

How to read COVID-19 Data

by Vicert

What is

The test <p>There are two types of tests: molecular and antibody. They test if you currently have the virus, or have developed resistance to it respectively. Overall growth in molecular testing means that more tests are being done, and that the governing body should have a better idea of the infection rate of a population.</p>	The positive test rate <p>The proportion of all molecular tests that come back positive. Assuming consistent testing, this metric translates to disease spread: a growing positivity rate means that the virus is spreading faster, the inverse is true as well. Beware: an extremely high positivity rate could indicate that a place is only testing the sickest people. The more people get tested, the more accurate the positivity rate.</p>	Bed capacity <p>The number of occupied beds is a good indicator of how much strain is being put on the healthcare system. It is also useful for understanding the disease at large, since the number of hospitalized patients helps give an idea of how rampant the disease is in the population.</p>
The basic reproduction number, R0 <p>A metric that shows how infectious a person is. If the R0 is higher than 1, the outbreak is expected to continue, since an infected person will pass the disease on to more than 1 person. If each infected person gives the virus to more than one other person, that can indicate that an outbreak is getting worse.</p>	Proportionality <p>Does Covid-19 impact all groups equally? No. Data shows us that the elderly are disproportionately affected, along with lower-income people, and BPOC. You can tell if infection is proportionate if the infection rate across groups are comparable, or if the proportion of sick people in the group matches the proportion of the group in the population.</p>	The doubling rate <p>How fast the cases are growing. The lower the doubling rate, or how many days it takes for the number of coronavirus cases/hospitalizations/deaths to double, the faster the spread of the virus. It is possible to have a net increase in cases, yet a slower doubling rate.</p>
Flattening the curve <p>The effort to not overwhelm the healthcare system. It is meant to distribute the caseload along a longer stretch of time to ensure that every sick person has access to care (and to avoid the healthcare system needing to send people back since they're saturated). It does not mean getting less people sick in total (the area under the curve stays the same).</p>	The cumulative total <p>The running total of all test results, deaths, hospitalizations, etc. This number will never decrease.</p>	A rolling average <p>An average of the last 7-14 days that is recalculated daily. It is meant to standardize the last 2-week period of time and give a more reliable idea of what cases are like at the moment.</p>
The invisible infections <p>These people were infected but asymptomatic. They may or may not have continued to spread the disease unconsciously. These people will be the last cases to be tested, most likely bringing up overall infection rates, but bringing down the proportion of dangerous cases.</p>	The Cold Catchers <p>These people were infected and got sick, but not sick enough to be hospitalized. These people would have probably spread the disease less than the invisible infections. They may or may not be tested, depending on their home's testing policies. When counted, they will likely increase the overall infection rate, but decrease the proportion of dangerous cases.</p>	Covid in the hospital/ICU <p>These are dangerous cases. The vast majority of these individuals have been tested, and contribute to the data showing that the virus is very dangerous, high danger of the virus.</p>

Different types of infected people

And what they mean for the data

Lines to follow



Cumulative Totals

The cumulative totals of confirmed cases and deaths: the steeper the slope, the faster the growth

Overall Trend

This line is a rolling average of typically the previous 7 or 14 days that seeks to eliminate daily discrepancies. This line is where you will see a "flatter curve".

Questions to ask

How many people are being tested compared to how many cases there are?
If there was a boom in testing, a boom in cases is not surprising. Conversely, low testing will result in low cases. You will want to look for how many tests are being done per million citizens.

What counts as a Covid death?
The CDC urges coroners and medical examiners to list COVID-19 as a cause or underlying factor of death on a death certificate. This being said, a Covid-positive person that died of a bus accident would not be counted as Covid death.

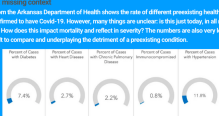
How are people collecting data?
Testing methods vary far and wide. Certain places reserve tests for those who have presented with symptoms to their doctor and have received an order to get tested, whereas other places have free testing sites for anybody who wants one. These policies will obviously impact the positive test rate.

How do you compare areas?
Look at infection rates per x residents. Logically, a place with a couple million people will have more cases than a place with a couple thousand. However this does not necessarily mean that the bigger place is more infected. Looking at infection per a certain number of residents (keep in mind how many people have been tested) will standardize the data.

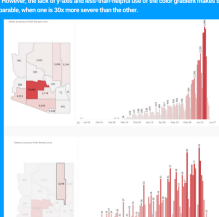
What about contact tracing?
Contact tracing is when an infected person reports all the people they could have potentially come into contact with. This data helps find more potential cases and track how infectious a disease may be. Contact tracing is happening in some parts of the US, but is not widespread.

Some examples

Beware of: missing context
This data from the Arkansas Department of Health shows the rate of different preexisting health conditions in patients confirmed to have Covid-19. However, many things are unclear: is this just today, in all reported cases in the state? How does this impact mortality and reflect in severity? The numbers are also very low, making them difficult to compare and underplaying the detriment of a preexisting condition.



Beware of: a missing axis
This data from the Arizona Department of Health compares case counts between the whole state and one of its counties. However, the lack of y-axis and less-than-helpful use of the color gradient makes the two counts appear comparable, when one is 30x more severe than the other.



Look for: good labeling
Washington state has been very intentional about explaining any data they put on their website. In the following example, you can see they have reported the overall positive case percentage along with the amount of tests given on that day. This then speaks to testing capacity and helps give a clearer image of where the state is at. Washington's Health Department also uses very careful and meaningful coloration.



Look for: appropriate graphics
A great example of this is New York State's Covid fatality by race and ethnicity table. It shows a disproportionate fatality rate among communities of color. Oftentimes, websites try and push data into a more "exciting" graphic, when it doesn't necessarily serve the data. One good tip is that pie charts almost never have a place in visual data representation; they're often oversimplified and difficult to translate to compare.

Race/Ethnicity	NYC	NYC Excl. NYC
Hispanic	24% (29% of population)	14% (9% of population)
Black	26% (22% of population)	11% (9% of population)
White	21% (32% of population)	41% (74% of population)
Asian	7% (14% of population)	4% (9% of population)
Other	4% (5% of population)	4% (1% of population)

Read about more data wrong and rights on Quartz's "How bad Covid-19 data visualizations mislead the public"

Websites we love

The Jahn's Hopkins Tracker
coronavirus.jhu.edu/map.html

The CDC's Tracker
<https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html>

For the scientists and enthusiasts: NextStrain
<https://nextstrain.org/ncov/global>

The Covid Tracking Project
<https://covidtracking.com/data>

91-Divoc
<http://91-divoc.com/pages/covid-visualization/>

Worldometer
<https://www.worldometers.info/coronavirus/>

Remember: stay home when you can, wear your mask, and wash your hands!