COVID-19 Results Briefing
Brazil
January 8, 2022

This document contains summary information on the latest projections from the IHME model on COVID-19 in Brazil. The model was run on January 7, 2022, with data through January 3, 2022.

Current situation

- Daily infections in the last week increased to 594,700 per day on average compared to 262,700 the week before (Figure 1.1). Daily hospital census in the last week (through January 3) increased to 5,600 per day on average compared to 5,200 the week before.
- Daily reported cases in the last week increased to 16,300 per day on average compared to 10,500 the week before (Figure 2.1).
- Reported deaths due to COVID-19 in the last week decreased to 140 per day on average compared to 140 the week before (Figure 3.1).
- Total deaths due to COVID-19 in the last week decreased to 140 per day on average compared to 150 the week before (Figure 3.1). This makes COVID-19 the number 8 cause of death in Brazil this week (Table 1). Estimated total daily deaths due to COVID-19 in the past week were 1 times larger than the reported number of deaths.
- No locations had daily reported COVID-19 death rates greater than 4 per million (Figure 4.1).
- No locations had daily total COVID-19 death rates greater than 4 per million (Figure 4.2).
- We estimate that 47% of people in Brazil have been infected at least once as of January 3 (Figure 6.1). Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in 27 states. (Figure 7.1).
- The infection-detection rate in Brazil was close to 14% on January 3 (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 (Figure 9.1-Figure 9.5). We estimate that the Alpha variant is circulating in 0 states, that the Beta variant is circulating in 0 states, that the Delta variant is circulating in 27 states, that the Gamma variant is circulating in 0 states and that the Omicron variant is circulating in 27 states.

Trends in drivers of transmission

- Mobility last week was 16% higher than the pre-COVID-19 baseline (Figure 11.1). Mobility was lower than 30% of baseline in no locations.
- As of January 3, 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 57% last week (Figure 13.1).
- There were 43 diagnostic tests per 100,000 people on January 3 (Figure 15.1).
- As of January 3, 10 states have reached 70% or more of the population who have received at least one vaccine dose and 6 states have reached 70% or more of the population who are fully vaccinated (Figure 17.1). 71% of people in Brazil have received at least one vaccine dose and 65% are fully vaccinated.
- In Brazil, 91.6% 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 0.2 percentage points from last week. The proportion of the population who are open to receiving a COVID-19 vaccine ranges from 80% in Amapá to 100% in São Paulo (Figure 19.1).
- In our current reference scenario, we expect that 153.5 million people will be vaccinated with at least one dose by May 1 (Figure 20.1). We expect that 67% of the population will be fully vaccinated by May 1.
Projections

Infections

- Daily estimated infections in the reference scenario, which represents what we think is most likely to happen, will rise to 2,388,030 by February 3, 2022 (Figure 21.1).
- Daily estimated infections in the high severity of Omicron scenario will rise to 2,390,130 by February 3, 2022 (Figure 21.1).
- Daily estimated infections in the 80% mask coverage scenario will rise to 1,807,680 by February 5, 2022 (Figure 21.1).
- Daily estimated infections in the third dose scenario will rise to 1,946,370 by February 4, 2022 (Figure 21.1).
- Daily estimated infections in the reduced vaccine hesitancy scenario will rise to 1,977,670 by February 5, 2022 (Figure 21.1).

Cases

- Daily cases in the reference scenario will rise to 281,520 by February 20, 2022 (Figure 21.2).
- Daily cases in the high severity of Omicron scenario will rise to 281,710 by February 20, 2022 (Figure 21.2).
- Daily cases in the 80% mask coverage scenario will rise to 207,170 by February 23, 2022 (Figure 21.2).
- Daily cases in the third dose scenario will rise to 224,550 by February 21, 2022 (Figure 21.2).
- Daily cases in the reduced vaccine hesitancy scenario will rise to 229,020 by February 21, 2022 (Figure 21.2).

Hospitalizations

- Daily hospital census in the reference scenario will rise to 65,970 by February 28, 2022 (Figure 21.3).
- Daily hospital census in the high severity of Omicron scenario will rise to 130,200 by February 28, 2022 (Figure 21.3).
- Daily hospital census in the 80% mask coverage scenario will rise to 49,150 by March 3, 2022 (Figure 21.3).
- Daily hospital census in the third dose scenario will rise to 45,350 by February 27, 2022 (Figure 21.3).
- Daily hospital census in the reduced vaccine hesitancy scenario will rise to 46,510 by February 28, 2022 (Figure 21.3).

Deaths

- In our reference scenario, our model projects 650,000 cumulative reported deaths due to COVID-19 on May 1. This represents 30,000 additional deaths from January 3 to May 1. Daily reported COVID-19 deaths in the reference scenario will rise to 400 by February 26, 2022 (Figure 21.4).
- Under our reference scenario, our model projects 672,000 cumulative total deaths due to COVID-19 on May 1. This represents 31,000 additional deaths from January 3 to May 1 (Figure 24.2).
- In our high severity of Omicron scenario, our model projects 668,000 cumulative reported deaths due to COVID-19 on May 1. This represents 47,000 additional deaths from January 3 to May 1. Daily reported COVID-19 deaths in the high severity of Omicron scenario will rise to 670 by March 2, 2022 (Figure 21.4).
- In our 80% mask coverage scenario, our model projects 646,000 cumulative reported deaths due to COVID-19 on May 1. This represents 25,000 additional deaths from January 3 to May 1. Daily reported COVID-19 deaths in the 80% mask coverage scenario will rise to 290 by February 26, 2022 (Figure 21.4).
- In our **third dose scenario**, our model projects 640,000 cumulative reported deaths due to COVID-19 on May 1. This represents 20,000 additional deaths from January 3 to May 1. Daily reported COVID-19 deaths in the **third dose scenario** will rise to 250 by February 25, 2022 (Figure 21.4).

- In our **reduced vaccine hesitancy scenario**, our model projects 640,000 cumulative reported deaths due to COVID-19 on May 1. This represents 20,000 additional deaths from January 3 to May 1. Daily reported COVID-19 deaths in the **reduced vaccine hesitancy scenario** will rise to 260 by February 25, 2022 (Figure 21.4).

- Figure 22.1 compares our reference scenario forecasts to other publicly archived models. Forecasts are widely divergent.

- At some point from January through May 1, 24 states will have high or extreme stress on hospital beds (Figure 23.1). At some point from January through May 1, 27 states will have high or extreme stress on intensive care unit (ICU) capacity (Figure 24.1).
Model updates

In this week’s update, we have made changes to key Omicron parameters based on data from South Africa, the United Kingdom, and the US. First, based on an analysis of the UK Office of National Statistics prevalence of infection surveys, we have revised the range of asymptomatic infection from 90% to 80%–90%. Second, the degree of transmissibility of Omicron compared to ancestral variants was increased from 1.5–2.5 to 2–3. This adjustment was based on matching the scale-up curves for Omicron from the analysis of the GISAID database. Third, the infection-hospitalization rate for Omicron relative to Delta has been increased from a mean of 0.07 to a mean of 0.125 (range 0.0625–0.1875) based on data from the UK, US, and South Africa. Fourth, the infection-hospitalization rate has been decreased from a mean of 0.02 to 0.01875 (range 0.009375–0.028125) based on published studies of the hospital-fatality rate, the case-hospitalization rate, and the fraction asymptomatic. Fifth, based on the timing of Omicron surges, we have adjusted the date of Omicron arrival for a number of countries to match the timing of increases in reported cases, taking into account the lag from introduction to the exponential rise in reported cases. Sixth, in the high-severity scenario, we have used IFR and IHR values that are double the ranges used in the reference scenario.
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>Ischemic heart disease</td>
<td>3,293</td>
<td>1</td>
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<tr>
<td>Stroke</td>
<td>2,519</td>
<td>2</td>
</tr>
<tr>
<td>Lower respiratory infections</td>
<td>1,705</td>
<td>3</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>1,321</td>
<td>4</td>
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<tr>
<td>Interpersonal violence</td>
<td>1,267</td>
<td>5</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>1,257</td>
<td>6</td>
</tr>
<tr>
<td>Alzheimer’s disease and other dementias</td>
<td>1,050</td>
<td>7</td>
</tr>
<tr>
<td>COVID-19</td>
<td>988</td>
<td>8</td>
</tr>
<tr>
<td>Road injuries</td>
<td>856</td>
<td>9</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>814</td>
<td>10</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 January 3, 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 January 3, 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 January 3, 2022

Figure 7.1. Mean effective R on December 23, 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 8.1. 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 January 3, 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

Brazil

0%
1−9%
10−24%
25−49%
50−74%
75−89%
90−100%
Figure 10.1. Infection-fatality rate on January 3, 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 January 3, 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 January 3, 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 January 3, 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>Severe disease</th>
<th>Infection</th>
<th>Severe disease</th>
<th>Infection</th>
<th>Severe disease</th>
<th>Infection</th>
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<th>Infection</th>
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<td></td>
<td>Ancestral</td>
<td>Alpha</td>
<td>Beta</td>
<td>Gamma</td>
<td>Delta</td>
<td>Omicron</td>
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<tr>
<td>AstraZeneca</td>
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<td>63%</td>
<td>94%</td>
<td>69%</td>
<td>94%</td>
<td>69%</td>
<td>94%</td>
<td>69%</td>
<td>71%</td>
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<td>62%</td>
<td>66%</td>
<td>62%</td>
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<td>61%</td>
<td>64%</td>
<td>61%</td>
<td>64%</td>
<td>61%</td>
</tr>
<tr>
<td>CoronaVac</td>
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<td>47%</td>
<td>50%</td>
<td>47%</td>
<td>49%</td>
<td>46%</td>
<td>49%</td>
<td>46%</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>
<td>76%</td>
<td>72%</td>
<td>76%</td>
<td>72%</td>
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<tr>
<td>Johnson &amp; Johnson</td>
<td>86%</td>
<td>72%</td>
<td>86%</td>
<td>72%</td>
<td>76%</td>
<td>64%</td>
<td>76%</td>
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<tr>
<td>Moderna</td>
<td>97%</td>
<td>92%</td>
<td>97%</td>
<td>92%</td>
<td>97%</td>
<td>91%</td>
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<tr>
<td>Novavax</td>
<td>89%</td>
<td>83%</td>
<td>89%</td>
<td>83%</td>
<td>86%</td>
<td>82%</td>
<td>86%</td>
<td>82%</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>
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<tr>
<td>Sinopharm</td>
<td>73%</td>
<td>68%</td>
<td>73%</td>
<td>68%</td>
<td>71%</td>
<td>67%</td>
<td>71%</td>
<td>67%</td>
<td>71%</td>
<td>67%</td>
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<tr>
<td>Sputnik-V</td>
<td>92%</td>
<td>85%</td>
<td>92%</td>
<td>86%</td>
<td>89%</td>
<td>85%</td>
<td>89%</td>
<td>85%</td>
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<tr>
<td>Other vaccines</td>
<td>75%</td>
<td>70%</td>
<td>75%</td>
<td>70%</td>
<td>73%</td>
<td>69%</td>
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<td>69%</td>
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<td>69%</td>
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<tr>
<td>Other vaccines (mRNA)</td>
<td>91%</td>
<td>86%</td>
<td>91%</td>
<td>86%</td>
<td>88%</td>
<td>85%</td>
<td>88%</td>
<td>85%</td>
<td>88%</td>
<td>85%</td>
</tr>
</tbody>
</table>

[covid19.healthdata.org](https://covid19.healthdata.org) Institute for Health Metrics and Evaluation
 Percent of the population having received at least one dose (17.1) and fully vaccinated against SARS-CoV-2 (17.2) by January 3, 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.
Projections and scenarios

We produce five 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.
- 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 6 months after their second dose.

The high severity of Omicron scenario modifies the reference scenario assumption in two ways:

- The infection-hospitalization ratio for Omicron is 2.3 times as high as compared to the reference scenario.
- The infection-fatality rate is 4.6 times as high as compared to the reference scenario.

The 80% mask use scenario makes all the same assumptions as the reference scenario but assumes all locations reach 80% mask use within 7 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 6 months.

The reduced vaccine hesitancy scenario assumes that those in each location who respond on surveys that they probably will not receive a vaccine are persuaded or mandated to receive a vaccine.
Figure 21.1. Daily COVID-19 infections until May 01, 2022 for five scenarios

Figure 21.2. Daily COVID-19 reported cases until May 01, 2022 for five scenarios
Figure 21.3. Daily COVID-19 hospital census until May 01, 2022 for five scenarios

Figure 21.4 Reported daily COVID-19 deaths per 100,000
Figure 21.5 Total daily COVID-19 deaths per 100,000
Figure 22.1. 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) [January 7, 2022], Imperial College London (Imperial) [December 13, 2021], the SI-KJalpha model from the University of Southern California (SIKJalpha) [January 4, 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 23.1. 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 24.1. 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.
Brazil

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.