
This section analyzes COVID infections reported to local, federal and intergovernmental agencies, and are heavily influenced by testing rates and differences in government reporting standards and capabilities. As we explain in Section 5, serology tests suggest that the true number of COVID infections may be 10x-20x 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.

Highest levels of infection, global and US

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

Infection levels for US states: peak vs current
Sorted by trailing 7 day average infection rate per mm people

Source: Johns Hopkins University, IMF, JPMAM. Countries shown represent 94% of World GDP. Asterisk denotes countries with infection levels over 225 per mm people. September 01, 2020

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.
Regional COVID monitors and risk measures

**World infections**
New daily infections per mm people, 7 day avg

![Graph showing world infections](source)

**US vs Europe infections**
New daily infections per mm people, 7 day avg

![Graph showing US vs Europe infections](source)

**World COVID risk index**
Population weighted vs GDP weighted

![Graph showing world COVID risk index](source)

**US COVID risk index**
Population weighted vs GDP weighted

![Graph showing US COVID risk index](source)

Risk index factors: infection level, infection decline from prior peak, trend in cases vs prior month, daily mortality, trend in mortality vs prior month and % of positive tests. Range: 0-10.
Source: JHU, Our World in Data, JPMAM. 09/01/2020.
How are second waves of infection different?

There are second waves of infection showing up in Europe and also in the US. The key difference: second waves tend to be accompanied by much lower levels of mortality than the first time around. One possible explanation: as shown below, the age distribution of more recent infections skews much younger (example below is for Switzerland; most countries do not publish this information on a timely basis).

Michigan new daily infections vs mortality per mm

Illinois new daily infections vs mortality per mm people

Europe new daily infections vs mortality per mm people

Spain new daily infections vs mortality per mm people

Switzerland new daily infections vs mortality per mm

Switzerland first wave vs second wave

Distribution of COVID infections by age group

Source: JHU, Our World in Data, JPMAM. 09/01/2020.
The Mess in the US (see note below for explanation of Hotspot states\(^1\))

\(^1\) We dynamically define hotspot states in two ways: the largest one-month increase in new daily infections per mm people, and states with the most persistent, rising infection rates per mm people.
Hotspots: HI IL ND MO IN MT AK SD IA KS KY
New daily infections per mm


United States virus tracking
New daily infections per mm


Infections by state category
US new daily infections per mm people, 7 day avg

Source: Johns Hopkins University, IMF, JPMAM. September 01, 2020

Hospitalizations by state category
US current hospitalizations per mm people, 7 day avg

Source: COVID Tracking Project, IMF, JPMAM. September 01, 2020

Mortality by state category
US daily deaths per mm people, 7 day avg

Source: Johns Hopkins University, IMF, JPMAM. September 01, 2020

Testing by state category
US daily tests per mm people, 7 day avg

Source: Johns Hopkins University, IMF, JPMAM. September 01, 2020
Why aren’t US infections declining more rapidly?

The US does not have internal border controls; as a result, focusing too much on infections at the state level ignores the ease with which US citizens cross state lines. As shown below, former Hotspot states have now transmitted the infection to new Hotspot states.

**Without border controls, Hotspots keep shifting**
(red states indicate current Hotspots, arrows begin at Hotspots one month prior)

![Image of US map showing the shift of Hotspots](image)

Source: JHU, JPMAM, August 2020

**State reopening charts**

The charts on the following pages show 7-day infection trends per mm people with the % of positive tests, and current hospitalizations per mm people. “Reopening date” is defined as the official end of stay-at-home orders; in some states the reopening was restricted to certain sectors, while in others it was more broad-based. The top 33 states shown represent ~93% of US GDP and population.

The colors on the charts denote some simple tests we apply.

*Infections.* Test 1: Positive testing rate below 5%. Test 2: infection levels below 25 per mm or a 15% decline from levels 2 weeks prior. Two passes: green; One pass: purple; No passes: red.

*Hospitalizations.* Test 1: Hospitalizations below 100 per mm or a 15% decline from levels 2 weeks prior. Test 2: Hospitalizations below 50 per mm. Two passes: green; One pass: purple; No passes: red.
33 largest states: reopening dates, infections and hospitalizations

- **California virus tracking**
- **Texas virus tracking**
- **New York virus tracking**
- **Florida virus tracking**
- **Illinois virus tracking**
- **Pennsylvania virus tracking**
- **Ohio virus tracking**
- **New Jersey virus tracking**
- **Georgia virus tracking**
- **Washington virus tracking**
- **Massachusetts virus tracking**
- **North Carolina virus tracking**
- **Virginia virus tracking**
- **Michigan virus tracking**
- **Maryland virus tracking**
Sources: COVID Tracking Project, Census Bureau, Ballotpedia, JPMAM, August 2020.
**Hospital and ICU bed utilization rates by state**

The Department of Health and Human Services (HHS) now publishes hospital bed and ICU bed utilization rates for each state. While current utilization rates appear high, for context, it’s necessary to look at each state’s excess utilization by comparing current rates to historical averages. In addition to current utilization rates, below we show 2018 average hospital bed and ICU bed utilization rates for each state sourced from a comprehensive study published by the University of North Carolina.

**Hospital bed and ICU bed utilization rates**

Sorted by hospital bed utilization rate

![Graph showing hospital and ICU bed utilization rates by state](image)


**Distribution of infections to date by age for select states**

The table below illustrates the distribution of infections by age group for the 9 largest states by GDP for which frequently updated data is available. Many states do not publish a breakdown of infections by age on their state health pages. While this is not an exhaustive list, the table shows some level of consistency in the distribution of infections by age. Since the “Under 50” group represents the largest population, it is unsurprising that this age group is facing the greatest proportion of total infections. The table on the right shows the number of infections adjusted for population bracket size.

<table>
<thead>
<tr>
<th>Distribution of COVID infections by age group</th>
<th>Cumulative COVID infections per mm in each age group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 50</td>
<td>50-64</td>
</tr>
<tr>
<td>California</td>
<td>70%</td>
</tr>
<tr>
<td>Texas</td>
<td>65%</td>
</tr>
<tr>
<td>Florida</td>
<td>64%</td>
</tr>
<tr>
<td>Virginia</td>
<td>67%</td>
</tr>
<tr>
<td>Ohio</td>
<td>61%</td>
</tr>
<tr>
<td>Washington</td>
<td>67%</td>
</tr>
<tr>
<td>Michigan</td>
<td>44%</td>
</tr>
<tr>
<td>Colorado</td>
<td>67%</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>69%</td>
</tr>
</tbody>
</table>

Source: State department of health. September 01, 2020. Texas demographic information is underreported due to ongoing case investigations.
Infections in the Developed World (all charts scaled to 200 per mm people)

Western Europe infections
New daily infections per mm people, 7 day avg

Scandinavia infections
New daily infections per mm people, 7 day avg

Anglosaxon infections
New daily infections per mm people, 7 day avg

Developed Eastern Europe infections
New daily infections per mm people, 7 day avg

Developed Asia infections
New daily infections per mm people, 7 day avg

Source: Johns Hopkins University, IMF, JPMAM. September 01, 2020
Infections in the Developing World (all charts scaled to 200 per mm)

EM World infections
New daily infections per mm people, 7 day avg

EM World infections
New daily infections per mm people, 7 day avg

Source: Johns Hopkins University, IMF, JPMAM. September 01, 2020

Latin America infections
New daily infections per mm people, 7 day avg

Latin America infections
New daily infections per mm people, 7 day avg

Source: Johns Hopkins University, IMF, JPMAM. September 01, 2020

Emerging Asia infections
New daily infections per mm people, 7 day avg

Emerging Asia infections
New daily infections per mm people, 7 day avg

Source: Johns Hopkins University, IMF, JPMAM. September 01, 2020

Other EM infections
New daily infections per mm people, 7 day avg

Other EM infections
New daily infections per mm people, 7 day avg

Source: Johns Hopkins University, IMF, JPMAM. September 01, 2020

Africa infections
New daily infections per mm people, 7 day avg

Africa infections
New daily infections per mm people, 7 day avg

Source: Johns Hopkins University, IMF, JPMAM. September 01, 2020

Emerging Europe infections
New daily infections per mm people, 7 day avg

Emerging Europe infections
New daily infections per mm people, 7 day avg

Source: Johns Hopkins University, IMF, JPMAM. September 01, 2020

Coronavirus

Source: Johns Hopkins University, IMF, JPMAM. September 01, 2020
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