COVID-19 Results Briefing

Global

September 1, 2021

This document contains summary information on the latest projections from the IHME model on COVID-19 globally. The model was run on August 31, 2021, with data through August 30, 2021.

Delta variant surges continue in many US and Mexican states, Canada, Central Europe, many countries in West, Central and East Africa, and Australasia. Transmission appears to have peaked in many countries of Southeast Asia and continues to decline in nearly all of South America. The second Delta surge in Scotland that appears to be related to school openings may be a warning that the more transmissible Delta variant, combined with insufficient mitigation measures in schools with largely unvaccinated children, may fuel a substantial increase in transmission in countries with school openings in September. In our reference scenario, we expect 35% of the world will be vaccinated by December 1. This level of vaccination and the protective efficacy against Delta infection, combined with the one-third of the world's population that is already infected, means that likely 50% of the world will be immune to the Delta variant by December 1. There will be plenty of susceptible individuals to sustain global transmission in 2022 on current trends even without the emergence of a new escape variant. Once waning vaccine-derived and natural immunity is factored in, the transmission potential for 2022 will be even larger. Our reference scenario for the globe suggests that daily deaths will remain near 9,000 until the end of the year, whereas daily reported cases should increase slowly, reaching over 750,000 by December 1. For high-income countries and those middle-income countries with substantial progress on vaccination, the critical debate that is emerging is whether the policy goal is controlling transmission or harm reduction (reducing hospitalization and death). Stopping transmission will be very difficult given vaccine hesitancy, waning natural and vaccine-derived immunity for infection, the difficulty sustaining careful behaviors, and the potential emergence of new variants. Long-term harm reduction requires very high levels of vaccination in the population over 60 and those under 60 who have increased risk of hospitalization and death; a focus on increasing vaccination through outreach, employer and school mandates, and making it easy for each group to be vaccinated will be critical. Harm reduction will likely require seasonal mask use or surge-related mask use in the at-risk population as an adjunct to vaccination. Countries such as Australia and New Zealand that have been slow to vaccinate and are battling Delta surges in a nearly 100% susceptible population face the challenge of controlling transmission until vaccination rates in the at-risk reach high levels such as 90%. In low-income countries, which do not have access to sufficient vaccines and in some cases have high vaccine hesitancy, managing the epidemic may require ongoing efforts at transmission control until vaccination rates in the at-risk groups can reach high levels.
Current situation

- Daily infections in the last week decreased to 5.3 million per day on average compared to 5.6 million the week before (Figure 1). Daily hospital census in the last week (through August 30) stayed roughly the same as the week before at 1.2 million per day on average.

- Daily reported cases in the last week increased slightly to 653,600 per day on average compared to 647,700 the week before (Figure 2).

- Reported deaths due to COVID-19 in the last week increased slightly to 9,900 per day on average compared to 9,800 the week before (Figure 3).

- Excess deaths due to COVID-19 in the last week stayed the same at 28,000 a day compared to the week before (Figure 3). This makes COVID-19 the number 1 cause of death globally this week (Table 1). Estimated excess daily deaths due to COVID-19 were 2.8 times larger than the reported number of deaths.

- The daily reported COVID-19 death rate is greater than 4 per million in 29 countries plus some states in the US, Mexico, and Brazil (Figure 4).

- The daily rate of excess deaths due to COVID-19 is greater than 4 per million in 53 countries (Figure 4).

- We estimate that 34% of people globally have been infected as of August 30 (Figure 6).

- Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in much of North America, large parts of Europe, many countries in West, Central, and East Africa, a few states in India, some countries in Southeast Asia, Japan, and Australasia (Figure 7).

- The infection-detection rate globally was close to 12% on August 30 (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). Most countries with increasing transmission are dominated by the Delta variant.

Trends in drivers of transmission

- Mobility last week was 7% lower than the pre-COVID-19 baseline (Figure 11). Mobility was near baseline (within 10%) in 127 countries. Mobility was lower than 30% of baseline in 15 countries, including Kazakhstan, Southeast Asia, and New Zealand.

- As of August 30, 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).

- There were 135 diagnostic tests per 100,000 people on August 30 (Figure 15).
As of August 30, 24 countries have reached 70% or more of the population who have received at least one vaccine dose and 13 countries have reached 70% or more of the population who are fully vaccinated (Figure 17). A number of countries or regions within low- and middle-income countries have also reached 70% of the population with a single dose. Vaccination rates remain uniformly low in Africa and most of the Middle East, except Saudi Arabia, UAE, and Oman.

75% of adults say they would accept or would probably accept a vaccine for COVID-19. The proportion of the population who are open to receiving a COVID-19 vaccine ranges from 28% in Kazakhstan to 97% in the United Arab Emirates (Figure 19).

In our current reference scenario, we expect that 3.4 billion people will be vaccinated with at least one dose by December 1 (Figure 20). We expect that 35% of the world’s population will be fully vaccinated by December 1.

Based on rates of past infection and vaccination and the protection each of these give against infection, we estimate that currently 40% of the population is immune to the Delta variant. This will grow to 50% by December 1 (Figure 21).

Projections

In our reference scenario, which represents what we think is most likely to happen, our model projects 5,377,000 cumulative reported deaths due to COVID-19 on December 1. This represents 838,000 additional deaths from August 30 to December 1. Daily reported deaths will remain above 8,000 through to December 1 (Figure 22).

Under our reference scenario, our model projects 12.0 million cumulative excess deaths due to COVID-19 on December 1. This represents 2,045,000 additional deaths from August 30 to December 1 (Figure 22).

If universal mask coverage (95%) were attained in the next week, our model projects 262,000 fewer cumulative reported deaths compared to the reference scenario on December 1.

Under our worse scenario, our model projects 6.2 million cumulative reported deaths on December 1, an additional 829,000 deaths compared to our reference scenario. Daily reported deaths in the worse scenario rise to a peak over 27,500 by mid-November (Figure 22).

Daily infections in the reference scenario will rise to 6.2 million by mid-November (Figure 23). Daily infections in the worse scenario will rise to 13.0 million by late October (Figure 23).

Daily cases in the reference scenario increase to over 750,000 by December 1 (Figure 24). Daily cases in the worse scenario will rise to 2.5 million by November 1, 2021 (Figure 24).

Daily hospital census in the reference scenario will decline to 907,840 by October 9, 2021 (Figure 25). Daily hospital census in the worse scenario will rise to 2,807,110 by November 10, 2021 (Figure 25).
Model updates

For 22 US states, we have observed poor temporal concordance over recent weeks when comparing (a) deaths, hospitalizations, and cases to (b) seroprevalence surveys after performing assay-specific corrections for sero-reversion. To improve this, we changed the assumptions in the model as to which assay was used in those particular states – from one with substantial declines in sensitivity over time to one with more robust long-term sensitivity – which resulted in a smaller adjustment for these data, and thus lower estimates of seroprevalence. The below are examples from Florida. The top figure shows the previous approach; the lower figure shows the new approach. Squares are reported, circles are post-correction.
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>COVID-19</td>
<td>193,666</td>
<td>1</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>175,727</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 30, 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 30, 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 August 30, 2021

**Figure 7.** Mean effective R on August 19, 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 August 30, 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 August 30, 2021. This is estimated as the ratio of COVID-19 deaths to estimated daily COVID-19 infections.
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 30, 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 30, 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 30, 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>85%</td>
<td>52%</td>
<td>83%</td>
<td>57%</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>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 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 17. Percent of the population (A) having received at least one dose and (B) fully vaccinated against SARS-CoV-2 by August 30, 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 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. Percent of people who receive at least one dose of a COVID-19 vaccine and those who are fully vaccinated

![Graph showing the percentage of the population that has received at least one dose and those who are fully vaccinated over time.]

Figure 21. Percentage of people who are immune to non-escape variants and the percentage of people who are immune to escape variants

![Graph showing the percentage of the population that is immune to non-escape variants and those who are immune to escape variants over time.]

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 December 01, 2021 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 December 01, 2021 for three scenarios

Figure 24. Daily COVID-19 reported cases until December 01, 2021 for three scenarios
Figure 25. Daily COVID-19 hospital census 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.
To download our most recent results, visit our Data downloads page.