COVID-19 Results Briefing

The African Region

March 19, 2022

This document contains summary information on the latest projections from the IHME model on COVID-19 in the African Region. The model was run on March 19, 2022, with data through March 14, 2022.

Estimated COVID-19 infections, hospital census, and daily reported deaths continue to decline across the African Region, while daily reported cases increased marginally this week. Despite a steady return to pre-COVID behaviors, including mobility rising to 36% higher than pre-COVID baselines and mask use dropping to 38%, transmission continues to decline. Data reporting in some countries is becoming less frequent, and we are detecting more and more anomalies in some countries’ data as attention may be turning elsewhere. Our reference and alternative scenarios suggest that there should be a steady decline in transmission until the southern hemisphere winter months, at which time we project a very modest increase in transmission.

Health officials in the African Region should take note of the rising case numbers in select countries in Western Europe including Germany, the UK, Austria, Switzerland, Italy, and Greece, which are cause for concern. The increase has been attributed to one of three factors: 1) declining mask use and social distancing, 2) the slow spread of the BA.2 sub-variant of Omicron, 3) waning immunity from vaccines and previous infections, or both combined. BA.2 has been present in many countries since December and more rapidly replaced BA.1 in Denmark. While BA.2 is able to replace BA.1, it has not necessarily led to a major sustained increase in transmission. In the Netherlands, the secondary increase of BA.2 appears to have already peaked. In some countries, such as South Africa, BA.2 spread has not led to any population-level increase in cases at all. Our models suggest that behavioral modification, particularly declines in mask use and social distancing, may be the most important explanation for the increasing case numbers in some countries in Europe.

Our models do not suggest there will be much of an increase in the region in the next weeks, if at all. Any increase in transmission, like those seen with effective R rising above one in pockets of West and Central Africa, Eswatini, and Tanzania, is expected to be short lived. However, it is certainly possible that the interaction of a rapid return to pre-COVID behavior, low vaccination rates, waning immunity, and the spread of BA.2 could see a short period of increasing case numbers in some countries.

Expanding vaccination coverage to those countries with insufficient supply, many of which are in sub-Saharan Africa, remains a moral imperative; however, the impact on hospitalizations and deaths in the coming months may be relatively small for three reasons.
First, cumulative infection rates in the African Region are high, and we estimate that 70% of people in the African Region have been infected; incremental immunity through vaccination will be beneficial but will be much less than vaccination in an immunologically naive population. Second, vaccine hesitancy is very high in the African Region and efforts to improve vaccine uptake should continue. Third, satisfying unmet demand for vaccination in some of these health systems, even when supplies are unconstrained due to health system constraints, may further reduce ultimate vaccination rates. Promoting vaccination is the right thing to do so that anyone who wants to be vaccinated can be vaccinated on moral grounds. However, it is equally or even more important to invest in expanding antiviral production and delivery of antivirals to all those at risk such as the population over 70 in all countries. International efforts to promote access and appropriate use of antivirals lags behind the policy attention on vaccination.

Appropriate use of antivirals may also be a more effective way to deal with the emergence of new variants. Given the experience with greatly reduced vaccine efficacy for Omicron as opposed to prior variants, the effectiveness of current vaccines against future new variants is unknown. It appears more likely that the antivirals will remain effective against new variants.

**Current situation**

- Daily infections in the last week decreased to 398,000 per day on average compared to 437,000 the week before (Figure 1.1). Daily hospital census in the last week (through March 14) decreased to 8,800 per day on average compared to 11,000 the week before.
- Daily reported cases in the last week increased to 3,300 per day on average compared to 3,200 the week before (Figure 2.1).
- Reported deaths due to COVID-19 in the last week decreased to 35 per day on average compared to 56 the week before (Figure 3.1).
- Total deaths due to COVID-19 in the last week decreased to 290 per day on average compared to 430 the week before (Figure 3.1). This makes COVID-19 the number 17 cause of death in the African Region this week (Table 1). Estimated total daily deaths due to COVID-19 in the past week were 8.2 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 no countries (Figure 4.1).
- The daily rate of total deaths due to COVID-19 is greater than 4 per million in no countries (Figure 4.2).
- We estimate that 70% of people in the African Region have been infected at least once as of March 14 (Figure 6.1). Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 11 countries (Figure 7.1).
- The infection-detection rate in the African Region was close to 1% on March 14 (Figure 8.1).
Based on the GISAID and various national databases, combined with our variant spread model, we estimate the current prevalence of variants of concern (Figures 9.1-9.5). We estimate that the Alpha variant is circulating in 39 countries, that the Beta variant is circulating in 38 countries, that the Delta variant is circulating in 44 countries, that the Gamma variant is circulating in 26 countries, and that the Omicron variant is circulating in 44 countries.

Trends in drivers of transmission

- Mobility last week was 36% higher than the pre-COVID-19 baseline (Figure 11.1). Mobility was lower than 30% of baseline in no countries.
- As of March 14, in the COVID-19 Trends and Impact Survey, 38% of people self-report that they always wore a mask when leaving their home, the same as last week (Figure 13.1).
- There were 15 diagnostic tests per 100,000 people on March 14 (Figure 15.1).
- As of March 14, two countries have reached 70% or more of the population who have received at least one vaccine dose, and two countries have reached 70% or more of the population who are fully vaccinated (Figure 17.1). 17% of people in the African Region have received at least one vaccine dose, and 11% are fully vaccinated.
- In the African Region, 56.8% 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. This is down by 0.3 percentage points from last week. The proportion of the population who are open to receiving a COVID-19 vaccine ranges from 30% in Lesotho to 73% in Mozambique (Figure 19.1).
- In our current reference scenario, we expect that 235.2 million people will be vaccinated with at least one dose by July 1 (Figure 20.1). We expect that 18% of the population will be fully vaccinated by July 1.

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 seven days.
- Mobility increases as vaccine coverage increases.
- Omicron variant spreads according to our flight and local spread model.
- 80% of those who have had two doses of vaccine (or one dose for Johnson & Johnson) receive a third dose at six months after their second dose.
The **80% mask use scenario** makes all the same assumptions as the reference scenario but assumes all locations reach 80% mask use within seven days. If a location currently has higher than 80% use, mask use remains at the current level.

The **third dose scenario** is the same as the reference scenario but assumes that 100% of those who have received two doses of vaccine will get a third dose at six months.

**Projections**

**Infections**

- Daily estimated infections in the **reference scenario** will rise to 828,090 by July 1, 2022 (Figure 22.1).
- Daily estimated infections in the **80% mask use scenario** will rise to 443,000 by July 1, 2022 (Figure 22.1).
- Daily estimated infections in the **third dose scenario** will rise to 754,640 by July 1, 2022 (Figure 22.1).

**Cases**

- Daily estimated cases in the **reference scenario** will rise to 5,170 by July 1, 2022 (Figure 22.2).
- Daily estimated cases in the **80% mask use scenario** will decline to 960 by May 6, 2022 (Figure 22.2).
- Daily estimated cases in the **third dose scenario** will rise to 3,950 by July 1, 2022 (Figure 22.2).

**Hospitalizations**

- Daily hospital census in the **reference scenario** will rise to 9,760 by July 1, 2022 (Figure 22.3).
- Daily hospital census in the **80% mask use scenario** will decline to 2,080 by May 1, 2022 (Figure 22.3).
- Daily hospital census in the **third dose scenario** will rise to 7,860 by July 1, 2022 (Figure 22.3).

**Deaths**

- In our **reference scenario**, our model projects 171,000 cumulative reported deaths due to COVID-19 on July 1. This represents 2,200 additional deaths from March 14 to July 1. Daily reported COVID-19 deaths in the **reference scenario** will rise to 40 by July 1, 2022 (Figure 22.4).
- Under our **reference scenario**, our model projects 1,897,000 cumulative total deaths due to COVID-19 on July 1. This represents 24,000 additional deaths from March 14 to July 1 (Figure 22.5).
• In our **80% mask use scenario**, our model projects 170,000 cumulative reported deaths due to COVID-19 on July 1. This represents 1,500 additional deaths from March 14 to July 1. Daily reported COVID-19 deaths in the **80% mask use scenario** will decline to 10 by May 13, 2022 (Figure 22.4).

• In our **third dose scenario**, our model projects 171,000 cumulative reported deaths due to COVID-19 on July 1. This represents 1,900 additional deaths from March 14 to July 1. Daily reported COVID-19 deaths in the **third dose scenario** will rise to 30 by July 1, 2022 (Figure 22.4).

• Figure 23.1 compares our reference scenario forecasts to other publicly archived models. Forecasts are widely divergent.

• At some point from March through July 1, no countries will have high or extreme stress on hospital beds (Figure 24.1). At some point from March through July 1, 16 countries will have high or extreme stress on intensive care unit (ICU) capacity (Figure 25.1).
Model updates

We had previously developed a model in which deaths and the infection-fatality ratio, hospital admissions and the infection-hospitalization ratio, and cases and the infection-detection ratio were all passed into a single run of our ODE system to simultaneously fit past transmission intensity for a given location over time. We have seen improved stability when instead we first derive transmission intensity based on each of the three abovementioned pairs of daily reported epi statistics and estimated ratios in separate SEIR models and then average them.
The African Region

Figure 1.1: Daily COVID-19 hospital census and estimated infections

Figure 2.1: Reported daily COVID-19 cases, moving average
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>Neonatal disorders</td>
<td>14,422</td>
<td>1</td>
</tr>
<tr>
<td>Lower respiratory infections</td>
<td>12,732</td>
<td>2</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>12,224</td>
<td>3</td>
</tr>
<tr>
<td>Malaria</td>
<td>11,351</td>
<td>4</td>
</tr>
<tr>
<td>Diarrheal diseases</td>
<td>11,088</td>
<td>5</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>8,306</td>
<td>6</td>
</tr>
<tr>
<td>Stroke</td>
<td>8,063</td>
<td>7</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>7,097</td>
<td>8</td>
</tr>
<tr>
<td>Congenital birth defects</td>
<td>3,721</td>
<td>9</td>
</tr>
<tr>
<td>Cirrhosis and other chronic liver diseases</td>
<td>3,615</td>
<td>10</td>
</tr>
<tr>
<td>COVID-19</td>
<td>2,012</td>
<td>17</td>
</tr>
</tbody>
</table>

Figure 3.1: Smoothed trend estimate of reported daily COVID-19 deaths (blue) and total daily deaths due to COVID-19 (orange)
Daily COVID-19 death rate per 1 million on March 14, 2022

Figure 4.1: Daily reported COVID-19 death rate per 1 million

Figure 4.2: Daily total COVID-19 death rate per 1 million
Cumulative COVID-19 deaths per 100,000 on March 14, 2022

**Figure 5.1: Reported cumulative COVID-19 deaths per 100,000**

**Figure 5.2: Total cumulative COVID-19 deaths per 100,000**
Figure 6.1: Estimated percent of the population infected with COVID-19 on March 14, 2022

Figure 7.1: **Mean effective R on March 3, 2022.** 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 8.1: Percent of estimated 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.
Estimated percent of circulating SARS-CoV-2 for primary variant families on March 14, 2022

Figure 9.1: Estimated percent of new infections that are Alpha variant

Figure 9.2: Estimated percent of new infections that are Beta variant
Figure 9.3: Estimated percent of new infections that are Delta variant

Figure 9.4: Estimated percent of new infections that are Gamma variant
Figure 9.5: Estimated percent of new infections that are Omicron variant
Figure 10.1: Infection-fatality rate on March 14, 2022. This is estimated as the ratio of COVID-19 deaths to estimated daily COVID-19 infections.
Critical drivers

Table 2: Current mandate implementation
Figure 11.1: Trend in mobility as measured through smartphone app use, compared to January 2020 baseline
Figure 12.1: Mobility level as measured through smartphone app use, compared to January 2020 baseline (percent) on March 14, 2022
Figure 13.1: Trend in the proportion of the population reporting always wearing a mask when leaving home

Figure 14.1: Proportion of the population reporting always wearing a mask when leaving home on March 14, 2022
Figure 15.1: Trend in COVID-19 diagnostic tests per 100,000 people

Figure 16.1: COVID-19 diagnostic tests per 100,000 people on March 14, 2022
Table 3: Estimates of vaccine effectiveness for specific vaccines used in the model at preventing severe disease and 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>Ancestral</th>
<th>Alpha</th>
<th>Beta</th>
<th>Gamma</th>
<th>Delta</th>
<th>Omicron</th>
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<tbody>
<tr>
<td></td>
<td>Severe disease</td>
<td>Infection</td>
<td>Severe disease</td>
<td>Infection</td>
<td>Severe disease</td>
<td>Infection</td>
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<tr>
<td>AstraZeneca</td>
<td>94%</td>
<td>63%</td>
<td>94%</td>
<td>63%</td>
<td>94%</td>
<td>69%</td>
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<tr>
<td>CanSino</td>
<td>66%</td>
<td>62%</td>
<td>66%</td>
<td>62%</td>
<td>64%</td>
<td>61%</td>
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<tr>
<td>CoronaVac</td>
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<td>47%</td>
<td>50%</td>
<td>47%</td>
<td>49%</td>
<td>46%</td>
</tr>
<tr>
<td>Covaxin</td>
<td>78%</td>
<td>73%</td>
<td>78%</td>
<td>73%</td>
<td>76%</td>
<td>72%</td>
</tr>
<tr>
<td>Johnson &amp; Johnson</td>
<td>86%</td>
<td>72%</td>
<td>86%</td>
<td>72%</td>
<td>76%</td>
<td>64%</td>
</tr>
<tr>
<td>Moderna</td>
<td>97%</td>
<td>92%</td>
<td>97%</td>
<td>92%</td>
<td>97%</td>
<td>91%</td>
</tr>
<tr>
<td>Novavax</td>
<td>89%</td>
<td>83%</td>
<td>89%</td>
<td>83%</td>
<td>86%</td>
<td>82%</td>
</tr>
<tr>
<td>Pfizer/BioNTech</td>
<td>95%</td>
<td>86%</td>
<td>95%</td>
<td>86%</td>
<td>95%</td>
<td>84%</td>
</tr>
<tr>
<td>Sinopharm</td>
<td>73%</td>
<td>68%</td>
<td>73%</td>
<td>68%</td>
<td>71%</td>
<td>67%</td>
</tr>
<tr>
<td>Sputnik-V</td>
<td>92%</td>
<td>86%</td>
<td>92%</td>
<td>86%</td>
<td>89%</td>
<td>85%</td>
</tr>
<tr>
<td>Other vaccines</td>
<td>75%</td>
<td>70%</td>
<td>75%</td>
<td>70%</td>
<td>73%</td>
<td>69%</td>
</tr>
<tr>
<td>Other vaccines (mRNA)</td>
<td>91%</td>
<td>86%</td>
<td>91%</td>
<td>86%</td>
<td>88%</td>
<td>85%</td>
</tr>
</tbody>
</table>
Percent of the population having received at least one dose (17.1) and fully vaccinated against SARS-CoV-2 (17.2) by March 14, 2022

Figure 17.1: Percent of the population having received one dose of a COVID-19 vaccine

Figure 17.2: Percent of the population fully vaccinated against SARS-CoV-2
Figure 18.1: 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 19.1: 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 20.1: Percent of people who receive at least one dose of a COVID-19 vaccine and those who are fully vaccinated

Figure 21.1: Percent of people who are immune to Delta or Omicron. Immunity is based on protection due to prior vaccination and infection(s). Moreover, variant-specific immunity is also based on variant-variant specific protection.
Projections and scenarios

Figure 22.1: Daily COVID-19 infections until July 01, 2022 for three scenarios

Figure 22.2: Daily COVID-19 reported cases until July 01, 2022 for three scenarios
Figure 22.3: Daily COVID-19 hospital census until July 01, 2022 for three scenarios

The African Region

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Figure 22.4: Reported daily COVID-19 deaths per 100,000
Figure 22.5: Total daily COVID-19 deaths per 100,000
Figure 23.1: Comparison of reference model projections with other COVID modeling groups. For this comparison, we are including projections of daily COVID-19 deaths from other modeling groups when available, last model update in brackets: Delphi from the Massachusetts Institute of Technology (Delphi) [March 20, 2022], Imperial College London (Imperial) [January 20, 2022], the SI-KJalpha model from the University of Southern California (SIKJalpha) [March 20, 2022]. Daily deaths from other modeling groups are smoothed to remove inconsistencies with rounding. Regional values are aggregates from available locations in that region.
Figure 24.1: The estimated inpatient hospital usage is shown over time. The percent of hospital beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of beds occupied by COVID-19 patients. Less than 5% is considered low stress, 5-9% is considered moderate stress, 10-19% is considered high stress, and 20% or greater is considered extreme stress.
Figure 25.1: The estimated intensive care unit (ICU) usage is shown over time. The percent of ICU beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of ICU beds occupied by COVID-19 patients. Less than 10% is considered low stress, 10-29% is considered moderate stress, 30-59% is considered high stress, and 60% or greater is considered extreme stress.
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.