of natural or vaccine-derived immunity.

Projections

• In our reference scenario, which represents what we think is most likely to happen, our model projects 722,000 cumulative reported deaths due to COVID-19 on January 1. This represents 50,000 additional deaths from September 27 to January 1. Daily reported deaths will decline to 380 by November 9, 2021 (Figure 22).

• Under our reference scenario, our model projects 1,991,000 cumulative excess deaths due to COVID-19 on January 1. This represents 110,000 additional deaths from September 27 to January 1 (Figure 22).

• If universal mask coverage (95%) were attained in the next week, our model projects 11,000 fewer cumulative reported deaths compared to the reference scenario on January 1.

• Under our worse scenario, our model projects 844,000 cumulative reported deaths on January 1, an additional 122,000 deaths compared to our reference scenario. Daily reported deaths in the worse scenario will rise to 4,450 by December 21, 2021 (Figure 22).

• Daily infections in the reference scenario will rise to 546,180 by December 28, 2021 (Figure 23). Daily infections in the worse scenario will rise to 2,520,140 by December 1, 2021 (Figure 23).

• Daily cases in the reference scenario will decline to 24,140 by November 3, 2021 (Figure 24). Daily cases in the worse scenario will rise to 237,250 by December 8, 2021 (Figure 24).

• Daily hospital census in the reference scenario will decline to 52,690 by November 19, 2021 (Figure 25). Daily hospital census in the worse scenario will rise to 396,330 by December 19, 2021 (Figure 25).
• Figure 26 compares our reference scenario forecasts to other publicly archived models. Forecasts are widely divergent.

• At some point from September through January 1, four countries will have high or extreme stress on hospital beds (Figure 27). At some point from September through January 1, six countries will have high or extreme stress on intensive care unit (ICU) capacity (Figure 28).
Model updates

We have revised the number of reported deaths for Mexican states as well as the Russian Federation away from numbers derived from routine surveillance to those sourced from national cause of death registries. In these two countries, we have seen substantial differences between reported deaths and those assigned to COVID through the death certification review process. Given that deaths recorded in cause of death registries neither span the total time series nor provide daily values, but monthly, we have made the following assumptions to compute a new time series: (a) that the pattern in daily deaths in the cause of death data follows the patterning present in the daily reported series for days within a given month, and (b) that the ratio of monthly reported deaths to monthly deaths registered in cause of death analysis is constant from the last common time period to today. The total excess death estimate is not affected by this change to the reported time series.


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>39,868</td>
<td>1</td>
</tr>
<tr>
<td>Stroke</td>
<td>27,102</td>
<td>2</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>21,984</td>
<td>3</td>
</tr>
<tr>
<td>Diarrheal diseases</td>
<td>14,328</td>
<td>4</td>
</tr>
<tr>
<td>COVID-19</td>
<td>12,206</td>
<td>5</td>
</tr>
<tr>
<td>Lower respiratory infections</td>
<td>11,327</td>
<td>6</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>10,815</td>
<td>7</td>
</tr>
<tr>
<td>Neonatal disorders</td>
<td>10,504</td>
<td>8</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>9,152</td>
<td>9</td>
</tr>
<tr>
<td>Cirrhosis and other chronic liver diseases</td>
<td>8,514</td>
<td>10</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 September 27, 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 September 27, 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 September 27, 2021

**Figure 7.** Mean effective R on September 16, 2021. 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. 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 September 27, 2021

A. Estimated percent Alpha variant

B. Estimated percent Beta variant
C. Estimated percent Delta variant

D. Estimated percent Gamma variant
Figure 10. Infection-fatality rate on September 27, 2021. This is estimated as the ratio of COVID-19 deaths to estimated daily COVID-19 infections.
Critical drivers

Table 2. Current mandate implementation

| Country                  | Primary school closure | Secondary school closure | Higher school closure | Borders closed to any non-resident | Borders closed to all non-residents | Individual movements restricted | Curfew for businesses | Individual curfew | Gathering limit: 6 indoor, 10 outdoor | Gathering limit: 10 indoor, 25 outdoor | Gathering limit: 25 indoor, 50 outdoor | Gathering limit: 50 indoor, 100 outdoor | Gathering limit: 100 indoor, 250 outdoor | Restaurants / 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 |
|--------------------------|------------------------|--------------------------|-----------------------|-----------------------------------|------------------------------------|-----------------------------------|-----------------------|-------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| Bangladesh               | True                   | True                     | True                  | True                              | False                              | False                             | True                  | True              | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    |
| Bhutan                   | True                   | True                     | True                  | True                              | False                              | False                             | True                  | True              | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    |
| Democratic People's Republic of Korea | True                   | True                     | True                  | True                              | False                              | False                             | True                  | True              | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    |
| India                    | True                   | True                     | True                  | True                              | False                              | False                             | True                  | True              | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    |
| Indonesia                | True                   | True                     | True                  | True                              | False                              | False                             | True                  | True              | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    |
| Maldives                 | True                   | True                     | True                  | True                              | False                              | False                             | True                  | True              | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    |
| Myanmar                  | True                   | True                     | True                  | True                              | False                              | False                             | True                  | True              | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    |
| Nepal                    | True                   | True                     | True                  | True                              | False                              | False                             | True                  | True              | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    |
| Sri Lanka                | True                   | True                     | True                  | True                              | False                              | False                             | True                  | True              | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    |
| Thailand                 | True                   | True                     | True                  | True                              | False                              | False                             | True                  | True              | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    |
| Timor-Leste              | True                   | True                     | True                  | True                              | False                              | False                             | True                  | True              | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    | True                                    |

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 (lifted this week)
No mandate (updated from previous reporting)

*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 September 27, 2021
**Figure 13.** Trend in the proportion of the population reporting always wearing a mask when leaving home

**Figure 14.** Proportion of the population reporting always wearing a mask when leaving home on September 27, 2021
Figure 15. Trend in COVID-19 diagnostic tests per 100,000 people

Figure 16. COVID-19 diagnostic tests per 100,000 people on September 27, 2021
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: ancestral and Alpha</th>
<th>Efficacy at preventing infection: ancestral and Alpha</th>
<th>Efficacy at preventing disease: Beta, Delta, &amp; Gamma</th>
<th>Efficacy at preventing infection: Beta, Delta, &amp; Gamma</th>
</tr>
</thead>
<tbody>
<tr>
<td>AstraZeneca</td>
<td>90%</td>
<td>52%</td>
<td>85%</td>
<td>49%</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>Johnson &amp; Johnson</td>
<td>86%</td>
<td>72%</td>
<td>60%</td>
<td>56%</td>
</tr>
<tr>
<td>Moderna</td>
<td>94%</td>
<td>89%</td>
<td>94%</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>94%</td>
<td>86%</td>
<td>85%</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>75%</td>
<td>66%</td>
<td>65%</td>
<td>57%</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>91%</td>
<td>86%</td>
<td>85%</td>
<td>78%</td>
</tr>
</tbody>
</table>
Figure 17. Percent of the population (A) having received at least one dose and (B) fully vaccinated against SARS-CoV-2 by September 27, 2021

A. Percent of the population having received one dose of a COVID-19 vaccine

B. Percent of the population fully vaccinated against SARS-CoV-2
Figure 18. 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. 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. Percent of people who receive at least one dose of a COVID-19 vaccine and those who are fully vaccinated

Figure 21. 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. 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 7 days.
- Mobility increases as vaccine coverage increases.
- 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 reference scenario assumes that mandates are re-imposed when daily deaths reach 15 per million.
- Variants Alpha, Beta, Gamma, and Delta continue to spread regionally and globally from locations with sufficient transmission.

The worse scenario modifies the reference scenario assumption in four ways:

- 100% of vaccinated individuals stop using masks.
- Mobility increases in all locations to 25% above the pre-pandemic winter baseline, irrespective of vaccine coverage.
- Governments are more reluctant to re-impose social distancing mandates, waiting until the daily death rate reaches 15 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 reference scenario assumes that mandates are re-imposed when daily deaths reach 38 per million. In either case, we assume social distancing mandates remain in effect for 6 weeks.
- Variants Alpha, Beta, Gamma, and Delta spread between locations twice as fast when compared with our reference scenario.

The universal masks scenario makes all the same assumptions as the reference scenario but assumes all locations reach 95% mask use within 7 days.
Figure 22. Daily COVID-19 deaths until January 01, 2022 for three scenarios

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

B. Excess daily COVID-19 deaths per 100,000
**Figure 23.** Daily COVID-19 infections until January 01, 2022 for three scenarios

**Figure 24.** Daily COVID-19 reported cases until January 01, 2022 for three scenarios
Figure 25. Daily COVID-19 hospital census until January 01, 2022 for three scenarios
Figure 26. 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) [September 22, 2021], Imperial College London (Imperial) [September 9, 2021], The Los Alamos National Laboratory (LANL) [September 19, 2021], the SI-KJalpha model from the University of Southern California (SIKJalpha) [September 22, 2021]. Daily deaths from other modeling groups are smoothed to remove inconsistencies with rounding. Regional values are aggregates from available locations in that region.
Figure 27. 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 28. 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.