COVID-19 Results Briefing

Global

August 5, 2021

This document contains summary information on the latest projections from the IHME model on COVID-19 globally. The model was run on August 3, 2021, with data through August 2, 2021.

Delta variant-related surges are driving up daily global infections to over 8.5 million. Much of this increase appears to be occurring in sub-Saharan Africa, including in Nigeria. The infection-fatality rate remains extremely low in sub-Saharan Africa, so this surge is not translating into considerable mortality. Delta variant surges continue to increase cases, hospitalizations, and deaths in many countries around the world, including the United States, Mexico, Cuba, Vietnam, Thailand, Bangladesh, Pakistan, Iran, Iraq, Turkey, and Kazakhstan. Rising cases and hospitalizations in many countries in Europe, including Spain, Germany, Italy, and France have led to limited increases in deaths so far. A number of countries have seen cases peak and decline, including the United Kingdom, the Netherlands, Cyprus, Malta, Indonesia, Cambodia, and Myanmar. In our reference scenario, a number of countries with either high vaccination rates or high rates of cumulative infection are expected to peak in the coming weeks. At the global level, the reference scenario suggests a peak in the beginning of September for deaths and then a very slow decline. Faster increases in mobility captured in our worse scenario could see much larger Delta surges, with daily deaths rising sharply until mid-October. In this week’s model updates, based on post-vaccination studies in Canada, Scotland, England, and Israel, we have revised upward our estimates of vaccine effectiveness in preventing hospitalization and death from the Delta variant. Our model, however, does not take into account waning immunity against preventing infection with the Delta variant, as suggested in the Israel analysis of Pfizer by month of second vaccination. Waning immunity could substantially alter the trajectory of the epidemic in high-income countries with substantial vaccination levels. Strategies to manage the pandemic should include: 1) in countries that have sufficient vaccine supply, persuading more of the vaccine-hesitant to get vaccinated; 2) transfer of more vaccine to low- and middle-income countries to help reduce transmission and prevent hospitalization and death; 3) mask mandates for the unvaccinated and vaccinated in settings with rising transmission given the evidence on the effectiveness of masks and the likely role of the vaccinated in transmission; 4) implementation of other social distancing mandates when hospitalization and death are increasing rapidly; and 5) more detailed reporting of cases, hospitalizations, and deaths by age, sex, and vaccination status so that vaccine effectiveness can be monitored. The magnitude of the Delta surges in many countries in the Northern Hemisphere may reduce the magnitude of the winter surge expected in the first quarter of 2022. Neither our reference nor our worse scenario includes the possibility of the emergence of new variants with more immune escape than Delta.
Current situation

- Daily infections have increased from a low of 5 million in the beginning of June to over 8.5 million due to the Delta surge in multiple regions (Figure 1). Daily hospital census has reached 1.5 million.

- Daily reported cases in the last week (through August 2) increased to 606,900 per day on average compared to 544,200 the week before (Figure 2).

- Reported deaths due to COVID-19 in the last week increased to 8,600 per day on average compared to 8,200 the week before (Figure 3).

- Excess deaths due to COVID-19 in the last week increased to 24,900 per day on average compared to 23,000 the week before (Figure 3). This makes COVID-19 the number 2 cause of death globally this week (Table 1). Estimated excess daily deaths due to COVID-19 were 2.2 times larger than the reported number of deaths.

- The daily reported COVID-19 death rate is greater than 4 per million in 20 countries (Figure 4). These countries are in South America, southern Africa, Southeast Asia, and Central Asia, and include the Russian Federation, Tunisia, and Libya.

- The daily rate of excess deaths due to COVID-19 is greater than 4 per million in 37 countries (Figure 4).

- We estimated that 33% of people globally have been infected as of August 2 (Figure 6).

- Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 114 countries (Figure 7). Transmission is increasing in most of the Northern Hemisphere with the exception of some Canadian provinces, the United Kingdom, Portugal, provinces in Spain, Cyprus, Malta, and the Russian Federation. Countries in all regions of sub-Saharan Africa have increasing transmission. Transmission is increasing in Vietnam and Thailand but has peaked in Indonesia.

- The infection-detection rate globally was close to 8% on August 2 (Figure 8).

- Based on the GISAID and various national databases, combined with our variant spread model, we estimate the current prevalence of variants of concern (Figure 9). The Delta variant is dominant in North America, Europe, parts of the Middle East, South Asia, Southeast Asia, and may have spread into Brazil.

Trends in drivers of transmission

- Mobility last week was 9% lower than the pre-COVID-19 baseline (Figure 11). Mobility was near baseline (within 10%) in in 120 countries. Mobility was lower than 30% of baseline in in 19 countries, most of which are in South and Southeast Asia along with Uganda.

- As of August 2, in the COVID-19 Trends and Impact Survey, 59% of people self-report that they always wore a mask when leaving their home (Figure 13). Reported mask use remains very high in all of Latin America, Southern Africa and South and Southeast Asia.
• There were 131 diagnostic tests per 100,000 people on August 2 (Figure 15).

• Globally, 73.3% of people say they would accept or would probably accept a vaccine for COVID-19. The fraction of the population who are open to receiving a COVID-19 vaccine ranges from 28% in Kazakhstan to over 90% in Uttarakhand (Figure 19).

• In our current reference scenario, we expect that 3.8 billion people will be vaccinated with at least one dose by December 1.

• Based on past infection and cross-variant immunity for the Delta variant and vaccination on the effectiveness of each vaccine in preventing infection with the Delta variant, we estimate that 34% of the population is immune to Delta variant infection. Through ongoing Delta transmission and increases in vaccination, the fraction immune should increase to 56% of the population by December 1 (Figure 20).

Projections

• In our reference scenario, which represents what we think is most likely to happen, our model projects 5,264,000 cumulative reported deaths due to COVID-19 on December 1. This represents 1,008,000 additional deaths from August 2 to December 1. Daily reported deaths will rise to over 10,000 by the end of August and then slowly decline to 7,500 by December first (Figure 21).

• Under our reference scenario, our model projects 11,603,000 cumulative excess deaths due to COVID-19 on December 1. This represents 2,436,000 additional deaths from August 2 to December 1. (Figure 21).

• If universal mask coverage (95%) were attained in the next week, our model projects 334,000 fewer cumulative reported deaths compared to the reference scenario on December 1.

• Under our worse scenario, our model projects 6,097,000 cumulative reported deaths on December 1, an additional 833,000 deaths compared to our reference scenario. Daily reported deaths in the worse scenario rise to over 21,000 by mid-October 16 (Figure 21).

• Daily infections in the reference scenario will rise to nearly 9 million by mid-August and decline to 5 million by December 1 (Figure 22). Daily infections in the worse scenario will rise to 14.5 million by late September and then decline to 7 million by December 1.

• Daily cases in the reference scenario remain around 775,000 over the next four months (Figure 23). Daily cases in the worse scenario will rise to 2.1 million by early October and then decline (Figure 23).
Model updates

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

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

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>175,727</td>
<td>1</td>
</tr>
<tr>
<td>COVID-19</td>
<td>173,985</td>
<td>2</td>
</tr>
<tr>
<td>Stroke</td>
<td>126,014</td>
<td>3</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>63,089</td>
<td>4</td>
</tr>
<tr>
<td>Lower respiratory infections</td>
<td>47,946</td>
<td>5</td>
</tr>
<tr>
<td>Tracheal, bronchus, and lung cancer</td>
<td>39,282</td>
<td>6</td>
</tr>
<tr>
<td>Neonatal disorders</td>
<td>36,201</td>
<td>7</td>
</tr>
<tr>
<td>Alzheimer’s disease and other dementias</td>
<td>31,217</td>
<td>8</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>29,830</td>
<td>9</td>
</tr>
<tr>
<td>Diarrheal diseases</td>
<td>29,509</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 August 2, 2021

A. Daily reported COVID-19 death rate per 1 million

B. Daily excess COVID-19 death rate per 1 million
**Figure 5.** Cumulative COVID-19 deaths per 100,000 on August 2, 2021

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

B. Excess cumulative COVID-19 deaths per 100,000

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Figure 6. Estimated percent of the population infected with COVID-19 on August 2, 2021

Figure 7. Mean effective R on July 22, 2021. The estimate of effective R is based on the combined analysis of deaths, case reporting, and hospitalizations where available. Current reported cases reflect infections 11-13 days prior, so estimates of effective R can only be made for the recent past. Effective R less than 1 means that transmission should decline, all other things being held the same.
Figure 8. Percent of COVID-19 infections detected. This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model. Due to measurement errors in cases and testing rates, the infection-detection rate can exceed 100% at particular points in time.
Figure 9. Estimated percent of circulating SARS-CoV-2 for primary variant families on August 2, 2021

A. Estimated percent B.1.1.7 variant

B. Estimated percent B.1.351 variant
C. Estimated percent B.1.617 variant

D. Estimated percent P.1 variant
Figure 10. Infection-fatality ratio on August 2, 2021
Critical drivers

**Figure 11.** Trend in mobility as measured through smartphone app use compared to January 2020 baseline

**Figure 12.** Mobility level as measured through smartphone app use compared to January 2020 baseline (percent) on August 2, 2021
Figure 13. Trend in the proportion of the population reporting always wearing a mask when leaving home.

Figure 14. Proportion of the population reporting always wearing a mask when leaving home on August 2, 2021.
Figure 15. Trend in COVID-19 diagnostic tests per 100,000 people

Figure 16. COVID-19 diagnostic tests per 100,000 people on August 2, 2021
Figure 17. Increase in the risk of death due to pneumonia on February 1 compared to August 1.
Table 3. Estimates of vaccine efficacy for specific vaccines used in the model at preventing disease and infection. The SEIR model uses variant-specific estimates of vaccine efficacy at preventing symptomatic disease and at preventing infection. We use data from clinical trials directly, where available, and make estimates otherwise. More information can be found on our website.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Efficacy at preventing disease: D614G &amp; B.1.1.7</th>
<th>Efficacy at preventing infection: D614G &amp; B.1.1.7</th>
<th>Efficacy at preventing disease: B.1.351, B.1.617, &amp; P.1</th>
<th>Efficacy at preventing infection: B.1.351, B.1.617, &amp; P.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>AstraZeneca</td>
<td>85%</td>
<td>52%</td>
<td>83%</td>
<td>51%</td>
</tr>
<tr>
<td>CoronaVac</td>
<td>50%</td>
<td>44%</td>
<td>43%</td>
<td>38%</td>
</tr>
<tr>
<td>Covaxin</td>
<td>78%</td>
<td>69%</td>
<td>68%</td>
<td>60%</td>
</tr>
<tr>
<td>Janssen</td>
<td>86%</td>
<td>72%</td>
<td>85%</td>
<td>56%</td>
</tr>
<tr>
<td>Moderna</td>
<td>94%</td>
<td>89%</td>
<td>93%</td>
<td>80%</td>
</tr>
<tr>
<td>Novavax</td>
<td>89%</td>
<td>79%</td>
<td>79%</td>
<td>69%</td>
</tr>
<tr>
<td>Pfizer/BioNTech</td>
<td>92%</td>
<td>86%</td>
<td>90%</td>
<td>78%</td>
</tr>
<tr>
<td>Sinopharm</td>
<td>73%</td>
<td>65%</td>
<td>63%</td>
<td>56%</td>
</tr>
<tr>
<td>Sputnik-V</td>
<td>92%</td>
<td>81%</td>
<td>80%</td>
<td>70%</td>
</tr>
<tr>
<td>Tianjin</td>
<td>66%</td>
<td>58%</td>
<td>57%</td>
<td>50%</td>
</tr>
<tr>
<td>CanSino</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other vaccines</td>
<td>75%</td>
<td>66%</td>
<td>65%</td>
<td>57%</td>
</tr>
<tr>
<td>Other vaccines (mRNA)</td>
<td>91%</td>
<td>86%</td>
<td>89%</td>
<td>78%</td>
</tr>
</tbody>
</table>
Figure 18. Trend in the estimated proportion of the adult (18+) population that have been vaccinated or would probably or definitely receive the COVID-19 vaccine if available.

Figure 19. This figure shows the estimated proportion of the adult (18+) population that has been vaccinated or would probably or definitely receive the COVID-19 vaccine if available.
Figure 20. Percentage of people who are immune to non-escape variants and the percentage of people who are immune to escape variants
Projections and scenarios

We produce three scenarios when projecting COVID-19. The reference scenario is our forecast of what we think is most likely to happen:

- Vaccines are distributed at the expected pace.
- Governments adapt their response by re-imposing social distancing mandates for 6 weeks whenever daily deaths reach 8 per million, unless a location has already spent at least 7 of the last 14 days with daily deaths above this rate and not yet re-imposed social distancing mandates. In this case, the scenario assumes that mandates are re-imposed when daily deaths reach 15 per million.
- Variants B.1.1.7 (first identified in the UK), B.1.351 (first identified in South Africa), and P1 (first identified in Brazil) continue to spread from locations with (a) more than 5 sequenced variants, and (b) reports of community transmission, to adjacent locations following the speed of variant scale-up observed in the regions of the United Kingdom.

The worse scenario modifies the reference scenario assumptions in two ways:

- First, it assumes that variants B.1.351 or P.1 begin to spread within three weeks in adjacent locations that do not already have B.1.351 or P.1 community transmission.
- Second, it assumes that all those vaccinated increase their mobility toward pre-COVID-19 levels.

The universal masks scenario makes all the same assumptions as the reference scenario but also assumes 95% of the population wear masks in public in every location.
Figure 21. Daily COVID-19 deaths until December 01, 2021 for three scenarios

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

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

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