COVID-19 Results Briefing

Global

April 15, 2021

This document contains summary information on the latest projections from the IHME model on COVID-19 globally. The model was run on April 13, 2021, with data through April 12, 2021.

The global COVID-19 situation continues to worsen. Daily infections are at an all-time high, and detected infections, namely reported cases, are approaching the high of 700,000 seen in early January. The adverse global trends are driven to a very large extent by the surge in South Asia and also the continuing P.1 epidemic in much of South America. Case counts are starting to decline in Europe, although this trend may still be affected by lags in reporting over the Easter holidays. Cases are increasing slowly in the US and Canada as well. The trend in Europe and the Middle East appears to be driven by the B.1.1.7 variant. Because of relatively few publicly reported sequences in South Asia, it is harder to determine which variant is the main driver. Given high levels of previous infection in some states of India such as Delhi, but continued expansion of cases, whatever variant is driving the surge appears likely to be an escape variant, possible B.1.617. Our reference scenario forecasts for the globe suggest daily deaths could begin to decline in late May. But this reference forecast may be optimistic because we have not fully taken into account which variant accounts for the dramatic surge in South Asia, due to sparse sequence data. Global strategies to manage the epidemic at this point remain the same. First, accelerate global efforts to vaccinate; as many high-income countries will saturate demand for vaccination in the next month, there are many opportunities for vaccine donation. Second, sustain mask use. We remain concerned that social desirability bias may be leading to individuals over-reporting mask use in the Facebook surveys; declines in mask use may already be unfolding in many locations. Third, continue to impose social distancing mandates in settings where major variant driven surges unfold.

Current situation

• Daily reported cases in the last week increased to 634,700 per day on average compared to 581,800 the week before (Figure 1).

• Daily deaths in the last week increased to 13,000 per day on average compared to 11,500 the week before (Figure 2). This makes COVID-19 the number 3 cause of death globally this week (Table 1).

• The daily death rate is greater than 4 per million in 32 countries (Figure 3).

• We estimated that 13% of people globally have been infected as of April 12 (Figure 4).

• Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 93 countries or regions of countries (Figure 5).

• The infection detection rate globally is close to 15% on April 12 (Figure 6).
• Based on publicly released sequencing data, which has an average lag of 2-3 weeks, and our variant spread model, we estimate current prevalence of key variants (Figure 7). B.1.1.7 is the dominant variant in nearly all locations in Europe and many parts of the Middle East and is rapidly becoming dominant in the US and Canada. B.1.351 is dominant in southern Africa and P.1 throughout most of South America. B.1.617 is not tracked in enough locations to be included in this analysis but may be expanding in South Asia.

Trends in drivers of transmission

• Mobility last week was 20% lower than the pre-COVID-19 baseline (Figure 9). Mobility was near baseline (within 10%) in 45 countries. Mobility was lower than 30% of baseline in 64 countries.

• As of April 12, according to Facebook surveys, 63% of people self-reported always wearing a mask when leaving their home (Figure 11). Mask use was lower than 50% in 44 countries, most of which are in sub-Saharan Africa and North Africa.

• There were 124 diagnostic tests per 100,000 people on April 12 (Figure 13).

• Globally, 69.6% of people have been vaccinated or say they would accept or probably accept a vaccine for COVID-19 (Figure 16). The fraction of the population who are open to receiving a COVID-19 vaccine ranges from 27% in Latvia to 96% in Extremadura (Figure 17).

• In our current reference scenario, we expect that 2.9 billion will have received at least one dose of vaccine by August 1 (Figure 18).

Projections

• In our reference scenario, which represents what we think is most likely to happen, our model projects 4,677,000 cumulative deaths on August 1, 2021. This represents 1,275,000 additional deaths from April 12 to August 1 (Figure 19). Daily deaths are expected to peak in early to mid-May and then decline to nearly 5,000 by August 1 (Figure 20).

• If universal mask coverage (95%) were attained in the next week, our model projects 286,000 fewer cumulative deaths compared to the reference scenario on August 1, 2021 (Figure 19).

• Under our worse scenario, in which mask use declines faster and mobility increases faster, our model projects 5,051,000 cumulative deaths on August 1, 2021, an additional 374,000 deaths compared to our reference scenario (Figure 19). Daily deaths will remain over 10,000 through to August 1.

• Daily infections are expected to peak in the reference scenario in early May and then decline to 2 million by August 1. In the worse scenario, daily infections increase through to mid-May and the decline to 5 million by August 1.

• By August 1, we project that 393,200 lives will be saved by the projected vaccine rollout.
Figure 22 compares our reference scenario forecasts to other publicly archived models. Forecasts are widely divergent.

At some point from April through August 1, 86 countries will have high or extreme stress on hospital beds (Figure 23). At some point from April through August 1, 96 countries will have high or extreme stress on ICU capacity (Figure 24).

Model updates

There are no major updates in the model this week.
**Figure 1.** Reported daily COVID-19 cases

**Table 1.** Ranking of 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>90,905</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. Reported daily COVID-19 deaths and smoothed trend estimate.
Figure 3. Daily COVID-19 death rate per 1 million on April 12, 2021

Figure 4. Estimated percent of the population infected with COVID-19 on April 12, 2021
Figure 5. Mean effective R on April 01, 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 6. 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 to detection rate (IDR) can exceed 100% at particular points in time.*
Figure 7. Percent of circulating SARS-CoV-2 for 3 primary variants on April 12, 2021.

A. Percent B.1.1.7 variant

B. Percent B.1.351 variant

C. Percent P1 variant
Figure 8. Infection fatality ratio on April 12, 2021. This is estimated as the ratio of COVID-19 deaths to infections based on the SEIR disease transmission model.
Critical drivers

Figure 9. Trend in mobility as measured through smartphone app use compared to January 2020 baseline

Figure 10. Mobility level as measured through smartphone app use compared to January 2020 baseline (percent) on April 12, 2021
Figure 11. Trend in the proportion of the population reporting always wearing a mask when leaving home.

![Trend in the proportion of the population reporting always wearing a mask when leaving home](image)

Figure 12. Proportion of the population reporting always wearing a mask when leaving home on April 12, 2021.

![Proportion of the population reporting always wearing a mask when leaving home on April 12, 2021](image)
Figure 13. Trend in COVID-19 diagnostic tests per 100,000 people

Figure 14. COVID-19 diagnostic tests per 100,000 people on April 09, 2021
Figure 15. Increase in the risk of death due to pneumonia on February 1 2020 compared to August 1 2020

Table 3. 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 (http://www.healthdata.org/node/8584).

<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 &amp; P.1</th>
<th>Efficacy at preventing infection: B.1.351 &amp; P.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>AstraZeneca</td>
<td>75%</td>
<td>52%</td>
<td>10%</td>
<td>6%</td>
</tr>
<tr>
<td>CoronaVac</td>
<td>50%</td>
<td>43%</td>
<td>38%</td>
<td>25%</td>
</tr>
<tr>
<td>Janssen</td>
<td>72%</td>
<td>72%</td>
<td>64%</td>
<td>42%</td>
</tr>
<tr>
<td>Moderna</td>
<td>94%</td>
<td>85%</td>
<td>72%</td>
<td>47%</td>
</tr>
<tr>
<td>Novavax</td>
<td>89%</td>
<td>77%</td>
<td>49%</td>
<td>32%</td>
</tr>
<tr>
<td>Pfizer/BioNTech</td>
<td>91%</td>
<td>86%</td>
<td>69%</td>
<td>45%</td>
</tr>
<tr>
<td>Sinopharm</td>
<td>73%</td>
<td>63%</td>
<td>56%</td>
<td>36%</td>
</tr>
<tr>
<td>Sputnik-V</td>
<td>92%</td>
<td>80%</td>
<td>70%</td>
<td>45%</td>
</tr>
<tr>
<td>Tianjin</td>
<td>66%</td>
<td>57%</td>
<td>50%</td>
<td>32%</td>
</tr>
<tr>
<td>CanSino</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other vaccines (mRNA)</td>
<td>95%</td>
<td>83%</td>
<td>72%</td>
<td>47%</td>
</tr>
</tbody>
</table>
**Figure 16.** Trend in the estimated proportion of the adult (18+) population that have been vaccinated or is open to receiving a COVID-19 vaccine based on Facebook survey responses (yes and yes, probably).

**Figure 17.** This figure shows the estimated proportion of the adult (18+) population that has been vaccinated or is open to receiving a COVID-19 vaccine based on Facebook survey responses (yes and yes, probably).
Figure 18. The 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.
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 UK.
- 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 P1 begin to spread within 3 weeks in adjacent locations that do not already have B.1.351 or P1 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 19. Cumulative COVID-19 deaths until August 01, 2021 for three scenarios

Figure 20. Daily COVID-19 deaths until August 01, 2021 for three scenarios,
Figure 21. Daily COVID-19 infections until August 01, 2021 for three scenarios.
More information

Data sources:

Mask use data sources include Premise; Facebook Global Symptom Survey (This research is based on survey results from University of Maryland Social Data Science Center) and the Facebook United States Symptom Survey (in collaboration with Carnegie Mellon University); Kaiser Family Foundation; YouGov COVID-19 Behaviour Tracker survey.

Vaccine hesitancy data are from the COVID-19 Beliefs, Behaviors, and Norms Study, a survey conducted on Facebook by the Massachusetts Institute of Technology (https://covidsurvey.mit.edu/).

Vaccine hesitancy data are from the Facebook Global Symptom Survey (This research is based on survey results from University of Maryland Social Data Science Center), the Facebook United States Symptom Survey (in collaboration with Carnegie Mellon University), and from the Facebook COVID-19 Beliefs, Behaviors, and Norms Study conducted by the Massachusetts Institute of Technology.

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.