
This section analyzes COVID infections and mortality reported to local, federal and intergovernmental agencies, and are heavily influenced by testing rates and differences in government reporting standards and capabilities. Serology tests suggest that the true number of COVID infections may be much higher than the number of reported infections. However, trends in reported infections are still important to monitor, since they influence government policy and the behavior of citizens and companies.

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Comments on infection data. Several countries show up with almost no COVID outbreak reported. In cases like New Zealand, Taiwan, Japan, Vietnam and South Korea, we interpret the lack of a material outbreak as possible based on the quality of data reporting and testing. Other countries which report low incidence of COVID include Nigeria, Kenya, Angola, DR Congo, Tanzania and Mozambique. As per various news reports, there’s a shortage of reliable data in many of these countries, and the lack of funds to carry out broad testing. On the other hand, while infections can be obscured, it’s harder to obscure a sharp rise in mortality; even when accounting for some under-reporting of deaths, Africa mortality rates are still much lower than expected. The few antibody surveys conducted in Africa reveal COVID prevalence that is similar to other European countries; in other words, COVID is spreading in Africa as it is elsewhere. The most likely explanation for lower relative mortality is age: Africa’s median age is 18, compared to 35 in North America and 42 in Europe. Since those over age 65 experience 80% of COVID mortality, age distributions are the most likely reason for lower African COVID mortality rates.

On data sources. We generally use infection and mortality data from Johns Hopkins, with any exceptions noted in chart sources. While JHU data usually match sources such as covidtracking.com and Worldometers, this is not always the case. Any large differences usually work themselves out over time; even so, such differences are a warning against over-extrapolating any short term trends seen in the data. There are also patterns in some countries in which tests and infections drop over the weekend, only to rise the following week. Other anomalies: countries and US states sometimes make large one-time additions or subtractions to infections or deaths data to reflect over- or underestimations made over the course of the entire pandemic. JHU and other data providers do not amortize such adjustments over time and simply reflect them on the day they are made; we do the same.

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COVID from an investor’s perspective: the Delta variant, vaccination and the developed vs developing world

One reason for thinking that the Delta variant impact on developed economies and markets will be manageable: with vaccination rates at 50% and rising, their governments should be able to avoid reimposing substantial restrictions. While Delta infections may spike in the developed world, the pass-through to hospitalization and mortality should remain low due to the effectiveness of vector and mRNA vaccines, and due to the lower age of newly infected unvaccinated persons. Even if there are outbreaks of unvaccinated mortality in the US, I do not expect much to be done about them.

To synthesize DM and EM trends from an investor’s perspective, we plot country COVID mortality trends vs the throw-weight of each country in the global economy (the sum of its trade, foreign direct investment and net portfolio inflows). While some EM countries are experiencing sharp rises in mortality, they generally have a small weight in global economic activity; Brazil and Russia are the exceptions, although now Indonesia and Malaysia are showing rising mortality as well. EM economies have been incubation zones for more damaging variants, but so far existing vaccines have shown substantial (but not complete) effectiveness in preventing hospitalization and mortality when such variants arrive.

COVID mortality trend, Globalization indicator and vaccination level

Daily COVID deaths per mm, 7 day avg


Regional vaccination rates

Unique people vaccinated as % of population

Summary of infection and mortality trends by region

While infections are soaring in the UK, the Netherlands, Spain and some US Hotspot states, their mortality rates remain low due to high levels of vaccination. The primary COVID mortality risks remain in the developing world due to the Gamma variant in South America, and the Delta variant in the Russia region, Southern Africa and Southeast Asia (Indonesia, Malaysia, Thailand, etc).

Vaccination, mortality and infection trends by region

Mortality per million people, 7 day avg; percentage = unique people vaccinated as % of population

Source: Johns Hopkins University, IMF, JPMAM. July 20, 2021.

Developed regions

Source: JHU, IMF, JPMAM. Jul 20, 2021. 7 day smoothing.

Global hotspots

Daily infections, # per mm, smoothing = 7 days

Source: Johns Hopkins University, IMF, JPMAM. Jul 20, 2021.

EM ex China, India & Africa

Source: JHU, IMF, JPMAM. Jul 20, 2021. 7 day smoothing.

World

Source: JHU, IMF, JPMAM. Jul 20, 2021. 7 day smoothing.
What’s new: In the US, COVID risks among the unvaccinated

- US infections, hospitalizations and mortality had breached summer 2020 lows but are rising again
- Delta variant hotspot states have higher infection rates, and now hospitalizations are rising as well
- US vaccinations now eclipsed by UK, Europe, China and Canada
- Among the largest 15 states, only Washington has similar hospitalizations to summer 2020

**US**

![Graph showing daily infections, hospitalizations, and deaths per million people in the US from February 2020 to June 2021.](Source: JHU, IMF, HHS, JPMAM. Jul 20, 2021. 7 day smoothing.)

**US hotspot states**

Daily infections, # per mm, smoothing = 7 days

![Graph showing daily infections in hotspot states compared to other US states from February 2020 to June 2021.](Source: Johns Hopkins University, IMF, JPMAM. Jul 20, 2021.)

**Country/Region vaccination rates**

Unique people vaccinated as % of population

![Graph showing vaccination rates in various countries and regions as of July 2021.](Source: OWID, JPMAM. July 20, 2021.)

**Current hospitalization levels vs summer 2020 average**

15 largest states

![Bar chart showing current hospitalization levels as a percentage of summer 2020 average for the 15 largest states.](Source: HHS, IMF, JPMAM. July 20, 2021.)
What’s new: Europe

- UK COVID stats had collapsed, but India variant now leading to an increase in infection. So far, not much of an increase in mortality or hospitalization since 96% of people over 50 are vaccinated (see Section 1)
- Delta variant now showing up in Continental Western Europe and leading to an increase in infection in Netherlands, Spain, Belgium, France, Portugal, etc; however, hospitalizations are still falling and there is no rise at all in mortality
- “Sweden model” failed (again)

United Kingdom

Source: JHU, IMF, OWID, JPMAM. Jul 20, 2021. 7 day smoothing.

W Europe

Current hospitalizations, # per mm, smoothing = 7 days


W Europe

Daily deaths, # per mm, smoothing = 14 days

Source: Johns Hopkins University, IMF, JPMAM. Jul 20, 2021.

Scandinavia

Daily infections, # per mm, smoothing = 7 days

Source: Johns Hopkins University, IMF, JPMAM. Jul 20, 2021.
**What’s new: South America, Central America, India region, Caribbean**

- LatAm is still the worst global hotspot of infection and mortality, although case counts have been declining from very high levels; mortality should follow.
- February 2021 reports of high seroprevalence levels in India were wildly inaccurate and another example of useless and premature COVID risk assessments/forecasting. India infections are rolling over; but vaccinations are still low, and there are widespread reports of COVID undercounting.
- Cuba now has one of the highest COVID infection rates in the world.

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**South America**
Daily infections, # per mm, smoothing = 7 days

![South America infection chart](source)

**South America**
Daily deaths, # per mm, smoothing = 14 days

![South America death chart](source)

**India region**
Daily infections, # per mm, smoothing = 7 days

![India region infection chart](source)

**India region**
Daily deaths, # per mm, smoothing = 14 days

![India region death chart](source)

**Central America**
Daily infections, # per mm, smoothing = 7 days

![Central America infection chart](source)

Source: Johns Hopkins University, IMF, JPMAM. Jul 20, 2021.
What’s new: Asia, Eastern Europe and Russia

- Infections remain low in Developed Asia, although the Delta variant is driving numbers higher
- Malaysia, Thailand and Indonesia seeing infection spikes and rising mortality as well due to low vaccination
- Eastern European infections rolling over sharply after winter surge, but Russia region infections rising again

**Developed Asia**
Daily infections, # per mm, smoothing = 7 days

**EM Asia**
Daily infections, # per mm, smoothing = 7 days

**E Europe**
Daily infections, # per mm, smoothing = 7 days

**Russia region**
Daily infections, # per mm, smoothing = 7 days

**Russia region**
Daily deaths, # per mm, smoothing = 14 days

Source: Johns Hopkins University, IMF, JPMAM. Jul 20, 2021.
What’s new: MidEast, Africa

- Israel COVID stats had collapsed but India variant now leading to an increase in infection despite a 66% vaccination rate. So far, not much of an increase in mortality or hospitalization.
- Delta variant now ripping through Africa. Vaccination rates across the continent are still less than 5%, and natural immunity provides less protection against the Delta variant.
- Southern Africa infections rising more quickly than in Northern Africa based on reported data. While reported infections in Africa are lower than in India/LatAm, there are questions about reliability of African data and many of its healthcare systems are less equipped to handle the increase in sick patients.

Source: Johns Hopkins University, IMF, JPMAM. Jul 20, 2021.
COVID at a glance: infections and mortality per mm in the developing world

Normally we show infection and mortality data in linear terms. But when comparing across the Emerging World right now, the dispersions are too great to properly grasp on a linear basis so we use a log scale instead. As a reminder, on a log scale each increment represents an increase of 10x vs the prior value. Currently, the COVID situation in Latin America is 10x or 100x worse than what is being reported elsewhere in the Emerging World. To be clear, there are substantial uncertainties regarding the accuracy of COVID infections and deaths reported in some countries; this chart shows the data as reported by Johns Hopkins.

Latest 7 day infection and mortality trends in Africa, EM Asia, S America, C America, M East, E Europe

Mortality per million people, log scale

Source: Johns Hopkins University, IMF, JPMAM. July 20, 2021.
Infection, mortality and hospitalization snapshots

The two charts below show the current rates of infection (top chart) and mortality (bottom chart) compared to the rate 21 days ago for the 50 largest countries in the world based on GDP. These countries represent 94% of global GDP.

**Infection levels for the largest 50 countries based on GDP**
Sorted by trailing 7 day average infection rate per mm people

**Mortality levels for the largest 50 countries based on GDP**
Sorted by trailing 7 day average mortality rate per mm people

Source: Johns Hopkins University, IMF, JPMAM. Countries shown represent 94% of World GDP. July 20, 2021.
The charts below show current rates of infection (first chart), mortality (second chart) and hospitalization (third chart) compared to the rate 21 days ago for the 50 US states and DC.

**Infection levels for US states**
Sorted by trailing 7 day average infection rate per mm people

**Mortality levels for US states**
Sorted by trailing 7 day average mortality rate per mm people

**Hospitalization levels for US states**
Sorted by trailing 7 day average current hospitalizations per mm people

Source: Johns Hopkins University, IMF, JPMAM. July 20, 2021.
US at a glance: testing data

The charts below track infection, hospitalization, testing and mortality data for the US in aggregate. See section 3 for a state-by-state chartpack which covers the full range of infection, hospitalizations and mortality.

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2 40 states report the total number of “testing encounters” or “testing specimens”; the rest show the number of people tested each day that have never been tested before or include untested probable cases. We only compute testing rates for the 40 states that provide encounter or specimen data.
How lethal is COVID, and for whom?

Let’s first compare it to the flu. A key issue to keep in mind: there’s a difference between case fatality rates (deaths as a % of reported cases) and infection fatality rates (deaths as a % of all infected people, whether symptomatic or not). The latter can only be derived through antibody testing and other sampling methods involving molecular assessments of infection. The IFR of the seasonal flu is reported to be well below 0.1% with other estimates ranging from 0.02% to 0.04%. In contrast, the IFR for COVID has been estimated at 0.23% by Stanford’s MetaResearch Innovation Center, and at 0.7%-0.9% by the CDC. Either way, COVID is significantly more lethal than the seasonal flu. Tracking “excess” abnormal death levels is another way to understand the incremental mortality impact of COVID (see second chart). In addition to higher mortality than the flu, COVID also appears to entail more longer-lasting medical complications (see web portal section 5).

Mortality by age in the US

The first section in the table below shows the distribution of US COVID deaths by age bracket. People over the age of 85 represent around 1/3 of all COVID fatalities to-date. However, the number of people over age 85 is much smaller than other age cohorts; as a result, fatality risks are much greater for people in this age group. The second section reflects this by showing deaths to date per mm people in each age bracket (you can divide one number by another to obtain relative mortality probabilities). The third section looks specifically at mortality risk across age brackets relative to older populations. For example, a person aged 55-64 is only around 12% as likely to die from COVID compared to someone over the age of 75, and only around 7% as likely to die as someone over the age of 85. Differences across states are generally minor.

### DISTRIBUTION OF ACTUAL MORTALITY: Mortality to-date by age group, % of total mortality

<table>
<thead>
<tr>
<th>United States</th>
<th>&lt; 1 yr</th>
<th>1-4 yrs</th>
<th>5-14 yrs</th>
<th>15-24 yrs</th>
<th>25-34 yrs</th>
<th>35-44 yrs</th>
<th>45-54 yrs</th>
<th>55-64 yrs</th>
<th>65-74 yrs</th>
<th>75-84 yrs</th>
<th>&gt; 85</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1 yr</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.2%</td>
<td>0.7%</td>
<td>1.9%</td>
<td>5.1%</td>
<td>12.7%</td>
<td>22.3%</td>
<td>27.4%</td>
<td>29.7%</td>
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<tr>
<td>1-4 yrs</td>
<td>0.0%</td>
<td>0.0%</td>
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<td>0.4%</td>
<td>1.0%</td>
<td>2.8%</td>
<td>6.7%</td>
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<td>38.2%</td>
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<tr>
<td>5-14 yrs</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.4%</td>
<td>0.6%</td>
<td>1.8%</td>
<td>5.0%</td>
<td>11.9%</td>
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<td>15-24 yrs</td>
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<td>25-34 yrs</td>
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<td>35-44 yrs</td>
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<td>45-54 yrs</td>
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<td>55-64 yrs</td>
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<td>65-74 yrs</td>
<td>22.3%</td>
<td>6.7%</td>
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<td>75-84 yrs</td>
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### MORTALITY RATES FOR EACH AGE BRACKET: COVID deaths to-date per mm population in each age group

<table>
<thead>
<tr>
<th>United States</th>
<th>&lt; 1 yr</th>
<th>1-4 yrs</th>
<th>5-14 yrs</th>
<th>15-24 yrs</th>
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<th>55-64 yrs</th>
<th>65-74 yrs</th>
<th>75-84 yrs</th>
<th>&gt; 85</th>
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<tr>
<td>&lt; 1 yr</td>
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<td>3</td>
<td>3</td>
<td>24</td>
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<td>267</td>
<td>750</td>
<td>1,797</td>
<td>4,238</td>
<td>10,266</td>
<td>26,897</td>
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### RELATIVE MORTALITY RISK: risk of dying across age brackets

<table>
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<tr>
<th>Relative to 85+</th>
<th>&lt; 1 yr</th>
<th>1-4 yrs</th>
<th>5-14 yrs</th>
<th>15-24 yrs</th>
<th>25-34 yrs</th>
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<th>&gt; 85</th>
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<tbody>
<tr>
<td>Relative to 75+</td>
<td>0.1%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.1%</td>
<td>0.4%</td>
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<td>15.8%</td>
<td>38.2%</td>
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<td>Source: CDC, JPMAM. July 10, 2021.</td>
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