COVID-19 Results Briefing

Global

October 20, 2021

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

The world passed a watershed mark this week with global mobility going fully back to pre-COVID-19 baseline levels. Some countries in Southeast Asia and Australia and New Zealand have still mobility levels well below baseline, but others are above the January 2020 baseline level. All behaviors have not returned to pre-COVID-19 levels, however, as illustrated by the 57% of the adult population still reporting they wear a mask. Reported cases, hospitalizations, and reported deaths have all declined in the last week at the global level. Declines are strongly driven by the 40% of the global population that has been fully vaccinated and the 40% that have been previously infected. Despite these trends, we expect in our reference scenario that daily infections will increase from 3.2 million now to around 4.0 million by late December and stay above 3.5 million until February 1. Sustained transmission will likely be driven to a large extent by seasonality in the Northern Hemisphere, which will slow or reverse downward trends in many countries. Four factors have the biggest potential role in altering these expected trends. First, the emergence of a new variant with immune escape can dramatically alter the forecasts, as we have seen with the Delta variant. While some have called attention to the emergence in the UK of the AY4.2 Delta sub-lineage, it is too early to conclude this will substantially alter our forecasts. Second, countries that vaccinated their population relatively early are now entering the phase where waning immunity is likely to have an impact on transmission. Our models do not yet explicitly take into account waning vaccine-derived or natural immunity, but prototypes indicate that the Northern Hemisphere winter surge could be worse when this is factored into the analysis. Third, the rollout of vaccination for children ages 5-12 in countries with considerable supply and the use of boosters may counteract the impact of waning immunity and could diminish the currently estimated winter surge in the Northern Hemisphere. Fourth, mask use remains above 50% globally but is well below this level in many Northern Hemisphere locations. Seasonal mask use could substantially alter the trajectory of the next 4-6 months and could also mitigate the impact of flu in the Northern Hemisphere winter.

Current situation

- Estimated daily infections in the last week remained essentially unchanged at 3.2 million compared to the week before (Figure 1).
- Daily hospital census in the last week (through October 19) decreased to 584,000 per day on average compared to 608,000 the week before.
- Daily reported cases in the last week decreased to 440,000 per day on average compared to 475,700 the week before (Figure 2).
• Reported deaths due to COVID-19 in the last week decreased to 7,500 per day on average compared to 7,700 the week before (Figure 3).

• Total deaths due to COVID-19 in the last week decreased to 14,100 per day on average compared to 14,700 the week before (Figure 3). This makes COVID-19 the number 3 cause of death globally this week (Table 1). Estimated total daily deaths due to COVID-19 in the past week were 1.9 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 32 locations (Figure 4). These locations are concentrated in the United States and Central and Eastern Europe.

• The daily rate of total deaths due to COVID-19 is greater than 4 per million in 54 locations (Figure 4).

• We estimate that 40% of people globally have been infected as of October 18 (Figure 6).

• Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 158 locations (Figure 7). Increased transmission can be grouped in five main clusters: some parts of North America, the more southern parts of South America, West Africa, Central and Eastern Europe, and the Middle East and Australasia.

• The infection-detection rate globally was close to 13% on October 18 (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). Delta is the dominant variant in most locations. Important exceptions are some countries in South America.

**Trends in drivers of transmission**

• Mobility last week was 1% higher than the pre-COVID-19 baseline (Figure 11). Mobility was near baseline (within 10%) in 137 locations. Mobility was lower than 30% of baseline in Cambodia, Laos, Myanmar, Sri Lanka, and Vietnam.

• As of October 18, in the COVID-19 Trends and Impact Survey, 57% of people self-report that they always wore a mask when leaving their home (Figure 13).

• There were 163 diagnostic tests per 100,000 people on October 18 (Figure 15).

• As of October 18, 42 locations have reached 70% or more of the population who have received at least one vaccine dose, and 20 locations have reached 70% or more of the population who are fully vaccinated (Figure 17). Vaccination coverage below 30% for first dose is largely occurring in sub-Saharan Africa, some parts of Eastern Europe, Bolivia, Venezuela, Central America, and parts of South Asia and the Middle East.

• In the world, 75.5% 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. The proportion of the population who are open to receiving a COVID-19 vaccine ranges from 31% in Botswana to 100% in United Arab Emirates (Figure 19).
In our current reference scenario, we expect that 4.2 billion people will be vaccinated with at least one dose by February 1 (Figure 20). We expect that 49% of the population will be fully vaccinated by February 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 46% of the region is immune to the Delta variant. In our current reference scenario, we expect that by February 1, 52% 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 6,087,000 cumulative reported deaths due to COVID-19 on February 1. This represents 770,000 additional deaths from October 18 to February 1. Daily reported deaths will rise to 7,650 by October 30, 2021 (Figure 22).

Under our reference scenario, our model projects 13,443,000 cumulative total deaths due to COVID-19 on February 1. This represents 1,702,000 additional deaths from October 18 to February 1 (Figure 22).

If universal mask coverage (95%) were attained in the next week, our model projects 319,000 fewer cumulative reported deaths compared to the reference scenario on February 1.

Under our worse scenario, our model projects 6,995,000 cumulative reported deaths on February 1, an additional 908,000 deaths compared to our reference scenario. Daily reported deaths in the worse scenario will rise to 25,790 by January 9, 2022 (Figure 22).

Daily infections in the reference scenario will rise to 3,945,430 by December 30, 2021 (Figure 23). Daily infections in the worse scenario will rise to 10,952,440 by December 20, 2021 (Figure 23).

Daily cases in the reference scenario will rise to 603,070 by January 11, 2022 (Figure 24). Daily cases in the worse scenario will rise to 2,274,230 by December 30, 2021 (Figure 24).

Daily hospital census in the reference scenario will decline to 490,470 by November 25, 2021 (Figure 25). Daily hospital census in the worse scenario will rise to 1,977,900 by January 7, 2022 (Figure 25).
Model updates
No model updates.
**Figure 1.** Daily COVID-19 hospital census and infections

![Graph showing daily COVID-19 hospital census and infections from January 20 to November 21. The graph displays two lines: one for daily hospital census and another for daily infections.](image)

**Figure 2.** Reported daily COVID-19 cases, moving average

![Graph showing reported daily COVID-19 cases from February 20 to October 21. The graph displays a line for daily cases.](image)
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>Ischemic heart disease</td>
<td>175,727</td>
<td>1</td>
</tr>
<tr>
<td>Stroke</td>
<td>126,014</td>
<td>2</td>
</tr>
<tr>
<td>COVID-19</td>
<td>98,487</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. Smoother trend estimate of reported daily COVID-19 deaths (blue) and total daily deaths due to COVID-19 (orange)
**Figure 4.** Daily COVID-19 death rate per 1 million on October 18, 2021

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

![Map of daily reported COVID-19 death rate per 1 million showing color codes for different ranges.]

B. Daily total COVID-19 death rate per 1 million

![Map of daily total COVID-19 death rate per 1 million showing color codes for different ranges.]

IHME
Figure 5. Cumulative COVID-19 deaths per 100,000 on October 18, 2021

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

B. Total cumulative COVID-19 deaths per 100,000
Figure 6. Estimated percent of the population infected with COVID-19 on October 18, 2021

Figure 7. Mean effective R on October 7, 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 October 18, 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 October 18, 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 October 18, 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 October 18, 2021
Figure 15. Trend in COVID-19 diagnostic tests per 100,000 people

Figure 16. COVID-19 diagnostic tests per 100,000 people on October 18, 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 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>85%</td>
<td>49%</td>
</tr>
<tr>
<td>CoronaVac</td>
<td>50%</td>
<td>43%</td>
<td>38%</td>
</tr>
<tr>
<td>Covaxin</td>
<td>78%</td>
<td>68%</td>
<td>60%</td>
</tr>
<tr>
<td>Johnson &amp; Johnson</td>
<td>86%</td>
<td>60%</td>
<td>56%</td>
</tr>
<tr>
<td>Moderna</td>
<td>94%</td>
<td>94%</td>
<td>80%</td>
</tr>
<tr>
<td>Novavax</td>
<td>89%</td>
<td>79%</td>
<td>69%</td>
</tr>
<tr>
<td>Pfizer/BioNTech</td>
<td>94%</td>
<td>85%</td>
<td>78%</td>
</tr>
<tr>
<td>Sinopharm</td>
<td>73%</td>
<td>63%</td>
<td>56%</td>
</tr>
<tr>
<td>Sputnik-V</td>
<td>92%</td>
<td>80%</td>
<td>70%</td>
</tr>
<tr>
<td>Tianjin</td>
<td>66%</td>
<td>57%</td>
<td>50%</td>
</tr>
<tr>
<td>CanSino</td>
<td>75%</td>
<td>65%</td>
<td>57%</td>
</tr>
<tr>
<td>Other vaccines</td>
<td>91%</td>
<td>85%</td>
<td>78%</td>
</tr>
<tr>
<td>Other vaccines (mRNA)</td>
<td>91%</td>
<td>86%</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 October 18, 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 February 01, 2022 for three scenarios

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

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

Figure 24. Daily COVID-19 reported cases until February 01, 2022 for three scenarios
Figure 25. Daily COVID-19 hospital census until February 01, 2022 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.