COVID-19 Results Briefing

Global

July 21, 2021

This document contains summary information on the latest projections from the IHME model on COVID-19 globally. The model was run on July 20, 2021, with data through July 19, 2021.

The global pandemic at this point is largely driven by the spread of the Delta variant throughout North America, Europe, sub-Saharan Africa, North Africa, South Asia, and Southeast Asia. Global infections are estimated to be close to 7 million a day, below the late April peak of 12 million but substantially higher than the 4.5 million at the beginning of June. We expect the different Delta surges to lead to rising reported daily deaths reaching nearly 10,000 in late August, which means more than 25,000 excess deaths a day at that point. Transmission, hospitalizations, and deaths in our reference scenario decline until early October and then start to increase again as the fall/winter surge expected in the Northern Hemisphere due to seasonality begins. Using vaccine coverage by vaccine type and our systematic analysis of vaccine effectiveness by variant, and also taking into account past infection and protection that provides against the Delta variant, we expect that only 40% of the world will have immunity against the Delta variant by November 1. With 60% susceptible at that point, we should expect continuing high levels of transmission of COVID-19 and the associated death toll. These forecasts do not take into account the possible emergence of new variants. As levels of immunity rise, it is possible that new variants that spread may manifest more immune escape. Our forecasts also do not take into account waning immunity after infection or waning immunity after vaccination. Strategies to manage COVID-19 now must focus on increasing the supply of vaccines that are effective against the prevailing Delta variant and reducing vaccine hesitancy. In addition to trying to increase protection through vaccination, use of mask mandates and other social distancing measures will be necessary to control transmission in settings where it is increasing rapidly. One of the critical issues emerging now is the effectiveness of different vaccines against the Delta variant in preventing infection and in preventing severe illness, hospitalization, and death. Routine collection and reporting of data on cases, hospitalizations, and deaths by age, sex, and vaccination status would greatly enhance the ability of each country to understand which groups among their population remain vulnerable; this will also substantially enhance our ability to evaluate effectiveness against new variants as they emerge.

Current situation

- Daily reported cases in the last week (through July 19) increased to 477,700 per day on average compared to 445,000 the week before (Figure 1).

- Reported deaths due to COVID-19 in the last week decreased to 7,300 per day on average compared to 7,400 the week before (Figure 2).
Excess deaths due to COVID-19 in the last week increased to 19,600 per day on average compared to 19,200 the week before (Figure 2). This makes COVID-19 the number 2 cause of death globally this week (Table 1). Estimated excess daily deaths due to COVID-19 were 2.1 times larger than the reported number of deaths.

The daily reported COVID-19 death rate is greater than 4 per million in 17 countries (Figure 3).

The daily rate of excess deaths due to COVID-19 is greater than 4 per million in 34 countries (Figure 3). These countries are concentrated in South America, southern Africa, and Southeast Asia, as well as the Russian Federation and Tunisia.

We estimated that 32% of people globally have been infected as of July 19 (Figure 5).

Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 108 countries (Figure 6). This includes nearly all of North America, select countries/regions in South America, North, West, and East Africa, most of Europe, and Southeast Asia.

The infection-detection rate globally was close to 8% on July 19 (Figure 7).

Based on the GISAID and various national databases, combined with our variant spread model, we estimate the current prevalence of variants of concern (Figure 8). The Delta variant is becoming the dominant variant in the regions with increasing transmission.

Trends in drivers of transmission

Mobility last week was 10% lower than the pre-COVID-19 baseline (Figure 10). Mobility was near baseline (within 10%) in 122 countries. Mobility was lower than 30% of baseline in 18 countries. Countries with reduced mobility are mostly in South and Southeast Asia as well as Uganda.

As of July 19, in the COVID-19 Trends and Impact Survey, 57% of people self-report that they always wore a mask when leaving their home compared to 60% last week (Figure 12).

There were 135 diagnostic tests per 100,000 people on July 19 (Figure 14).

Globally, 73.7% of people say they would accept or would probably accept a vaccine for COVID-19. This is down by 1 percentage point from last week. The fraction of the population who are open to receiving a COVID-19 vaccine ranges from 28% in Kazakhstan to over 95% in Spain (Figure 18). Vaccine hesitancy is particularly high in most of sub-Saharan Africa, Eastern Europe, and Central Asia.

In our current reference scenario, we expect that 3.0 billion people will be vaccinated by November 1 (Figure 19).
Currently, based on vaccine coverage and the effectiveness of each vaccine against the Delta variant, combined with levels of past infection and cross-variant immunity for the Delta variant, we estimate that 30% of the global population is immune to the Delta variant. This number should increase to 40% by November 1 due to vaccine rollout and continued Delta variant transmission (Figure 20).

Projections

• In our reference scenario, which represents what we think is most likely to happen, our model projects 4,928,000 cumulative reported deaths due to COVID-19 on November 1. This represents 810,000 additional deaths from July 19 to November 1. Daily reported deaths will rise to nearly 10,000 by the third week of August and then decline to around 7,000 deaths a day by November 1 (Figure 21).

• Under our reference scenario, our model projects 10,776,000 cumulative excess deaths due to COVID-19 on November 1.

• If universal mask coverage (95%) were attained in the next week, our model projects 276,000 fewer cumulative reported deaths compared to the reference scenario on November 1.

• Under our worse scenario, our model projects 5,118,000 cumulative reported deaths on November 1, an additional 190,000 deaths compared to our reference scenario (Figure 21).

• Daily infections in the reference scenario will rise to 7.2 million by late July and then decline to near 5 million by early September and remain at that level until November 1 (Figure 26).

• By November 1, we project that 350,700 lives will be saved by the projected vaccine rollout. This does not include lives saved through vaccination that has already been delivered.
Model updates

Our mobility covariate that is used in the projections of COVID infections and deaths was updated to account for observed sustained levels of high mobility. Specifically, the mobility forecasts used in both the reference and universal mask coverage projection scenarios were adjusted upward according to vaccine uptake. This is equivalent to what was previously used in the worse projection scenario. To produce vaccine-adjusted mobility forecasts, we assume that social distancing mandates decline exponentially with respect to increasing vaccine uptake such that all mandates are lifted 30 days after vaccine coverage reaches 75%. In locations where vaccine uptake is already high, projected mandates are ramped down linearly from the current value to the vaccine-adjusted value over a 30-day period. As a final change, for locations whose last day of data indicates mobility levels above baseline (defined as average mobility during the period 1/3/2020 to 2/6/2020), we no longer cap forecasted mobility at zero. The variant spread model was updated to allow for spread to have occurred in the past in locations with some variant surveillance when there was little to no sequence data to confirm or reject the potential invasion.
Projections

Figure 1. Reported daily COVID-19 cases

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>137,437</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 2. Smoothed trend estimate of reported daily COVID-19 deaths (blue) and excess daily deaths due to COVID-19 (orange)
Figure 3. Daily COVID-19 death rate per 1 million on July 19, 2021

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

B. Daily excess COVID-19 death rate per 1 million
Figure 4. Cumulative COVID-19 deaths per 100,000 on July 19, 2021

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

B. Excess cumulative COVID-19 deaths per 100,000
Figure 5. Estimated percent of the population infected with COVID-19 on July 19, 2021

Figure 6. Mean effective R on July 8, 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 7. 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 8. Estimated percent of circulating SARS-CoV-2 for primary variant families on July 19, 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 9. Infection-fatality ratio on July 19, 2021
Critical drivers

Figure 10. Trend in mobility as measured through smartphone app use compared to January 2020 baseline

Figure 11. Mobility level as measured through smartphone app use compared to January 2020 baseline (percent) on July 19, 2021
Figure 12. Trend in the proportion of the population reporting always wearing a mask when leaving home

Figure 13. Proportion of the population reporting always wearing a mask when leaving home on July 19, 2021
Figure 14. Trend in COVID-19 diagnostic tests per 100,000 people

![Figure 14](image)

Global

Figure 15. COVID-19 diagnostic tests per 100,000 people on July 19, 2021

![Figure 15](image)
Figure 16. 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>74%</td>
<td>52%</td>
<td>53%</td>
<td>47%</td>
</tr>
<tr>
<td>CoronaVac</td>
<td>50%</td>
<td>44%</td>
<td>40%</td>
<td>35%</td>
</tr>
<tr>
<td>Covaxin</td>
<td>78%</td>
<td>69%</td>
<td>62%</td>
<td>55%</td>
</tr>
<tr>
<td>Janssen</td>
<td>72%</td>
<td>72%</td>
<td>64%</td>
<td>56%</td>
</tr>
<tr>
<td>Moderna</td>
<td>94%</td>
<td>89%</td>
<td>83%</td>
<td>79%</td>
</tr>
<tr>
<td>Novavax</td>
<td>89%</td>
<td>79%</td>
<td>73%</td>
<td>64%</td>
</tr>
<tr>
<td>Pfizer/BioNTech</td>
<td>91%</td>
<td>86%</td>
<td>81%</td>
<td>77%</td>
</tr>
<tr>
<td>Sinopharm</td>
<td>73%</td>
<td>65%</td>
<td>47%</td>
<td>41%</td>
</tr>
<tr>
<td>Sputnik-V</td>
<td>92%</td>
<td>81%</td>
<td>73%</td>
<td>65%</td>
</tr>
<tr>
<td>Tianjin</td>
<td>66%</td>
<td>58%</td>
<td>53%</td>
<td>47%</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>60%</td>
<td>53%</td>
</tr>
<tr>
<td>Other vaccines (mRNA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>91%</td>
<td>86%</td>
<td>81%</td>
<td>77%</td>
</tr>
</tbody>
</table>
**Figure 17.** 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 18.** 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 19.** Number of people who receive any vaccine and those who are effectively vaccinated and protected against disease, accounting for efficacy, loss to follow up for two-dose vaccines, partial immunity after one dose, and immunity after two doses

![Graph showing number of people vaccinated and protected against disease](image)

**Figure 20.** Percentage of people who are immune to non-escape variants and the percentage of people who are immune to escape variants

![Graph showing percentage immune to escape and non-escape variants](image)
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.
- In one-quarter of those vaccinated, mobility increases toward pre-COVID-19 levels.

The worse scenario modifies the reference scenario assumptions in three 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.
- Third, it assumes that among those vaccinated, mask use starts to decline exponentially one month after completed vaccination.

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 November 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 November 01, 2021 for three scenarios

- **Reference scenario**
- **Universal mask use**
- **Worse**
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.